**附件2**

**重大科技研发专项企业需求类项目榜单**

本次发布的榜单，省内外符合条件且具有研发能力的创新主体均可主动揭榜，经专家论证及技术需求企业(以下简称需求方)和揭榜方对接并达成合作协议后，组织开展相关技术攻关任务，**项目研发经费由需求方提供，省财政资金提供相应研发费用补助。**

****一、揭榜条件****

揭榜方无单位注册时间、地域（省、内外均可）等限制条件，揭榜项目负责人无年龄、学历和职称等门槛要求。揭榜单位应同时符合揭榜的共性条件和单个榜单的个性化要求。

****（一）共性条件****

揭榜方主要为省内外具有研发能力的高校、科研院所、企业、新型研发机构等法人单位，应具备以下基本条件：

1. 具有良好的科研道德和社会诚信，三年之内无违背科研诚信要求的行为记录及需科研部门实施联合惩戒的社会失信行为记录。

（2）具有较强的研发实力、科研条件和团队力量等，有能力完成需求方提出的任务目标。

（3）能提供攻克关键技术的可行性方案。

（4）承诺项目取得的成果在需求方进行转移转化。

（5）需求方及其子母公司不得作为揭榜方，成功对接后可作为合作单位承接转化项目成果。

****（二）个性化要求****

单个榜单的个性化要求，具体详见榜单信息。

**二、揭榜流程及要求**

****（一）工作流程****

**1．材料填报。**揭榜方围绕榜单内容，组织编制项目揭榜方案，并按要求提交申报材料及相关附件。

**2．揭榜论证。**省科技厅组织同行专家对揭榜方的资质条件、揭榜方案的可行性等进行充分论证，根据专家论证结果，向需求方征询意见。

**3．对接磋商。**由需求方与被推荐的揭榜单位进行接洽，并就技术需求、任务目标、项目实施、经费拨付、成果权属及收益分配等细节进行磋商。经双方协商达成一致意见的，由需求方向省科技厅提交同意支持项目立项的意向书；如双方未达成一致意见的，则该榜单废止。

**4．签约立项**。拟立项项目经省科技厅审议、公示后，由省科技厅组织揭榜方、需求方进行签约立项，三方共同签订项目任务书。项目立项后，需求方、揭榜方分别按项目任务书的约定，认真履行各自责任和义务。省科技厅将成功签约的企业作为优质企业向金融机构进行推介，助力企业创新发展。

**5．资金拨付。**揭榜方所需经费由需求方负责拨付。省级财政在项目立项时，给予**需求方**100万元/项的启动经费。揭榜单位完成项目任务后，需求方应及时向省科技厅提出项目综合评价申请。省科技厅委托第三方机构组织有关专家等进行项目评估，经专家组评估通过的，省科技厅按照需求企业对该项目实际投入研发经费总额的20%对需求方进行补助，最高不超过500万元（含立项时拨付的100万元）。

****（二）相关要求****

1．揭榜方、需求方应在技术攻关过程中，应本着实事求是的精神，严格遵循科研诚信、科学伦理等有关规定，坚决杜绝弄虚作假、串通控榜等不良行为发生。相关部门将全程跟踪和监督检查，并严肃追究违规违纪行为人的相关责任。

2．揭榜申报书中的揭榜方案应在榜单要求的预期目标基础上，进一步细化并提出具体、明确的考核指标及考核方式，项目的研究内容不得少于榜单要求的研究内容。

3．提交揭榜申报材料时，无需归口管理单位或属地管理单位推荐，由揭榜方对揭榜申报材料的真实性、完整性、合规性负责。联合揭榜的需提供合作协议作为附件资料一并提交。

4．企业需求类项目实行项目经理人负责制。在坚持张榜和揭榜有效分离的前提下，充分发挥需求企业的保障作用，在需求企业中明确一名负责人作为**项目经理人**，主动跟踪服务揭榜攻关全过程，对项目实施过程中揭榜方提出的技术路线调整、项目人员选配、经费开支使用等方面问题提供支持和服务。

附：榜单选题

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| --- |
| **附****重大科技研发专项企业需求类榜单** |
| **序号** | **行业领域或产业链** | **重大技术需求****（难题）题目** | **技术需求单位** | **需求企业承诺投入研发资金（万元）** | **承诺支付揭榜单位研发资金（万元）** |
| 1 | 电子信息 | 晶圆级光学组件纳米压印的设计与加工 | 江西省欧迈斯微电子有限公司 | 5000 | 500 |
| 2 | 电子信息 | 汽车智能网联与控制印制电路关键技术研究 | 赣州市深联电路有限公司 | 3000 | 300 |
| 3 | 电子信息 | 高弹性接入型光传送网（OTN）设备研究 | 江西山水光电科技股份有限公司 | 2460 | 1200 |
| 4 | 装备制造 | 采用可降解合成脂油的大容量水电解制氢整流变压器技术研究 | 江西变压器科技股份有限公司 | 1290 | 110 |
| 5 | 装备制造 | 基于深度学习的果蔬多频段全景视觉识别分选技术研究 | 江西绿萌科技控股有限公司 | 2000 | 1000 |
| 6 | 装备制造 | 小口径、厚壁高强度精密焊管成型机组研究 | 江西福事特液压股份有限公司 | 1500 | 1000 |
| 7 | 新材料 | 线路瓷绝缘子用高可靠性瓷件制备关键技术研究 | 中材江西电瓷电气有限公司 | 2500 | 2500 |
| 8 | 新材料 | 阳极泥中有价金属的绿色高效回收关键技术研究 | 贵溪市鑫浩泰环保科技有限公司 | 600 | 300 |
| 9 | 新材料 | 高精高效微晶磷铜球全自动产线关键技术研究 | 江西保太有色金属集团有限公司 | 1200 | 500 |
| 10 | 新材料 | 基于再生铝的新能源汽车高强韧免热处理铸造铝合金及制备关键技术研究 | 江西万泰铝业有限公司 | 2200 | 200 |
| 11 | 新材料 | 新型无锂耐热陶瓷材料技术研究 | 江西帮企陶瓷股份有限公司 | 2400 | 600 |
| 12 | 新能源 | “双碳”背景下源网荷储一体化系统综合配置策略关键技术研究及系统研究 | 中国电建集团江西省电力设计院有限公司 | 500 | 100 |
| 13 | 新能源 | 多源智能微电网供电系统开发及其关键技术研究 | 江西清华泰豪三波电机有限公司 | 700 | 300 |
| 14 | 航空 | 直升机轻量化用纳米均匀弥散增强铝基复合材料关键技术研究 | 北京通用航空江西直升机有限公司 | 520 | 100 |
| 15 | 绿色食品 | 蔓三七降尿酸药食健康新产品研发与产业化 | 江西蔓三七健康科技有限公司 | 500 | 200 |
| 16 | 绿色食品 | 植物甾（烷）醇酯高效制备及其应用关键技术 | 宜春大海龟生命科学有限公司 | 1000 | 100 |
| 17 | 绿色食品 | 带骨白羽鸡肉熟化前淤血防控技术攻关与产品研制 | 江西圣农食品有限公司 | 1200 | 160 |
| 18 | 绿色食品 | 罗城扎粉生产工艺的标准化及绿色安全装备改进 | 江西锦江酒业有限责任公司 | 500 | 200 |
| 19 | 生物医药 | 3类新药厄贝沙坦氨氯地平片的Ⅲ期临床试验研究 | 江西施美药业股份有限公司 | 1100 | 1100 |
| 20 | 生物医药 | 接触式激光光纤及刀头能量转换技术的研究与应用 | 江西麦帝施科技有限公司 | 2600 | 200 |
| 21 | 中医药 | 鲜竹沥传统炮炙工艺关键装备与质量控制技术研发 | 江西仁安药业有限公司 | 1500 | 600 |
| 22 | 中医药 | 樟树中药炮制技艺标准的制定 | 江西樟树天齐堂中药饮片有限公司 | 1600 | 300 |
| 23 | 节能环保 | 芳烃吸附剂自动化关键技术研究 | 江西八六三实业有限公司 | 2000 | 2000 |
| 24 | 房地产建筑 | 波形钢骨组合剪力墙住宅智能建造成套技术 | 中阳建设集团有限公司 | 3000 | 500 |
| 25 | 节能环保 | 天然纤维面料改性及前处理用多效复合酶的研究 | 江西恩达麻世纪科技股份有限公司 | 500 | 100 |

**“揭榜挂帅”企业重大技术需求榜单（1）**

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| --- | --- | --- | --- |
| 所属产业领域或产业链 | 虚拟现实/Virtual Reality VR | 细分方向 | 晶圆级光学组件/wafer-level optical element  |
| 重大技术需求项目名称 | 晶圆级光学组件纳米压印的设计与加工/Design and fabrication of wafer-level optical element using Nano imprint lithography |
| 技术需求提出企业 | 江西省欧迈斯微电子有限公司/Jiangxi OMS Microelectronics Co.,Ltd. |
| 技术需求牵头企业联系人 | 姓名 | 何静/Gena He | 职务 | 总裁助理/ CEO assistant | 手机：18317915105 | 邮箱：Gina.He@omsmicro.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 舜宇光电/Sunny Optical Technology (Group） Company Limited | □龙头企业√骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 |  | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 晶圆级光学组件（WLO）是指利用半导体工艺在基片晶圆上产生微纳结构而制成的光学组件，即利用晶圆级光学集成制造技术工艺，同时制作数以千计的微纳米等级光学组件，主要包括光学扩散片（Diffuser）、光学衍射元件（DOE）、超薄光学指纹微透镜数组（MLA）、超构透镜 (Meta-Lens)、超构表面 (Meta-Surface)、多光谱滤光片（Multi-Spectral filter）等等。从而将光学相关产品的应用范围从毫米缩小到纳米，随着结构尺度缩小，光学物理特性也发生改变，从传统的几何光学，发展到衍射光学、纳米光学以及等离子光学(Meta-Surface)，带来了颠覆性的新光学特性。WLO产品的应用场景主要有以下几方面：穿戴产品包括手机的人脸辨识、光学指纹辨识以及AR眼镜；家用产品包括扫地机器人与物联网家用电器；车用产品包括HUD、车用感测组件；生物检测与精密光学产品包括生物医疗检测芯片、胶囊镜头、超构表面与超构透镜等等。这些硬件设备能促进VR/AR等光电产业的不断发展，能够补齐我省在该方面产业链的不足，提升可控能力，推动产业升级。目前，WLO的量产工艺可分为直接光刻与纳米压印两种。纳米压印制造方式具备许多优势：在制程方面，能快速且大量生产，使得组件制作成本大幅降低,提高附加价值；在组件方面，具备轻巧、高稳定性、高可靠度、高精确度等特点，可提升组件性能。近年来世界各国对于微纳米组件的设计、制造与微系统的应用与整合相当重视，也使得此技术成为目前科技发展的主流趋势之一。最新报道纳米压印技术已制作出5纳米的线宽，大幅提高了制作纳米组件的可行性。目前在衍射组件与AR眼镜的光波导技术将大量使用纳米压印技术进行量产。Wafer Level Optics(WLO) enables the design and manufacture of miniaturized optics at the wafer level using advanced semiconductor-like techniques. Wafer-level optics imprint technology is suitable to realize such a microscopic/nanoscopic optics designs in a very cost-efficient way, and is easily scalable from prototype of thousands of optical elements, mainly including optical Diffuser, Diffractive optical element(DOE), Microlens array(MLA), Meta-Lens, Meta-Surface, Multi-Spectral filter, etc. Thus, the size range of optical-related products is reduced from millimeters to the nanometer. With the decrease of structural element size, the optical physical properties are also different. The traditional geometric optics has been changed into diffraction optics, nano-optics, and meta-surface, which brings new optical properties. The application scenarios of WLO products mainly include the following aspects: face recognition, optical fingerprint recognition, and AR glasses of mobile phones in wearable products, household products include sweeping robots and Internet of Things household appliances; vehicle products including HUD (Head-Up Display), vehicle sensing components; biological detection and precision optical products including biomedical detection chip, capsule lens, hypersurface, and hyperlens, etc. These hardware devices continue to promote the development of the next generation of virtual reality (VR/AR), and supplement and upgrade the industry chains.Currently the scale production process of WLO include direct-write lithography and nano imprint lithography. Nano imprint manufacturing has many advantages in terms of process and components. It can be quickly mass-produced, which greatly reduces the production cost of components and brings new value. And it has the advantages of lightweight, high stability, high reliability, and high accuracy, which can improve the performance of components. In recent years, more and more countries have attached great importance to the research of micro-nano optical technology. The design and manufacture of micro-nano components, and the application and integration of micro-systems have become important industries globally. Nano imprinting technology has been reported to have a line width of 5 nm, which will greatly improve the feasibility of fabricating nano assembly. Nano imprint technology will be widely applied for mass production in the optical waveguide technology for diffraction assembly and AR glasses.  |
| 技术难题概述 | 纳米压印量产工艺技术含量高，目前核心技术主要掌握在国外。纳米压印的关键技术有些是卡脖子的技术，主要包括以下三点：1.高折射率材料：压印产品使用的高折射率材料(RI 1.7以上)，主要集中在海外厂商，比如DELO、INKRON、NTT等。国内无商用化的材料，依赖进口,市场上的高折射率材料少且多数掌控在海外厂商。2.压印母版制作：母模的制作是纳米压印的核心关键工序，对于线宽的分辨率、刻蚀深度的均匀性方面都有很高的要求，例如DOE元件用到的母模，需要8寸的wafer，线条分辨率在0.13um以下。母模的加工通常有激光直写、电子束直写、半导体光刻等方式，需要较昂贵的设备来进行加工。加工厂商主要集中在海外，主要有Scivax、NILT等等。这一方面的瓶颈在于加工工艺上需要高精度的光刻机与电子束加工，母模制作设备与工艺上均需要提高。3.制程设备：主要是指纳米压印设备，纳米压印机海外厂商有EVG、SUSS、Nanonex等等。纳米压印设备厂商国内较少，且起步较晚、开发周期较长。这一方面瓶颈在于设备成本较高，设备精度与自动化程度需要提升。制造满足消费电子、3D识别（3D sensing）、AR glass、自动驾驶、光纤通讯、激光医疗以及工业激光整形等领域需求的WLO产品，离不开先进的纳米压印技术。目前我们虽然有纳米压印的生产线，但在纳米压印材料、母模制作、纳米压印设备方面存在瓶颈，希望与有识之士、有关单位加强合作，解决我们在实际研发过程中遇到的问题，使WLO产品国产化程度不断提高，填补国内在此领域的空白，加快晶圆级光学组件领域的发展。Mass production of Nano imprint process requires high technology, and is the bottlenecks. The existing key technologies are mainly as follows:1. Materials.

 High refractive index materials (RI>1.7) used in imprint products are mainly controlled in overseas manufacturers, such as DELO, INKRON, and NTT. There is no such commercial material made in China, which is heavily dependent on imports. There are few high-index materials in the market and most of them are controlled by overseas manufacturers.1. Master production.

The production of master mold is the core key process of nanoimprint. It has high requirements on the resolution of line width and the uniformity of etching depth, and the master mold used in DOE components needs 8-inch wafers, and the line resolution is less than 0.13um. Master mold processing usually has laser direct writing, electron-beam direct-write lithography, and semiconductor lithography, which need more expensive equipment to process. Manufacturers are mainly controlled in overseas suppliers, such as Scivax, NILT, and so on. The bottleneck of this aspect are lack of high precision lithography and electron beam processing, and the master mold production equipment and process need to be improved.1. Nanoimprint process equipment

Overseas manufacturers of nanoimprint machines include EVG, SUSS, Nanonex, and so on. Domestic manufacturers lay behind in technology. There are few nanoimprint equipment manufacturers in China, and the development cycle is long. The bottleneck in this aspect is the high cost of equipment, and the accuracy and automation of equipment need to be improved.The advanced nanoimprint lithography technology is essential for the manufacture of WLO products which meet the needs of consumer electronics, 3D sensing, AR glass, automatic driving, optical fiber communication, laser medicine, and industrial laser shaping, together with optical design technology. At present, there are some bottlenecks in nanoimprint lithography technology, including nanoimprint lithography materials, master mold production, and nanoimprint lithography equipment. We hope to strengthen connections with suppliers to solve the problems. |
| 技术攻关后希望达到的预期技术目标 | 需要达成的技术目标分为以下三个方面1.模具制作 针对后续应用技术发展，模具制作上需要与设计配合做优化迭代，针对国内半导体资源在微光学器件制作上资源有限，后续发展将以电子束加工搭配拼接技术达到量产，此技术需要外部公司的协作，才能不受限制与卡脖子，需求结构变异量小于20nm。2.工艺优化纳米压印生产过程不亚于半导体生产工艺，因此控制尺寸精度与量产再现性是需要攻克的一个重要环节，而为了在生产工艺上达到质量与良率提升，需要优化工作模具在连续压印的稳定性与表面处理来降低模具损坏，进而提高量产。需要达到压印次数20次变形量小于3%（假设结构深度1000nm,深度变化小于30nm）。3.材料开发 纳米压印过程中材料主要分别为工作模具材料与压印材料，而高折射率胶材(RI>1.7)主要受制国外，国内已有相关学术研究但未有商用产品，未来在AR眼镜与相关衍射光学上将会应用更多高折射率材料，我们的目标是开发出国产的高折射率材料(RI>1.7)，并在高温高湿与冷热冲击下折射率变异量小于0.1%。The technical goals to be achieved include the following three aspects1. Mold fabrication For the development of the application technology, it is necessary to optimize the mold fabrication in cooperation with design. With limited semiconductor resources in the production of micro-optical devices in China, we need the cooperation with suppliers of electron beam processing to achieve mass production of micro-nano optics with need substrate deformation less than 20nm.2. Process optimizationThe control of dimensional accuracy and mass production reproducibility are very important for the nanoimprint technology. To improve the quality and yield in the production process, it is necessary to optimize the working stamp for continuous imprinting, and reduce the working stamp damage by surface treatment and thus improve mass productivity. It requires 20 impressions with deformation less than 3%.3. Material developmentThe materials in the nanoimprint process are mainly working mold materials and imprint materials, while high-refractive-index adhesives (RI>1.7) are mainly controlled by foreign companies. There have been relevant academic research work in China, but there are no commercial products. More and more high refractive index materials will be needed for AR glasses and related diffraction optics. Our goal is to develop domestic high refractive index materials (RI>1.7) with suppliers. The refractive index variation of high temperature, high humidity and thermal shock is less than 0.1%.  |
| 时限要求 | 以目前架构分三期，预计三年完成第一阶段:对模具制作与设计进行优化与迭代，预估时间2022~2023年。第二阶段:生产工艺上确保质量与良率提升，预估时间2023~2024年。第三阶段:开发高折射率胶材与可靠性验证，预估时间2022~2024年。The program will be executed in three phases, and is expected to be completed in three years.1. The mold fabrication and design optimization and iteration, 2022-2023. 2. Quality and yield improvement in production process, 2023-2024. 3. Development of high refractive index adhesive and reliability verification, 2022-2024. |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 5000 万元。其中：愿意支付揭榜单位研发资金不少于 500 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 与揭榜单位在知识产权、成果管理及合作权益分配等方面问题，需与揭榜单位协商解决。For the intellectual property rights, benefit of cooperation and outcomes, further discussion is needed with the claiming partners. |
| 企业承接转化后预期的经济、社会效益 | WLO在国内还处于快速发展期，市场前景广阔，处于蓝海市场。目前WLO产品规划以Diffuser、DOE以及AR光波导片为主，在2018年~2024年期间，市场规模都将有超过50％以上的成长，是市场预测将会最快成长的方向。根据调研数据，预计2025年在3D Sensing、WLO镜头、车用HUD、AR显示等领域的市场规模将达到915亿美元。其中AR头戴显示设备为727亿美元，AR光波导片占20%成本，约为145亿美元。3D Sensing为150亿美元，按5%的占比计算发射器内DOE，Diffuser产品成本，市场规模为7.5亿美元。AR-HUD抬头显示，目前在高端车型中均有应用，2022年全球HUD市场规模有望增加至24亿美元。通过WLO领域的发展能带动上下游的企业协同发展，形成产业集群，打造新的产业升级点，带动上游的光学设计与光学模具企业，下游的封装、模组企业发展，形成产业链协同，促进经济社会发展。WLO industry is developing rapidly currently in China, with broad market prospects and in a blue ocean market. At present, WLO product planning is mainly based on Diffuser, DOE, and AR optical waveguides. During the period from 2018 to 2024, the market size is expected to grow by more than 50 %, which is the fastest-growing sector in the market forecast. According to survey data, the market in 3D Sensing, WLO lens, vehicle HUD, AR display and other fields are expected to reach 91.5 billion dollars in 2025. Among them, the AR head-mounted display equipment is 72.7 billion dollars, and the AR optical waveguide chip accounts for 20 % of the cost, which is about 14.5 billion dollars. 3D Sensing is 15 billion dollars, and the cost of DOE and Diffuser products in the transmitter is calculated according to the proportion of 5 %, with a market size of 750 million dollars. The rise of AR-HUD (Augmented Reality-Head Up Display) that it is currently used in high-end vehicles, and the global HUD market is expected to increase to 2.4 billion dollars in 2022. In addition to smartphones, 3D Sensing has been widely used in sweeping robots. In addition, with the popularity of consumer AR/VR, ToF technology will be widely used in human-computer interaction gesture recognition. Consumer products and automotive markets will bring 3D Sensing to 15 billion dollars in 2025. The development of WLO industry can promote the collaborative development of upstream and downstream enterprises, form industrial clusters, create new industrial upgrading points, drive the upstream optical design and optical mold enterprises, the downstream packaging, model enterprise development, and in the end promote economic and social development level. |

**“揭榜挂帅”企业重大技术需求榜单（2）**

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| 所属产业领域或产业链 | 电子信息/ Electronic Information | 细分方向 | 电子元器件/ Electronic Components |
| 重大技术需求项目名称 | 汽车智能网联与控制印制电路关键技术研发及产业化/Research on Key Technologies for Automotive Intelligent Networking and Controlling Printed Circuit Boards and Their Industrialization |
| 技术需求提出企业 | 赣州市深联电路有限公司/Ganzhou Sun&Lynn Circuits Co. LTD. |
| 技术需求牵头企业联系人 | 姓名 | 文泽生/Zesheng Wen | 职务 | 技术总监/CTO | 手机：15350291029 | 邮箱：gzslpcb2010@163.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 博敏电子股份有限公司/Bomin Electronics Co. LTD. | □龙头企业■骨干企业■战略性新兴产业企业■高新技术企业□科技型中小企业 |
| 2 | 江苏苏杭电子集团有限公司/Jiangsu Suhang Group Co. LTD. | □龙头企业■骨干企业■战略性新兴产业企业■高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 2022年以来，受疫情与俄乌战争的影响，全球汽车市场总体呈现萎缩状态。但是，新能源汽车却一枝独秀，其中比亚迪汽车第一季度以增长近90%傲视群雄。新能源汽车以智能化、网联化以及高功率化等特性为发展载体，正在向由传统的机械化快速地向电子化跨越。江西省一直以来都是我国重要的汽车大省，迈向新能源汽车时代也是我省在匹配国家大战战略发展的产业发展方向。印制电路是新能源汽车电子化、智能化、网联化所需的核心部件之一，在汽车产品中承担着载流、信号传输、自动驾驶信号收发等关键性功能，被称为汽车电子的“神经系统”。开发具有自主研发、技术可控的针对智能网联与核心控制印制电路产品对于我省新能源汽车产业掌握核心技术方向具有重要的发展意义。此外，经过多年的产业培育，江西省已经成为了继广东省、江苏省之后的第三大印制电路大省。但是，相比广东、江苏等沿海地区，我省印制电路研发、制造水平仍存在明显的差距。高端的、用于L3、L4级驾驶的77GHz雷达的印制电路，超过百安以上载流的印制电路产品在省内，乃至全国均存在重大的技术壁垒，导致部分用于汽车网联与控制的印制电路产品必须以来进口，导致我国目前部分高端的汽车电子部件仍然受制于人。美国著名的咨询机构Prismark预测，新能源汽车电子产业将是印制电路产业的下一个蓝海，掌握先进技术与产品的企业将在这次产业发展中异军突起，实现二次新生。因此，开展汽车智能网联与控制印制电路关键技术研发及产业化项目的研发对江西省的汽车与电子信息产业的产业升级与先进技术自主可控具有重要的意义。Affected by the COVID-19 and the war of Russia and Ukraine, the global automobile market has generally shrunk. However, new energy vehicles stand out with high increasing. Thereof, nearly 90% growth of new energy vehicle was announced for BYD auto in the first quarter of 2022. With the characteristics of intelligence, networking and high power as the development trend, new energy vehicles are rapidly leaping from traditional mechanization to electronization. Jiangxi Province has always been an important automobile Province in China. Marching towards new energy vehicles is also the industrial development direction of Jiangxi Province in matching the strategic development of the national strategy.Printed circuit is one of the core components of new energy vehicles requiring for electronization, intellectualization and networking. It undertakes the key functions of current carrying, signal transmission, automatic driving signal transceiver in automotive products. It is known as the "nervous system" in automotive electronics. The development of printed circuit products for intelligent network connection and core control with independent and controllable technology is of great significance for the new energy vehicle industry in our province.In addition, Jiangxi Province has become the third largest printed circuit province after Guangdong Province and Jiangsu Province. However, compared with Guangdong and Jiangsu, we have an obvious gap in the printed circuit R&D and manufacturing ability. The printed circuit of high-end 77GHz radar used for L3 and L4 driving and the printed circuit products with current carrying capacity of more than 100 amps have major technical barriers in the province and even the whole country, resulting in that some printed circuit products used for automobile network connection and control must be imported, resulting in that some high-end automobile electronic components in China are still controlled by others.The well-known consulting organization in the United States, i.e., Prismark predicts that the new energy vehicle electronics industry will be the next blue ocean for the printed circuit industry. Enterprises mastering corresponding advanced technologies will rise abruptly in this industrial development and achieve a second rebirth. Therefore, the printed circuit research for automobile intelligent network connection and control is of great significance to the industrial upgrading and independent control of advanced technology of automobile and electronic information industry in Jiangxi Province. |
| 技术难题概述 | 项目是针对新能源汽车智能网联、智能控制等电子信息化用关键性印制电路系列产品展开研究。针对自动驾驶毫米波雷达、超高密度通信以及电池管理系统中大电流智能控制与传输等核心场景展开关键性技术的攻关，具体包括：（1）毫米波段77GHz高频印制电路技术研究：突破超高频惰性材料体系阻抗设计与制作、三元等离子活化、超高频天线补偿以及高多层混压等关键技术，旨在解决针对L3、L4级自动驾驶高精度还原识别物所需的高通量信号收发难题。（2）超高密度积层印制电路技术研究：突破超声二流体协同真空蚀刻、非平衡盲孔填铜以及复合靶向对位等关键技术，旨在解决新能源汽车大规模通信等所需海量信息传输所需的高密度互连难题。（3）大电流智能控制印制电路技术研究。突破大电流超厚铜线路制造、散热设计与铜块嵌入、高可靠性多层结构复合等关键技术，旨在解决新能源汽车电池智能化管理与电流传输等难题。一直以来，以日本、美国为代表汽车印制电路企业垄断着先进产品的技术。目前，如毫米波段印制电路产品、低于40μm以下超高密度印制电路以及百安以上载流电流仍然被垄断。因此，本项目的研发对于攻克新能源汽车向电子化方向发展的“卡脖子”技术具有重要的意义。The project focuses on the research of key printed circuit products for electronic informatization such as intelligent network connection and intelligent control of new energy vehicles. The core scenarios such as autonomous millimeter wave radar, ultra-high-density communication and high current intelligent control and transmission in battery management system was carried out as following: (1) Research on high frequency printed circuit technology for millimeter wave band 77GHz: It should break through the key technologies such as impedance design and fabrication, ternary plasma activation of hydrophobic dielectric, UHF antenna compensation and high multi-layer mixed voltage, and thus solve the problem of high flux signal transceiver required for high-precision restoration of identification objects for L3 and L4 leveled automatic driving.(2) Research on ultra-high density laminated printed circuit: It should break through key technologies such as ultrasonic two fluid cooperative vacuum etching, unbalanced blind hole copper filling and composite target alignment, and thus solve the high-density interconnection problems required for massive information transmission required by large-scale communication of new energy vehicles.(3) Research on high current intelligent control printed circuit. It should break through the key technologies such as high current ultra thick copper line manufacturing, heat dissipation design and copper block embedding, high reliability multi-layer structure composite and so on, and thus solve the problems such as intelligent management and current transmission of new energy vehicle battery.For a long time, automobile printed circuit enterprises represented by Japan and the United States have monopolized the technology of related advanced products. At present, such as millimeter wave band printed circuit products, that less than 40 μm in width and current carrying above 100 A are still monopolized. Therefore, the research and development of this project is of great significance to overcome the "neck" technology of new energy vehicles developing towards electronization. |
| 技术攻关后希望达到的预期技术目标 | 项目产品是针对新能源汽车智能网联与控制等三大核心应用场景提出需求，势在解决关键性信号传输与载流的核心印制电路的关键性技术难题。目前，本项目技术指标为：最高应用频率：24GHz；阻抗误差：±10%；天线尺寸误差：±10μm；积层结构：3阶；最小线宽线距：50μm/50μm；Dimple：10μm；层间对位精度：38μm；最大载流铜厚：4OZ；最大载流能力：50A。通过本项目技术开发，通过材料、电子化学品以及新技术的开发实施技术原创性突破，实现技术指标达到：最高应用频率：77GHz；阻抗误差：±8%；天线尺寸误差：±5μm；积层结构：任意阶；最小线宽线距：40μm/40μm；Dimple：10μm；层间对位精度：25μm；最大载流铜厚：10OZ；最大载流能力：300A。The project product is aimed at the requirements of three core application scenarios such as intelligent network connection and control of new energy vehicles, which is expected to solve the key technical problems of key signal transmission and current carrying core printed circuit. At present, the technical indicators of the project are:Maximum application frequency: 24GHz;Impedance error: ± 10%;Antenna size error: ± 10 μ m;Accumulation structure: 3 steps;Minimum line width and line spacing: 50 μ m/50 μ m；Dimple：10 μ m；Inter layer alignment accuracy: 38 μ m；Maximum copper thickness for current carrying: 4OZ;Maximum current carrying capacity: 50A.Through the technical development of the project and the development of materials, electronic chemicals and new technologies, the original technological breakthroughs are implemented to achieve the following technical indicators:Maximum application frequency: 77GHz;Impedance error: ± 8%;Antenna size error: ± 5 μ m；Laminated structure: Any layer;Minimum line width and line spacing: 40 μ m/40 μ m；Dimple：10 μ m；Inter layer alignment accuracy: 25 μ m；Maximum copper thickness for current carrying: 10OZ;Maximum current carrying capacity: 300A. |
| 时限要求 | 要求于2023年12月31日前完成关键技术攻关；2024年12月31日前完成项目的产业化试验（到企服务）；2025年4月30日完成产品的量产（到企服务）。It should complete key technology research before December 31, 2023.It should complete the industrialization test of the project (At Enterprise for service) before December 31, 2024.It should be complete the mass production of products (At Enterprise for service) before April 30, 2025. |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 3000 万元。其中：愿意支付揭榜单位研发资金不少于 300 万元。 2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 由本项目资助产生的自主知识产权可由双方共享，但是我单位具有项目具有知识产权的使用权。任何知识产权转让、许可等均需要获得我单位同意。由本项目产品产业化形成的利润的10%可与揭榜单位持续性合作用于撰写支持项目的研发。The intellectual property rights generated by the project can be shared by both parties, but our company has the right to use the intellectual property. Any intellectual property transfer, license, etc. shall be approved by our company. 10% of the profits generated by the industrialization of the products of the project can be used for supporting the R&D of the project in continuous cooperation. |
| 企业承接转化后预期的经济、社会效益 | 本单位主要从事汽车电子印制电路产品研发及产业化，此次指南的提出是我单位突破领域内前沿性技术研发的战略方向。预计通过此项目的产业化，在项目期间实现超过8000万元产值的智能网联与控制产品，利税超过1500万元。通过生产线的改造与完善，可实现年产能超过2亿元的制造能力。通过此项目的研究，进一步完善汽车智能化的产业链，支撑我省、乃至我国通过新能源汽车实现汽车产业弯道超车的重要发展战略。此外，项目的成功实施不但能够巩固我省在印制电路行业的地位，而且可以推动我省在印制电路领域的科技创新，形成具备国际竞争力的自主知识产品，全面提升江西省电子信息产业结构。Our company is mainly engaged in the R&D and industrialization of automotive electronic printed circuits. This proposal is the strategic direction of our company to break through the cutting-edge technology in the field of automotive electronics. It is expected that the intelligent network connection and control products with an output value of more than 80 million yuan will be realized during the project period. Related profit and tax will exceed 15 million yuan. Through the transformation and improvement of the production line, the annual production capacity can be more than 200 million yuan.Through the research of this project, we will further improve the intelligent industrial chain of automobile and support the important development strategy of overtaking in the curve of new energy vehicle industry in our province and even our country. In addition, the successful implementation of the project can not only consolidate our province's position in the printed circuit industry, but also promote our province's scientific and technological innovation in the printed circuit field, form independent knowledge products with international competitiveness, and comprehensively improve the electronic information industrial structure of Jiangxi Province. |

**“揭榜挂帅”企业重大技术需求榜单（3）**

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| 所属产业领域或产业链 | 数字经济（电子信息）Digital Economy (electronic information) | 细分方向 | 通信系统设备制造Communication system equipment manufacturing |
| 重大技术需求项目名称 | 高弹性接入型光传送网（OTN）设备研发与产业化R&D and industrialization of highly resilient accessing type optical transmission network (OTN) equipment |
| 技术需求提出企业 | 江西山水光电科技股份有限公司JIANGXI SHANSHUI OPTOELECTRONIC TECHNOLOGY CO.,LTD |
| 技术需求牵头企业联系人 | 姓名 | 张行Zhang Xing | 职务 | 副主任Deputy Director of office | 手机：13879200321 | 邮箱：zx@ssdx.com.cn |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 北京格林伟迪科技股份有限公司Beijing GW Delight Technology Co., Ltd | □龙头企业□骨干企业□战略性新兴产业企业☑高新技术企业□科技型中小企业 |
| 2 | 烽火通信科技股份有限公司FiberHome Telecommunication Technologies Co., Ltd | □龙头企业□骨干企业□战略性新兴产业企业🗹高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 本项目面向网络强国战略，深入贯彻落实我省《关于深入推进数字经济做优做强“一号发展工程”》战略部署，抓住国家新型数字信息基础设施建设带来的光通信接入设备更新换代发展契机，立足我省电子信息产业制造发展优势，自主研发高弹性接入型光传送网（OTN）设备关键技术，形成系列新型光通信设备产品，助力5G技术推广应用，带动我省通信设备制造业发展。随着OTN全面替代传统光通信技术进程不断加快，为实现对包括5G、数据中心互联和视频等新型算力业务的综合承载，OTN技术已下沉应用到城域网和接入网。伴随工业互联网和云边端融合应用的爆发，带宽颗粒度小、灵活调整、业务数量多的接入需求迫切，传统OTN技术已无法为此类提供高效承载服务。为应对高速增长通信容量和应用数量，急需提升光网络的容量及使用效率；为适配越来越多高质量服务需求，急需提升光网络差异化服务能力，急需研发满足相应需求的高弹性接入型OTN设备。随着包括5G在内的新基建全面推进，实现最后一公里接入的高弹性接入型OTN设备市场空间巨大，需求呈现爆发趋势。据预测，2025年接入型OTN设备在电信运营商市场将达500亿规模，在垂直行业市场也将达到百亿规模。本项目将以提升光通信系统的易用性、灵活性与生存性为主旨，开展细颗粒度交叉技术、系统仿真、设备研制、性能评测、组网验证等研究工作，形成适用于多种场景的系列化高弹性接入型OTN设备，支撑5G网络、“东数西算”工程建设和算力网络服务，积极开拓军民融合及外销出口市场。The project is oriented to the CyberPower strategy, deeply implement the province's strategic deployment of "No.1 development project" to promote the digital economy and make it better and stronger, seize the opportunity to update the development of optical communication access equipment brought by the construction of new national digital information infrastructure, based on the advantages of electronic product manufacturing in our province, independently develop the key technology of highly resilient access optical transmission network (OTN) equipment, form a series of new optical communication equipment products and drive the development of our province's communication equipment manufacturing industry.With the OTN comprehensive replacement of traditional optical communication technology process continues to accelerate, in order to achieve the comprehensive bearing of new arithmetic services, including 5G, data center interconnection and video, OTN technology has been applicate of metropolitan networks and access networks. Along with the explosion of industrial Internet and cloud-side end convergence applications, the access demand for small bandwidth granularity, flexible adjustment and large number of services is urgent, and the traditional OTN technology has been unable to provide efficient bearing services for such. In order to cope with the rapid growth of communication capacity and the number of applications, the urgent need to improve the capacity of optical networks and the use of efficiency; to adapt to the increasing demand for high-quality services, the urgent need to enhance the optical network differentiated service capabilities. To this end, highly resilient access OTN equipment needs to be developed to meet the corresponding needs.With the comprehensive promotion of new infrastructure, including 5G, the market for highly resilient access OTN equipment to achieve the last mile of access is huge, and demand is exploding. It is predicted that the market for access OTN equipment will reach 50 billion in 2025 in the telecom operator market and 10 billion in the vertical industry market.The project will focus on improving the ease of use, flexibility and survivability of optical communication systems, carrying out research on fine-grained crossover technology, system simulation, equipment development, performance evaluation, network verification, etc., to form a series of highly flexible access OTN devices applicable to a variety of scenarios, supporting the construction of 5G networks, "East Digital West Computing" project and The company also actively explores the military-civilian integration and export markets. |
| 技术难题概述 | 工业互联网和新型算力业务接入需求的爆发对光通信网络构成了新的挑战，急需提升光网络的容量及使用效率，并提升光网络的差异化服务能力。具体表现为：（1）光网络大容量管道承载小颗粒业务效率低下传统OTN网络基本管道单元为ODU0，当业务速率低于1Gbps时，占用一个ODU0单元将造成巨大带宽浪费。若采用分组增强型OTN承载1Gps以下业务，则需引入额外的VC容器或者分组管道，带来实现复杂难和兼容性问题。因此，OTN网络大容量管道服务已经无法适应大连接需求，急需研究兼容小颗粒业务的统一承载技术。（2）光网络共享式管道无法精准服务高品质专线需求带宽和时延是企业级用户最关注的关键性能指标，进而催生了高品质专线高价值业务产生。OTN借助其电路交换特征，可提供稳定带宽和确定时延性能。传统OTN使用共享管道，无法精准对差异化专线需求提供服务质量保障，急需研究面向独享资源专线的端到端连接能力。（3）光网络刚性管道无法适配业务的高动态需求传统OTN使用刚性管道服务模式，连接建立后可提供的带宽容量为固定值。面对网络需求的变化，如果对连接进行调整将造成网络的短时中断，对客户业务造成显著的影响。面向业务的高动态需求，急需研究OTN业务的无损调整技术。The explosion of demand for industrial Internet and new arithmetic service access poses new challenges to optical communication networks, and there is an urgent need to improve the capacity and usage efficiency of optical networks and enhance the differentiated service capability of optical networks. Specifically expressed as:1. optical network high-capacity pipeline bearing small particle business inefficiency

Traditional OTN network basic pipe unit for ODU0, when the service rate is lower than 1Gbps, occupying an ODU0 unit will cause huge bandwidth waste. If packet-enhanced OTN is used to bear services below 1Gps, additional VC containers or packet pipelines need to be introduced, bringing complex difficulties in implementation and compatibility issues. Therefore, OTN network high-capacity pipe service has been unable to adapt to the demand for large connections, and it is urgent to explore the unified bearing technology compatible with small particle services.1. Optical network shared pipeline cannot accurately serve the demand for high-quality private lines

Bandwidth and latency are the key performance indicators that enterprise users are most concerned about, thus giving rise to high-quality leased-line high-value services. OTN can provide stable bandwidth and definite latency performance with its circuit switching characteristics. Traditional OTNs use shared pipes and cannot precisely provide quality of service guarantees for differentiated leased line demands, and there is an urgent need to study end-to-end connectivity capabilities for exclusive resource leased lines.1. Rigid pipes of optical networks cannot adapt to the highly dynamic demand of services

Traditional OTN uses a rigid pipe service model, and the bandwidth capacity available after the connection is established is a fixed value. In the face of changing network demand, adjustment of the connection will cause short-term disruption of the network, which will have a significant impact on customer services. In view of the highly dynamic demand of the service, it is urgent to explore the lossless adjustment technology of OTN service. |
| 技术攻关后希望达到的预期技术目标 | 设计自主知识产权的OTN核心ASIC芯片，采用单板设计研制容量40G的高弹性接入型OTN设备，关键技术形成企业或行业标准，并满足如下技术指标：1. 支持FE/GE/10GE业务到ODUk和OSU适配能力；
2. 支持STM-1/4/16 SDH业务到ODUk和OSU适配能力；
3. 支持VC12/VC3/VC4 SDH业务到OSU适配能力，经过OSU适配功能模块封装、映射处理后产生OSU通道信号；
4. 通过OTN各层开销支持OTN OAM能力：

1）具有OSU/OPU/ODU/OTU层的开销处理监测功能，支持OTU SM段层、OSU PM、ODU PM通道层监测管理，包含连续性监测支持光通道LOS/LOF检测，连通性监测支持SM、PM的TTI检测及告警上报，信号质量检测支持SM、PM的BIP-8处理及误码块上报功能；2）插板式基于OSU的OTN设备提供6级ODUk TCM连接监视功能，对于多运营商/多设备商/多子网环境，可实现分级和分段管理；3）OSU层提供2级TCM连接监视或等效功能，用于分段监控、时延测量和分段保护；ODU/OSU层开销支持双向时延测量，OSU层开销可选支持单向时延测量；4）具备ODU/OSU层支持PRBS测试功能。1. 支持不少于4个OTU1/2线路接口、不少于8个FE/GE分组业务光接口、不少于2个10GE分组业务光接口、不少于2个STM-1/4/16 SDH业务光接口、不少于8个E1业务接口、不少于8个ANY业务适配接口（包括STM/16/4/1、1GE/10GE、CPRI、FC1/2/4/8、OTU0/1/2）；
2. 支持不少于60G分组交换处理容量；
3. 支持不少于5G TDM交叉处理容量。

Design the OTN core ASIC chip with independent intellectual property rights, develop highly resilient access type OTN equipment with 40G capacity using single board design, form enterprise or industry standards for key technologies, and meet the following technical indicators:1.Supporting FE/GE/10GE services to ODUk and OSU adaptation capability.2.Supporting STM-1/4/16 SDH services to ODUk and OSU adaptation capability.3.Supporting VC12/VC3/VC4 SDH services to OSU adaptation capability, and generate OSU channel signals after encapsulation and mapping processing by OSU adaptation function module.4.Supporting OTN OAM capability through OTN overheads of each layer.(1) Overhead processing monitoring function with OSU/OPU/ODU/OTU layers, supporting OTU SM segment layer, OSU PM, ODU PM channel layer monitoring and management, including continuity monitoring supporting optical channel LOS/LOF detection, connectivity monitoring supporting TTI detection of SM and PM and alarm reporting, signal quality detection supporting BIP-8 processing of SM and PM and error code block reporting function.(2) The plug-in OSU-based OTN equipment provides 6 levels of ODUk TCM connection monitoring functions, and for multi-operator/multi-equipment vendor/multi-subnet environments, hierarchical and segmented management can be realized.(3) OSU layer provides 2 levels of TCM connection monitoring or equivalent functions for segment monitoring, delay measurement and segment protection; ODU/OSU layer overhead supports bidirectional delay measurement and OSU layer overhead optionally supports unidirectional delay measurement.(4) With ODU/OSU layer support PRBS test function.5.Supporting no less than 4 OTU1/2 line interfaces, no less than 8 FE/GE packet service optical interfaces, no less than 2 10GE packet service optical interfaces, no less than 2 STM-1/4/16 SDH service optical interfaces, no less than 8 E1 service interfaces, no less than 8 ANY service adaptation interfaces (including STM/16/4/1, 1GE/10GE, CPRI, FC1/2/4/8, OTU0/1/2).6.Supporting not less than 60G packet switching processing capacity.7.Supporting no less than 5G TDM crossover processing capacity. |
| 时限要求 | 本项目执行期为2021年7月至2023年12月。项目启动至今已经投入841.52万元，主要用于需求分析、技术方案研究和功能仿真性。The project implementation period is from July 2021 to December 2023. The project has invested more than 8.4152 million RMB since its launch, mainly for requirement analysis, technical solution research and functional simulation. |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 2460万元(24.6 million RMB)。其中：愿意支付揭榜单位研发资金不少于 1200 万元(12 million RMB)2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 承担揭榜项目所产生的知识产权申请权属，原则上归揭榜方和需求方共同拥有（具体按项目协议执行）。联合向国家、部委、相关行业及江西省申报和完成的各类项目产生的科技成果知识产权依法按合同约定确定。需求方资助揭榜方的各类项目以及新技术新产品委托开发经费所产生的知识产权申请权、使用权、收益分配权属于双方共有。The intellectual property rights of the application generated by the undertaking of the unveiling project shall, in principle, be jointly owned by the unveiling party and the demand party (specifically according to the implementation of the project agreement). The intellectual property rights of scientific and technological achievements arising from various projects jointly declared and completed to the state, ministries, relevant industries and Jiangxi Province shall be determined according to the contractual agreement. The demand side funds the various projects of the unveiling party and the new technology and new products commissioned by the development funds generated by the right to apply for intellectual property, the right to use, and the right to distribute the proceeds belong to both parties. |
| 企业承接转化后预期的经济、社会效益 | 项目执行期内，小批量设备销售将带来新增产值8400万元，利润2436万元，税收1038万元（含所得税）。达产后，产品为本企业带来的年产值可超5500万元。通过向行业内其他接入网设备制造企业进行技术转让或授权生产，可创造超过1.6亿元的年产值。参与研发的企业将积极牵头开展新技术的标准化工作，所突破的关键技术将形成国内行业标准和国际标准；项目产业化后可带动我省上下游电子信息、元器件制造产业发展，推动新一代光传输技术和应用模式变革，助力电信运营商和各行业加快建设高速泛在、天地一体、云网融合、智能敏捷、绿色低碳、安全可控的智能化综合性数字信息基础设施，提升我国在接入型OTN技术和市场的话语权，助力打通经济社会发展的信息“大动脉”。During the implementation period of the project, the sales of small batch equipment will bring new output value of 84 million RMB, profit of 24.36 million RMB and tax of 10.38 million RMB (including income tax). After reaching production, the annual output value of the product for the enterprise can exceed 55 million RMB. Through technology transfer or authorized production to other access network equipment manufacturers in the industry, it can create an annual output value of more than 160 billion RMB.The enterprises participating in the R&D will actively lead the standardization of the new technology, and the key technologies broken through will form domestic industry standards and international standards; the industrialization of the project will drive the development of upstream and downstream electronic information and component manufacturing industries in our province, promote a new generation of optical transmission technology and application mode changes, help telecom operators and industries to accelerate the construction of high-speed ubiquitous, integrated in heaven and earth, cloud-network integration, intelligent and agile, green and low-carbon, secure and controllable, enhance China's discourse power in access OTN technology and market, and help to open the information "artery" of economic and social development. |

**“揭榜挂帅”企业重大技术需求榜单（4）**

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| 所属产业领域或产业链 | 装备制造Equipment manucfature | 细分方向 | 可再生能源制氢 Renewable energy hydrogen production |
| 重大技术需求项目名称 | 采用可降解合成脂油的大容量水电解制氢整流变压器技术开发 Development of large-capacitywater electrolysis hydrogen production rectifier transformerusing degradable synthetic oil |
| 技术需求提出企业 | 江西变压器科技股份有限公司Jiangxi Transformer Science&Technology Co.,Ltd. |
| 技术需求牵头企业联系人 | 姓名 | 傅爱华/Aihua Fu | 职务 | 主任工程师/Chief engineer | 手机：13576106422 | 邮箱：1574689579@qq.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 西安西电变压器有限责任公司Xian XD Transformer Co., Ltd. | ■龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 | 广西柳州特种变压器有限责任公司Guangxi Liuzhou Special Transformer Co., Ltd. | □龙头企业■骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 |  “双碳”战略背景下，氢气作为一种来源丰富、清洁低碳、应用广泛的二次能源，是未来国家能源体系的重要组成部分。《氢能产业发展中长期规划（2021-2035年）》文件指出，氢能产业是战略性新兴产业和未来产业重点发展方向，聚焦短板弱项，适度超前部署一批氢能项目，重点发展可再生能源制氢。同时，《江西省“十四五”科技创新规划》提出重点攻克光氢转化、光电氢转化、光热氢转化等氢能源利用关键技术研究。随着氢能源的大规模发展，作为可再生能源制氢系统的关键设备之一，大容量水电解制氢整流变压器关键技术突破和装备质量提升已成为氢能产业链中亟待攻关的重要环节。多年来，公司深耕整流变压器的研制，在行业内处于领先地位，为国内光伏发电水电解制氢龙头企业宝丰能源的水电解装置提供整流变压器，与中船重工718所合作研发产能为1000Nm3/h的水电解装置用整流变压器。目前，公司正与蒂森克虏伯伍德公司联合开发产能为4000Nm3/h的大型水电解成套装置，承担了大容量水电解制氢整流变压器技术开发工作。预期大容量水电解制氢整流变压器研制成功后，仅沙特某客户就可产生3亿产值的经济效益。当前大型水电解成套装置需求正逐渐向国内传递，国内市场需求正在逐步显现且大有爆发之势。本项目将通过攻克采用新型环保绝缘油的大容量换流变压器整机系统设计、温升管理、抗高强度冲击等关键技术难题，能有效填补大型水电解成套装置技术空白，为即将到来的国内大型水电解成套装置需求规划布局，抢占市场先机。Under the background of "dual carbon" strategy,hydrogen, as a secondary energy source with abundant sources, clean and low-carbon, and wide application, will be an important part of the future national energy system.The "Hydrogen Energy Industry Development Medium and Long-term Plan (2021-2035)" document pointed out that the hydrogen energy industry is a strategic emerging industry and a key development direction of the future industry, and should focus on the development of hydrogen production from renewable energy.At the same time, the "14th Five-Year Plan for Scientific and Technological Innovation of Jiangxi Province" proposes to focus on the research on key technologies for hydrogen energy utilization such as photo-hydrogen conversion, photo-electric hydrogen conversion, and photo-thermal hydrogen conversion.With the large-scale development of hydrogen energy, as one of the key equipment of the renewable energy hydrogen production system, the key technology breakthrough and equipment quality improvement of the large-capacity water electrolysis hydrogen production rectifier transformer have become an important link in the hydrogen energy industry chain that needs to be tackled urgently.Over the years, JXTC has been deeply engaged in the research and development of rectifier transformers and is in a leading position in the industry.JXTC provided rectifier transformers for the water electrolysis device of Baofeng Energy, a leading domestic photovoltaic power generation water electrolysis hydrogen production enterprise, and cooperated with CSIC 718 to develop rectifier transformers for water electrolysis devices with a production capacity of 1000Nm3/h.At present, JXTC is jointly developing a large-scale water electrolysis plant with a production capacity of 4000Nm3/h with ThyssenKrupp Uhde, and has undertaken the development of large-capacity water electrolysis hydrogen production rectifier transformer technology.It is expected that after the successful development of the large-capacity water electrolysis hydrogen production rectifier transformer, only a customer in Saudi Arabia can generate economic benefits of 300 millionRMB output value.At present, the demand for large-scale water electrolysis complete sets is gradually being transmitted to the country, and the domestic market demand is gradually emerging and has a great potential to explode.This project will overcome key technical problems such as system design, temperature rise management, and high-strength impact resistance of large-capacity converter transformers using new environmentally friendly insulating oil，andit can effectively fill the technical gap of large-scale water electrolysis plants, plan the layout for the upcoming domestic demand for large-scale water electrolysis plants, and seize market opportunities. |
| 技术难题概述 | 项目研制适配4000Nm3/h的水电解成套装置的大容量（27000kVA）水电解制氢整流变压器，容量约为现有水电解制氢整流变压器容量（7300kVA）的4倍。同时要求采用可降解合成脂油（此技术在大容量整流变压器中尚无先例），运动黏性为传统矿物油的3倍。大容量和高黏性带来的系列技术难题，属于行业共性的“卡脖子”技术：（1）**整机联合系统仿真分析：**内部线路、结构形式、单机脉波数、谐波控制等技术要点参数均需要与整流柜、电解槽、控制系统进行联合系统仿真分析。（2）**温升控制**：项目要求装置的顶层油温升45K、绕组温升55K，均严于现有标准规定；合成脂油的运动黏性大、流动性差导致油冷循环散热效率大幅降低；变压器内部存在大量谐波磁场，导致其内部线圈、结构件等涡流损耗量值较大。多因素叠加带来的散热问题是本项目关键技术点，从结构-电磁-流体等多物理场耦合角度对变压温升进行理论建模分析，并提出散热方案。（3）**抗高强度冲击**：由于换流变压器的电源侧来自光伏发电，存在极短时间里电源侧能量突然跌落至10%以下的可能，这种能量跌落将对变压器造成强烈冲击，且容量越大，冲击强度越大。采用各种仿真技术对整流变压器的冲击进行运行模拟分析，并结合样机的实际运行，不断优化设计方案。The projectisto develop a large-capacity (27000kVA) water electrolysis hydrogen production rectifier transformer suitable for a 4000Nm3/h water electrolysis complete set, and the capacity is about 4 times that of the existing water electrolysis hydrogen production rectifier transformer capacity (7300kVA).At the same time, it is required to use degradable synthetic oil (this technology has no precedent in large-capacity rectifier transformers so far), and the kinematic viscosity is 3 times that of traditional mineral oil.The series of technical problems caused by large capacity and high viscosity belong to the common "neck stuck" technology in the industry:(1)**Simulation analysis of the whole machine joint system:**The internal circuit, structural form, single machine pulse number, harmonic control and other technical key parameters need to carry out joint system simulation analysis with the rectifier cabinet, electrolyzer, and control system.(2)**Temperature rise control:**The project requires that the top oil temperature rise of the device is 45K, and the winding temperature rise is 55K, which are stricter than the existing standards, and the high kinematic viscosity and poor fluidity of synthetic fat oil greatly reduces the heat dissipation efficiency of the oil cooling cycle, and there are a large number of harmonic magnetic fields inside the transformer, resulting in a large amount of eddy current losses in its internal coils and structural parts.The heat dissipation problem caused by the superposition of multiple factors is the key technical point of this project.From the perspective of multi-physics coupling such as structure-electromagnetic-fluid, the theoretical modeling and analysis of the temperature rise of the transformer are carried out, and the heat dissipation scheme is proposed.(3)**High-strength impact resistance:** The power supply of water electrolysis system is photovoltaic power. Since the power supply side of the converter transformer comes from photovoltaic power generation, there is a possibility that the energy of the power supply side suddenly drops below 10% in a very short period of time. This energy drop will cause a strong impact on the transformer, and the greater the capacity, the greater the impact strength.Various simulation technologies are used to simulate and analyze the impact of the rectifier transformer, and the design scheme is continuously optimized based on the actual operation of the prototype. |
| 技术攻关后希望达到的预期技术目标 | （1）解决合成脂油在大容量整流变压器应用的各种技术问题，制定公司关于该型水电解制氢整流变压器的绿色产品设计规范1份。（2）研制大容量水电解制氢整流变压器样机1台，预计容量将达到27000kVA。样机产品及配套技术可满足单装置产能为4000Nm3/h的水电解成套装置的需求。样机产品在蒂森克虏伯伍德公司的沙特项目上试运行。（3）技术指标参数对比：国内当前1000Nm3/h的水电解成套装置配套的整流变压器技术参数指标为：容量7300kVA、直流电压645V、直流电流0-9240A、效率98.8%、顶层油温升55K、绕组温升65K、频率50Hz、矿物油。项目研制适配4000Nm3/h的水电解成套装置配套的整流变压器技术参数指标为：容量27000kVA、直流电压675V、直流电流0-34500A、效率99.0%、顶层油温升45K、绕组温升55K、频率60Hz、合成脂油。项目研发技术产品在各项指标上均远高于现有产品,特别是体现产品运行寿命的温升指标上，整体下降10K，产品预期寿命较现有产品延长1.5倍。（4）形成国家专利不少于3项，要求专利核心保护点内容与本项目关键技术难点相关。(1)To solve various technical problems in the application of synthetic oil in large-capacity rectifier transformers, formulate a green product design specification for this type of water electrolysis hydrogen rectifier transformer.(2)ToDevelope a large-capacity water electrolysis hydrogen production rectifier transformer prototype, with an estimated capacity of 27,000kVA.The prototype products and supporting technologies can meet the needs of a complete set of water electrolysis units with a single unit capacity of 4000Nm3/h. Prototype products willbe commissioned at ThyssenKrupp Wood's Saudi project.(3) Comparison of technical data: Technical data of water electrolysis system of 1000Nm3/h:Capacity7300kVA, DC voltage645V, DC current0 ~9240A, efficiency98.8%, top oil temperature rise 55K, winding temperature rise65K, frequency50Hz, mineral oil.Technical data of water electrolysis system of 4000Nm3/h in this project:Capacity27000kVA, DC voltage675V, DC current0~34500A, efficiency99%, top oil temperature rise 45K, winding temperature rise55K, frequency60Hz, synthetic oil.The technical products developed by the project are much higher than the existing products in various indicators, especially the temperature rise index reflecting the operating life of the product, which is reduced by 10K as a whole, and the expected life of the product is 1.5 times longer than that of the existing product.(4) No less than 3 national patents should be formed, and the content of the core protection points of the patent is required to be related to the key technical difficulties of the project. |
| 时限要求 | 预计技术攻关及样机研制完成的时间为2023年12月。It is estimated that the technical research and prototype development will be completed in December 2023. |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于1290万元。其中：愿意支付揭榜单位研发资金不少于110万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。1.The company is willing to provide research and development funds of not less than 12.9 million RMB for this technical problem. Among them: willing to pay R&D funds of not less than 1.1millionRMB to unveil the position.2.Commitment to timely and full disbursement of research and development funds and payment of the funds for the unveiling position. |
| 产权归属 | 1.由相关合作方牵头完成的技术成果，由公司与合作方协商确定。2.江变牵头完成或独立完成的技术成果全部权利归江变公司。1.The technical achievements led by the relevant partners shall be determined through consultation between the company and the partners.2.All rights to the technical achievements completed under the lead or independently belong to JXTC. |
| 企业承接转化后预期的经济、社会效益 | 项目样机将在沙特某绿氢项目中试运行，根据实际运行情况进行改进后可能获得其后期55台产品，预计该用户产生的整流变压器产品合同额将达到3亿元人民币。项目成果可在国内进行产品转化，根据《氢能产业发展中长期规划（2021-2035年）》推算2025年国内电解水制氢设备装机规模将超过2GW，整流变压器装机容量达到2800MVA，经济产值数十亿元。项目研制的大容量水电解制氢整流变压器技术，不仅彰显中国电力装备的制造能力、提升我国在新能源领域的竞争力，而且该技术未来在国内应用，助力提升我国绿色能源消费占比，清洁低碳，减少碳排放。此外，项目产品采用可降解合成脂油，是一种新型可降解环保油，较传统矿物质变压器油可有效减少环境资源消耗。The prototype of the project will be put into trial operation in a green hydrogen project in Saudi Arabia. After improvement according to the actual operation, it may obtain 55 products in the later stage. It is expected that the contract value of the rectifier transformer products generated by the user will reach 300 million RMB.The project results can be transformed into domestic products. According to the "Medium and Long-Term Plan for the Development of Hydrogen Energy Industry (2021-2035)", it is estimated that the installed capacity of domestic electrolyzed water hydrogen production equipment will exceed 2GW in 2025, and the installed capacity of rectifier transformers will reach 2800MVA，and the economic output value is billions ofyuan.The large-capacity water electrolysis hydrogen production rectifier transformer technology developed by the project not only demonstrates the manufacturing capacity of China's power equipment and enhances my country's competitiveness in the field of new energy, but also the technology will be applied in China in the future to help increase the proportion of my country's green energy consumption, clean low carbon, reducing carbon emissions.In addition, the project product uses degradable synthetic oil, which is a new type of degradable and environmentally friendly oil, which can effectively reduce the consumption of environmental resources compared with traditional mineral transformer oil. |

**“揭榜挂帅”企业重大技术需求榜单（5）**

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| 所属产业领域或产业链 | 装备制造Equipment Manufacturing | 细分方向 | 农、林、牧、渔业专用设备制造Manufacture of special equipment for agriculture, forestry, animal husbandry and fishery |
| 重大技术需求项目名称 | 基于深度学习的果蔬多频段全景视觉识别分选技术研究及应用Research and application of multi-band panoramic visual recognition sorting technology for fruits and vegetables based on deep learning |
| 技术需求提出企业 | 江西绿萌科技控股有限公司Jiangxi Reemoon Technology Holding Co. LTD |
| 技术需求牵头企业联系人 | 姓名 | 丁飞霞Sophia | 职务 | 项目经理project manager | 手机18879730015 | 邮箱：pr@reemoon.com.cn |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 |  | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 |  | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 我国是水果生产大国， 2021年水果产量达29611万吨，需求量为29912万吨，总产量和需求量稳居世界第一。我省是水果生产大省，省政府大力支持水果产业发展，提出“一主多特”水果产业发展布局，重点做大做强“脐橙、蜜橘、甜柚”等柑橘优势产区，支持发展猕猴桃、葡萄、早熟梨等特色水果产区的发展战略。2021年我省水果种植面积达650万亩、产量420万吨，赣南脐橙、广丰马家柚、奉新猕猴桃等18种地域特色水果，广受消费者青睐。China is a big fruit producing country. In 2021, the fruit output will reach 296.11 million tons, and the demand will be 299.12 million tons. The total output and demand will rank first in the world. Our province is a major fruit-producing province, and the provincial government strongly supports the development of the fruit industry, proposing a “one main, multiple special” fruit industry development layout, focusing on expanding and strengthening “navel oranges, tangerines, sweet pomelo” and other citrus advantageous producing areas, supporting development Development strategies for characteristic fruit producing areas such as kiwifruit, grapes and early pears. In 2021, the fruit planting area in our province will reach 6.5 million mu and the output will be 4.2 million tons. 18 kinds of regional characteristic fruits such as Gannan navel orange, Guangfeng Majia pomelo and Fengxin kiwi are widely favored by consumers.我国水果采后商品化处理行业发展较晚，导致我国水果产品商品化处理水平低、缺乏核心市场竞争力，附加值难以提升，产业转型升级发展困难。随着近年国内研究发展，已经突破了水果外部品质无损检测技术，并成功应用于水果采后商品化处理设备，然而现有设备在软硬件功能性能方面仍存在不足，如多视觉系统不兼容、视觉成像不均匀，模型算法通用性差等问题，导致水果采后商品化设备智能化程度不高，水果外观品质分选效率低、精度差，设备制造成本居高不下。项目拟引入人工智能技术，通过智能算法设计，实现机器自主学习，高水果外观品质检测精度和效率；通过软件系统开发提升水果采后商品化处理设备稳定性、降低视觉分选系统的制造成本。通过项目实施，有效提升我省特色水果商业价值、加速地域代表性水果品牌建设，对带动水果生产企业降本增效、促进农民增收具有重要意义。同时，能进一步对我国水果采后商品化处理设备制造业发展、水果产业经济效益提升和转型升级起到显著的推动作用。The post-harvest commercialization of fruit in my country has developed late, resulting in a low level of commercialization of fruit products in my country, a lack of core market competitiveness, difficulty in increasing added value, and difficulties in industrial transformation, upgrading and development. With the development of domestic research in recent years, it has broken through the non-destructive testing technology of fruit external quality, and has been successfully applied to commercial fruit processing equipment after harvesting. Problems such as uneven visual imaging and poor generality of model algorithms lead to low intelligence of post-harvest commercialized fruit equipment, low efficiency and poor accuracy of fruit appearance quality sorting, and high equipment manufacturing costs. The project plans to introduce artificial intelligence technology, through intelligent algorithm design, to achieve machine self-learning, high fruit appearance quality detection accuracy and efficiency; through software system development to improve the stability of post-harvest commercial fruit processing equipment and reduce the manufacturing cost of the visual sorting system. Through the implementation of the project, it is of great significance to effectively enhance the commercial value of special fruits in our province and accelerate the construction of regionally representative fruit brands, which is of great significance for driving fruit production enterprises to reduce costs and increase efficiency and increase farmers' income. At the same time, it can further play a significant role in promoting the development of my country's fruit post-harvest commercialization processing equipment manufacturing industry, the improvement of economic benefits and the transformation and upgrading of the fruit industry. |
| 技术难题概述 | 随着水果采后商品化处理技术的发展，现有的水果视觉分选系统已经能够对多种水果进行尺寸、颜色、大小、大面积缺陷、普通瑕疵等多种外观品质指标进行标准化检测和分级。然而面向大规模、多品种的水果分选商业应用，现有方法仍存在算法版本落后、计算速度低、建模程序复杂，多视觉系统不兼容、高频率采图丢帧、控制系统有延迟、图像采集设备可用型号少等问题，导致设备整体视觉分选速度低，分选精度不高，智能化程度低。以尺寸分选为例，不同品种水果尺寸分选标准不同，部分水果的果蒂较大或较长，会对尺寸计算造成影响，单一检测方式和简单的算法不能实现多品种水果尺寸分选信息的快速有效判别，尺寸分选效果不好，分选模型通用性差。传统的瑕疵检测算法能实现普通瑕疵、白斑、溃疡、风疤、腐烂、开裂、红斑等瑕疵块的检测和判别，但是受到图像采集方式单一、算法智能化程度低的限制，难以实现灰干果、粗皮果、太阳果、麻点果、内裂果、油包凸起果、大脐部果等特殊次果的判定，严重影响了水果商品化外观品质分级。受传统视觉方法人工设计特征的影响，多色果皮、果蒂褶皱、脐部阴影极易被误判成瑕疵，造成大量的原料果浪费，造成经济损失。With the development of fruit post-harvest commercialization processing technology, the existing fruit visual sorting system has been able to carry out standardized detection and classification of various appearance quality indicators such as size, color, size, large area defect, common defect and so on for a variety of fruits. . However, for the commercial application of large-scale and multi-variety fruit sorting, the existing methods still suffer from outdated algorithm versions, low calculation speed, complex modeling procedures, incompatibility with multi-vision systems, high-frequency image capture and frame loss, delays in the control system, Problems such as few available models of image acquisition equipment lead to low overall visual sorting speed of the equipment, low sorting accuracy, and low degree of intelligence. Take size sorting as an example. Different varieties of fruit have different size sorting standards. Some fruits have large or long stems, which will affect the size calculation. A single detection method and simple algorithm cannot realize the size sorting information of multiple varieties of fruits. The fast and effective discrimination of the size sorting effect is not good, and the generality of the sorting model is poor. The traditional flaw detection algorithm can detect and discriminate common flaws, vitiligo, ulcers, wind scars, rot, cracking, erythema and other flaws. Judgment of special secondary fruits such as rough-skinned fruits, sun fruits, pitted fruits, internal cracked fruits, oil-packed raised fruits, and large umbilical fruits has seriously affected the appearance and quality classification of fruit commercialization. Affected by the artificial design features of traditional visual methods, multi-colored peels, fruit stalk folds, and shadows on the umbilicus are easily misjudged as defects, resulting in a large amount of raw fruit waste and economic losses. |
| 技术攻关后希望达到的预期技术目标 | 通过基于深度学习的果蔬多频段全景视觉识别分选关键技术研究，研发出一款针对水果实时分选的软件系统。基于人工智能技术设计开发水果视觉品质并行检测算法，实现机器自主学习，在分选机进行实时分选的同时，可利用该软件实时查看当前水果的颜色、大小、形状、瑕疵等分选效果，并通过调整参数设置当前需要的分选等级，可应用于柑橘、猕猴桃、梨、苹果、红枣等多种水果采后智能商品化处理设备。实现多视觉系统的兼容和升级外部品质在线快速检测，提高尺寸检测分选精度，能够准确识别特殊次果避免误判，系统成功应用后应实现对水果外部品质进行综合分级。在千兆网下，实现最多同时三个方向的彩色相机和同方位的三个红外相机的同步采图，颜色分选区间0~360°，帧率最快为50fps，分辨率最大为2048\*1000。中型水果外观品质分选速度达到900个/分钟/通道，小型水果外观品质分选速度达到1800个/分钟/通道，尺寸分选精度≤±0.5mm，缺陷检测最小面积0.1 mm²，实现柑橘灰干果、粗皮果、太阳果、麻点果、内裂果、油包凸起果、大脐部果等特殊次果的判定，正确识别多色果皮、果蒂褶皱、脐部阴影等，分级合格率达≥97.5%，分选等级≤16个，损伤率≤0.5%。项目实施期内申报发明专利15件以上、实用新型专利20件以上，发表科技论文1-3篇， 2024年正式规模化应用，2024年和2025年两年应用新技术的设备销售200台（套），设备新增销售收入10亿元，利润2亿元，纳税1.5亿元。Through the research on the key technology of multi-band panoramic visual recognition and sorting of fruits and vegetables based on deep learning, a software system for real-time fruit sorting was developed. Based on artificial intelligence technology, a parallel detection algorithm for fruit visual quality is designed and developed to realize machine self-learning. While the sorting machine is performing real-time sorting, the software can be used to view the sorting effect of the current fruit in real time, such as color, size, shape, defect, etc. And by adjusting the parameters to set the currently required sorting level, it can be applied to post-harvest intelligent commercial processing equipment for citrus, kiwi, pear, apple, red date and other fruits. Realize the compatibility of multi-vision systems and upgrade the online rapid detection of external quality, improve the accuracy of size detection and sorting, and can accurately identify special secondary fruits to avoid misjudgment. Under the gigabit network, it can realize the simultaneous acquisition of color cameras in up to three directions and three infrared cameras in the same orientation. The color sorting range is 0~360°, the frame rate is up to 50fps, and the resolution is up to 2048\* 1000. The appearance quality sorting speed of medium-sized fruits reaches 900 pieces/min/channel, and the appearance quality sorting speed of small fruits reaches 1800 pieces/min/channel. The size sorting accuracy is ≤±0.5mm, and the minimum defect detection area is 0.1 mm². Judgment of special secondary fruits such as , coarse-skinned fruits, sun fruits, pitted fruits, internal cracked fruits, oil-packed raised fruits, large umbilical fruits, etc., and correctly identified multi-colored peels, pedicle folds, umbilical shadows, etc., and the grading pass rate reached ≥97.5%, sorting grade ≤16, damage rate ≤0.5%. During the implementation period of the project, apply for more than 15 invention patents, more than 20 utility model patents, publish 1-3 scientific papers, and formally apply it on a large scale in 2024. In 2024 and 2025, 200 sets of equipment for applying new technologies will be sold (sets). ), the new equipment sales revenue is 1 billion yuan, the profit is 200 million yuan, and the tax payment is 150 million yuan. |
| 时限要求 | 2025年1月前完成Completed before January 2025 |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 2000 万元。其中：愿意支付揭榜单位研发资金不少于 1000 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 该项目技术相关知识产权、成果归需求方和技术攻关单位共有，一方如需转让或变更知识产权及成果，需经另一方同意，否则无效，由此引起的责任由责任方承担。双方需对项目的技术内容进行保密未经双方同意不得将相关资料泄露给他人或擅自提交第三方阅览。若技术攻关单位有知识产权及成果转让需求，需求方拥有优先接受转让权。The intellectual property rights and achievements related to the technology of the project are shared by the demander and the technical research unit. If one party needs to transfer or change the intellectual property rights and achievements, it needs the consent of the other party, otherwise it will be invalid, and the responsible party will bear the responsibility. Both parties need to keep the technical content of the project confidential. Without the consent of both parties, relevant information shall not be disclosed to others or submitted to a third party for viewing without authorization. If the technical research unit has the need to transfer intellectual property rights and achievements, the demander has the priority to accept the transfer. |
| 企业承接转化后预期的经济、社会效益 | 项目技术成功实现产业化后，预计每年产销100台套，年新增销售额5亿元，新增利税1.75亿元。应用于生产后，可实现果蔬多频段全方位视觉识别分选，提高水果采后商品化处理设备的稳定性，降低设备的制造成本，突破国外采后设备技术垄断，填补了国内水果分选领域的技术空白，满足水果产业对高端采后分选设备的需求，推动我国水果采后商品化设备制造业的发展，提升我国水果采后处理技术水平。助力 柑橘、猕猴桃、梨、苹果、红枣等多种水果产业商品化发展，提高水果货架质量和市场竞争力和附加值，推动水果产业的转型升级和经济效益提升，助力我国农业现代化的发展。延长水果产业链条，带动区域种植业、物流运输、电子商务和零售业等下游相关产业的稳定发展，促进产业增收，增加农民收入，扩大就业，有助于解决“三农”问题，具有良好的社会效益。After the successful industrialization of the project technology, it is expected to produce and sell 100 sets per year, with an annual increase of 500 million yuan in sales and 175 million yuan in new profits and taxes. After being applied in production, it can realize multi-band and all-round visual identification and sorting of fruits and vegetables, improve the stability of post-harvest commercial processing equipment, reduce the manufacturing cost of equipment, break through the monopoly of foreign post-harvest equipment technology, and fill the domestic fruit sorting field. To meet the needs of the fruit industry for high-end post-harvest sorting equipment, promote the development of my country's post-harvest commercialized equipment manufacturing industry, and improve my country's post-harvest processing technology level. Help the commercialization of citrus, kiwi, pear, apple, red dates and other fruit industries, improve the quality of fruit shelves, market competitiveness and added value, promote the transformation and upgrading of the fruit industry and improve economic benefits, and help the development of my country's agricultural modernization. Extend the fruit industry chain, drive the stable development of downstream related industries such as regional planting, logistics and transportation, e-commerce and retail, promote industrial income, increase farmers' income, and expand employment, which is helpful to solve the "three rural" problems. social benefit. |

**“揭榜挂帅”企业重大技术需求榜单（6）**

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| --- | --- | --- | --- |
| 所属产业领域或产业链 | 装备制造Equipment manufacturing | 细分方向 | 专用设备制造Special equipment manufacturing |
| 重大技术需求项目名称 | 小口径、厚壁高强度精密焊管成型机组研制Development of small diameter, thick wall and high strength precision welding pipe forming unit |
| 技术需求提出企业 | 江西福事特液压股份有限公司JIANGXI FIRST HYDRAULIC CO., LTD |
| 技术需求牵头企业联系人 | 姓名 | 吴兆平wuzhaoping | 职务 | 技术总监Technical Director | 手机：13585888915 | 邮箱：wuzhaoping699@163.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 徐工集团、三一重工Xuzhou Construction Machinery Group、SANY | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 | 中联重科、卡特、小松Zoomlion、Caterpillar Inc.,、Komatsu Ltd. | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 小口径、厚壁高强度精密焊管的外径和壁厚精度高，具有高强度、塑性好等优越的机械性能，是应用于超高压、高脉冲恶劣或极端工况的液压系统以及汽车稳定杆等场合的关键零件，质量要求高，需求量大。先进制造装备是精密焊管高精度、高性能和大批量生产的根本保证。但是，我国从70年代对日本焊管技术及其装备进行研究开始，到80年代进口德国、美国和意大利等多国的精密焊管成套设备（含配套的拉拔机组和无氧退火炉），再到90年代以后大量从国外引进精密焊管成套设备，历经几十年，焊管成套设备仍只能满足煤浆输送、城市供水、锅炉、汽车、船舶和建筑等行业所需的中低端产品，在高强度精密焊管关键核心技术及成套装备制造上仍未取得突破，如液压用精密焊管材料、设备成型以及高质量焊接技术及成套装备，特别是小管径、厚壁精密焊管生产成套装备的技术水平与国外差距更大，导致精密焊管高端成套设备长期依赖进口。因此，攻克小管径、厚壁精密焊管关键核心技术和研发成套设备十分紧迫。本项目通过攻克小管径、厚壁精密焊管关键核心技术，研发高端成套设备，可以打破国外垄断的局面，对服务于国家重大战略需求、实现产业链供应链自主可控和应对国际不确定性因素的竞争环境等方面具有重大意义。项目实施后，还可推广应用到工程机械、矿山机械、港口、风电等领域的液压用精密焊管的生产，也可推广应用到新能源汽车转向柱、齿轮轴、安全座椅预警、防撞门梁、凸轮轴和减震器用管的生产，提高管道强度，减小管道壁厚，提高可靠性，实现轻量化，对推动我省产业转型升级十分重要。The outer diameter and wall thickness of small diameter, thick wall high strength precision welding pipe has high accuracy, high strength, good plasticity and other superior mechanical properties, is used in ultra-high pressure, high pulse harsh or extreme working conditions of hydraulic system and automotive stabilizer pole and other key parts, high quality requirements, large demand.Advanced manufacturing equipment is the fundamental guarantee of high precision, high performance and mass production of precision welding pipe.but, China began to study Japanese welding pipe technology and equipment in the 1970s, By the 1980s, it imported complete sets of precision welding pipe equipment from Germany, the United States and Italy (including the supporting pulling unit and anaerobic reducing furnace), After the 1990s, a large number of precision welding pipe complete equipment was introduced from abroad, After several decades, Complete sets of welded pipe equipment can still only meet the middle and low-end products of coal slurry transportation, urban water supply, boiler, automobile, shipbuilding and construction industries, No breakthrough has been made in the key core technology and the manufacturing of complete equipment of high strength precision welding pipe, Such as hydraulic precision welding pipe materials, equipment molding and high-quality welding technology and complete sets of equipment, In particular, the technical level of small tube diameter, thick wall precision welding pipe production complete set of equipment and foreign gap is bigger, Lead to precision welding pipe high-end complete equipment long-term dependence on imports.Therefore, it is very urgent to conquer the key core technologies of small pipe diameter and thick wall precision welding pipe and develop complete sets of equipment.By conquering the key core technologies of small pipe diameter and thick wall precision welding pipe and developing high-end complete sets of equipment, this project can break the situation of foreign monopoly, and is of great significance to serving the major national strategic needs, realizing the autonomy and control of the industrial chain and supply chain, and the competitive environment dealing with international uncertain factors.After the implementation of the project, can also be applied to construction machinery, mining machinery, port, wind power and other fields of hydraulic precision welding pipe production, can also be applied to new energy vehicles steering column, gear shaft, safety seat warning, collision door beam, camshaft and shock absorber pipe production, improve pipe strength, reduce pipe wall thickness, improve reliability, realize lightweight, is very important to promote industrial transformation and upgrading in our province. |
| 技术难题概述 | 超高精度、高强度焊管机组的研制，多系统综合技术繁琐复杂1. 解决24小时连续高负荷轧制运转状态下机架微量变形问题，多种规格动态轧制下的抗扭转刚性机架有限元变形特征验证，通过仿真设计精准确定机架的变形量，确保多种规格动态轧制下机架结构的有限元变形可控；
2. 轧制中，无间隙、精密轧辊调节，根据板厚不均匀情况，采用闭环数字调节系统，误差自动多点补偿，粗、精成型段机架、立棍、模具轧辊的配合精度，轧制发丝误差变化，微控瞬间调整，即便是在载荷变动下，调整精度和重复精度仍然非常高，相应的电机、增量传感器，可在满载下进行微控自动调节；
3. 感应器和阻抗器的固态焊接系统要求能精确快速焊接8mm厚高强度钢板并确保焊缝质量零缺陷，焊接产生的高硬度内、外毛刺能同步刮除并确保管内外圆度精度。
4. 实现焊后急冷降温精确控制，确保后工序实现精准矫直
5. 在线智能探伤系统，确保产品焊缝零缺陷；
6. 多规格模具的快速互换轧制，通过一健式控制系统，实现计算机辅助轧辊快速调节，达到钢管中心轧制线恒定，可靠的无间隙精确调节、高度同心快速换辊。

通过上述“卡脖子”问题的，针对性的组织研发攻关，自主创新，解决国外技术壁垒的垄断，真正实现高强度直缝焊管机组国产量化，承制小管径厚壁管和高钢级的焊管生产。The development of ultra-high precision and high strength welding pipe unit, the multi-system comprehensive technology is complicated1. Solve the problem of trace deformation of frame under 24-hour continuous high-load rolling operation, verify the finite element deformation characteristics of anti-torsional rigid frame under dynamic rolling of various specifications, accurately determine the deformation of frame through simulation design, and ensure the controllable finite element deformation of frame structure under dynamic rolling of various specifications;2, Rolling, no gap, precision roll adjustment, according to the uneven plate thickness, using closed-loop digital adjustment system, error automatic multi-point compensation, coarse, finishing section frame, stick, mold roll with accuracy, rolling hair error change, micro control instant adjustment, even under the load changes, adjustment accuracy and repeated accuracy is still very high, the corresponding motor, incremental sensor, can be micro control automatic adjustment under full load;3. The solid state welding system of sensor and impedance requires accurate and rapid welding of 8mm thick high strength steel plate and ensures zero defect in the quality of the weld. The high hardness internal and external burrs produced by welding can be scraped simultaneously and ensure the accuracy of roundness inside and outside the pipe.4. Realize precise control of emergency cooling after welding to ensure accurate straightening of the later process5. Online intelligent flaw detection system to ensure zero defects in product welds;6. Rapid switching and rolling of multi-specification molds, through a one-type control system, realizes the rapid adjustment of computer-assisted roll, to achieve the constant central rolling line of steel pipe, reliable gapless accurate adjustment, and high concentric rapid roll change.Through the above "neck" problem, targeted organization research and development, independent innovation, solve the monopoly of foreign technical barriers, truly achieve high strength straight seam welding pipe unit domestic quantification, making small pipe diameter thick wall pipe and high steel grade welding pipe production |
| 技术攻关后希望达到的预期技术目标 | 1. 机组轧制的材料：E355、26MnB5、34MnB5、S550MC；带钢屈服强度：max.600N/mm²；管径：φ20mm～φ60mm；壁厚：2.0mm～8.0mm；管径公差：φ﹤30±0.02mm、φ≥30±0.05mm、壁厚公差max.±0.01mm；厚径比：1:5-1:30；直线度：≤1mm/m；切长公差：±1.0mm(线速度60m/min和管长10m以下)；见附件1
2. 生产线速度：max.60m/min；
3. 主机架轧制力：≥240 kN；
4. 定径段设计公差：夹紧件无辊同心度：﹤0.02mm、在夹紧件上每根轴运行精度：﹤0.01mm；
5. 定位/重复精度，在相同的载荷条件下：圆管外径公差，包括椭圆度±0.02mm；
6. 挤压机、定径机、被动机架同轴度﹤0.02mm；
7. 粗成型、精成型、立辊机架、焊缝导向机架同轴度﹤0.02mm；

8、感应器和阻抗器的固态焊接系统要求能精确快速焊接8mm厚高强度钢板，确保焊缝质量零缺陷；内、外毛刺刮刀要耐高温、强度高1. 快速换辊，多种规格产品之间，采用在线换辊，具有自动换辊一健调节功能，从轧制一个规格到另一个规格换辊时间：≤2个小时；达到柔性生产模式
2. 设备标准：要能满足ISO国际标准、DIN德国工业标准、EN DIN由欧标覆盖、TEC国际电气技术协会、EURONORM欧标、C-标准-欧洲EN产品安全标准，可参照相应不同国家的标准要求设计。

1. Unit rolled materials: E355,26MnB5,34MnB5, S550MC; strip yield strength: max.600N/mm²; pipe diameter: 20mm~ 60mm; wall thickness: 2.0mm~8.0mm; pipe diameter tolerance: 30±0.02mm, φ≥30±0.05mm, wall thickness tolerance max.±0.01mm; thickness ratio: 1:5-1:30; linear: 1mm / m; cutting length tolerance: ± 1.0mm (line speed 60m / min and pipe length below 10m); see Annex 12. Production line speed: max.60m/min;3. Rolling force of the main engine frame: 240 kN;4. Design tolerance of fixed diameter section: no roller centricity of clamping: 0.02mm, operation accuracy of each shaft on the clamping: 0.01mm;5. Positioning / repetition accuracy, under the same load conditions: the outer diameter tolerance of the circular pipe, including the ellipticity of ± 0.02mm;6. Coaxial degree of extrusion machine, diameter machine and passive frame is 0.02mm;7. Coarse forming, fine forming, vertical roll frame, weld guide frame: 0.02mm;8. The solid state welding system of sensor and impedance requires accurate and rapid welding of 8mm thick high strength steel plate to ensure zero-defect weld quality; internal and external burr scraper shall be resistant to high temperature and high strength8. Rapid roll changing, between a variety of specifications of products, with automatic roll changing one health adjustment function, from rolling one specification to another specification roll changing time: 2 hours; to achieve flexible production mode9. Equipment standards: To be able to meet ISO international standards, DIN German industrial standard, EN DIN covered by European standards, TEC International Electrical Technology Association, EURONORM European standard, C-standard-European EN product safety standards, can be designed according to the corresponding standards of different countries. |
| 时限要求 |   根据项目时间进度的安排，项目预计2023年12月30日前完成According to the project schedule, the project is expected to be completed by December 30,2023 |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 1500万元。其中：愿意支付揭榜单位研发资金不少于 1000 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。1. The enterprise is willing to provide a research and development fund of no less than 15 million yuan for solving this technical problem.Among them: willing to pay the research and development fund of the listed unit is not less than 10 million yuan.2. Promise to timely and full allocation of research and development funds and the payment unit. |
| 产权归属 | “揭榜挂帅”企业在项目期间，参与本公司项目开发所取得的成果、知识产权归江西福事特液压股份有限公司所有。During the project, the achievements and intellectual property rights of the project development of the company belong to JIANGXI FIRST HYDRAULIC CO., LTD |
| 企业承接转化后预期的经济、社会效益 |  项目成果实施转化后，填补了国内液压钢管、油缸缸筒、汽车稳定杆等高强度精密焊管无缝化材料关键技术研究的空白，并将产品在各个行业上进行推广使用，初期形成年产9万吨高强度直缝精密焊管能力，新增销售收入13.5亿元，新增利润6亿元，新增利税1.2亿元；随着需求进一步提升，并拓展到工程、矿山、风电等机械液压系统上的高压钢管总成应用，将进一步扩大产能。满足各类市场不断增长的需求。After the transformation of project results, fill the gap of the key technology research of high strength precision welding pipe, cylinder cylinder, automobile stabilizer rod, and promote products in various industries, form the annual capacity of 90,000 tons, new sales revenue of 1.35 billion yuan, new profit of 600 million yuan; with the demand further increase, and expand to high pressure steel pipe assembly on the mechanical hydraulic system such as engineering, mine, wind power, which will further expand the production capacity.To meet the growing demand of various markets. |

**“揭榜挂帅”企业重大技术需求榜单（7）**

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| --- | --- | --- | --- |
| 所属产业领域或产业链 | 新材料New Material | 细分方向 | 无机非金属材料Inorganic Materials |
| 重大技术需求项目名称 | 线路瓷绝缘子用高可靠性瓷件制备关键技术研究Research on Key Technology of Preparating High Reliability Porcelain Parts for Suspension Line Porcelain Insulators |
| 技术需求提出企业 | 中材江西电瓷电气有限公司Sinoma Jiangxi Insulator and Electricity Co., Ltd. |
| 技术需求牵头企业联系人 | 姓名 | 徐炎 | 职务 |  | 手机：17307993798 | 邮箱：282572172@qq.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 中铁国材绝缘材料有限公司China Railway Sinoma Insulation Products Co., Ltd. | 龙头企业骨干企业战略性新兴产业企业高新技术企业科技型中小企业 |
| 2 |  |  |
| 项目需求的背景与意义 | 外绝缘技术是高压输变电和铁路接触网的核心技术之一，线路瓷绝缘子是高压输变电和铁路接触网外绝缘技术的核心部件和关键材料，它的性能直接影响高压输配电和铁路接触网技术的可行性、运营的可靠性和安全性。The external insulation technology is one of the core technologies of high voltage power transmission and transformation line as well as railway catenary among which line porcelain insulator is the core component and key material. Its performance directly affects the feasibility, operation reliability and safety of high voltage power transmission and transformation line as well as railway catenary.萍乡芦溪是中国电瓷之都、国家电瓷高新技术产业化基地、国家电瓷产业化基地、全省首批20个省级工业示范产业集群之一。目前，芦溪县境内通过国家电网公司和铁路总公司合格供应商资质评审的电瓷企业分别有19家和4家，各占全国的一半以上，芦溪电瓷占据了国内60%、国际20%以上的市场份额。但是芦溪电瓷大部分还停留在中低端水平，而且近年来芦溪电瓷因使用当地瓷土原料，引起瓷件性能劣化严重，而导致产品失效的事故频出，出现了退单、企业被投诉和通报等恶劣问题。目前业界普遍认为芦溪电瓷产品质量基本达不到国际标准要求，部分产品质量甚至达不到国家电网和南方电网采购要求，有部分芦溪电瓷企业因产品质量问题而被迫关闭停产，严重影响了地方电瓷产业的发展。Luxi Pingxiang is the capital of China’s electric porcelain, the national high-tech electric porcelain industrial base, the national electric porcelain industrial base, and one of the first 20 provincial industrial demonstration industrial clusters in the province. In Luxi, there are 19 enterprises and 4 enterprises received qualified supplier qualification of State Grid of China and China National Railway Group Limited respectively, taking up more than half of the whole country. Luxi electric porcelain occupies 60% shares of the China domestic market and 20% of the international market. However, most of Luxi electric porcelain still stays at the medium and low-end level. In recent years, due to the usage of local porcelain clay, there are frequent accidents of product failure caused by serious performance deterioration of Luxi electric porcelain, resulting in serious problems such as order cancel, enterprise complaint and notification. At present, it is widely believed in the field that the quality of Luxi electric porcelain products cannot meet the requirements of international standards, and some cannot even meet the procurement requirements of State Grid and Southern Power Grid. Some Luxi electric porcelain enterprises were forced to shut down due to product quality problems, which seriously affects the development of local electric porcelain industry.在这个背景下，地方政府和产业联盟提出亟需在当地瓷土原料标准化应用技术研究的基础上，开展线路瓷绝缘子用高可靠性瓷件制备关键技术攻关，提升线路瓷绝缘子瓷件性能和产品整体性能，提升地方线路瓷绝缘子整体质量水平，助力芦溪电瓷迈向中高端和高质量发展，为输变电和铁路轨道交通工程提供性能稳定、运行可靠的线路瓷绝缘子产品，为“一带一路”、“ 走出去”、新基建等国家战略的实施提供强力支撑。Based on this background, the local government and industrial alliance put forward that, on the basis of local porcelain clay standardized application technological research, it is urgently needed to carry out key preparating technology research on High reliability porcelain parts of line porcelain insulators, improve the performance of porcelain parts and the overall performance of whole products, improve the overall quality level of local line porcelain insulators, and help Luxi electric porcelain to move forward to medium-high-end and high-quality development, in the hope of providing stable and reliable line porcelain insulator products to power transmission and transformation line as well as railway rail transit projects, and providing strong support for the implementation of national strategies such as "One Belt and One Road", "Going Abroad" and new infrastructure construction. |
| 技术难题概述 | 发展瓶颈：一，主要原料为当地瓷土原料，未经工业化制备，缺少原料标准，原料性能波动大；二、缺少对地方原料应用技术及其在瓷件中作用机理的系统研究，不能发挥地方原料的优势，导致产品生产和质量波动大；三、缺少利用地方原料制备电瓷的技术规范和技术标准的研究，生产工艺控制能力薄弱，产品质量不稳定。上述问题导致瓷件性能差、波动大、衰减严重，难以保证瓷件在高外力、强电场、大温度梯度等多物理场复杂环境下长期运行的可靠性，导致产品质量事故频发。At present, Luxi electric porcelain industry is confronting following development bottlenecks: 1. The main material is from local raw material lacking of industrialization preparation and raw material standards which result in unstable performance and low added-value. 2. Insufficient systematic research on the action mechanism, formula system and sintering mechanism of local raw materials in porcelain parts, and the advantages of local raw materials cannot be given full play and the fluctuation of production and performance is great. 3. Lack of reach on local raw material electric porcelain preparation technology, specifications and standards, and the production technology control capability is weak which result in unstable product performance. The above-mentioned problems lead to poor performance, great fluctuation and degradation of porcelain parts, therefore, the long-term operation reliability of porcelain parts in the complex environment of multiple physical fields, such as high external force, strong electric field and large temperature gradient cannot be insured, resulting in frequent product quality accidents. 技术攻关的方向：一、开展瓷件化学成分、微观构成对瓷件性能影响的研究，揭示瓷件在高外力、强电场、大温度梯度等多物理场复杂环境下长期运行的劣化老化机理，形成理论与方法，解决瓷件微观构成的调控难题，实现瓷件长期优异的应用性能。二、开展地方原料在绝缘子瓷件中作用机理和烧结机理的研究，揭示地方瓷土原料对瓷件制备的影响原理，明确从原料性能提升瓷件性能的方向。Technical breakthrough directions: 1. To perform reach on the chemical component and micro structure influence to porcelain parts, to reveal the degradation failure mechanism of the porcelain in the complex environment of multiple physical fields such as high external force, strong electric field, and large temperature gradient for long-term operation and form theories and methods in order to solve the difficult problem of controlling the micro structure of porcelain parts, realizing long-term excellent performance of it. 2. To perform research on the action mechanism and sintering mechanism of local material in porcelain parts, reveal the influence of local material to porcelain preparation and clarify the direction for improving the performance of porcelain parts. 通过科技创新解决的技术壁垒：一、解决因瓷件性能劣化导致线路瓷绝缘子产品失效的评判技术，确定评价指标、方法和标准，实现瓷件内部组成、结构等的优化设计；二、解决利用地方瓷土原料制备高可靠性瓷件的微观组成调控与制备技术，建立瓷土评价方法和产品标准，优化并形成系列配方体系，制订瓷件生产工艺标准和作业规范，保证瓷件在线路瓷绝缘子产品的长期运行中具有优异的电气以及机械性能。Technical barriers solved through scientific and technological innovation: 1. To solve the evaluation technology of the failure of line porcelain insulator products due to the deterioration of porcelain part performance, determine the evaluation index, evaluation method and evaluation standard, and realize the optimization design of the internal composition and structure of porcelain parts; 2. To solve the micro composition regulation and preparation technology of high reliability porcelain parts prepared from local porcelain clay raw materials, establish porcelain clay evaluation methods and product standards, optimize series formula systems, and formulate porcelain part production technological standards and operation specifications so as to insure excellent electrical and mechanical performance of porcelain parts of insulators in the long run operation. |
| 技术攻关后希望达到的预期技术目标 | 1. 目前的技术指标参数

Current technical parameters1. 瓷件强度分散性大，瓷件强度标偏≥15%额定破坏负荷；

Large dispersion of porcelain parts strength, porcelain parts strength standard deviation≥15% of rated failure load. 1. 瓷件电气击穿强度＜20kV/mm；

Porcelain parts electric puncture strength＜20kV/mm1. 抗热震性能△T＜150K；

Thermal shock resistance △T＜150K1. 电瓷用原料没有统一标准。

No uniform standard to raw material used for porcelain insulator1. 攻关后要求达到的技术参数

Technical parameters to be achieved after key problems solved.1. 瓷质均匀，瓷件强度分散性小，瓷件强度≥1.25倍额定破坏负荷，瓷件强度标偏≤10%额定破坏负荷；

Uniform porcelain, porcelain strength with small dispersion, porcelain strength ≥1.25 times of rated failure load, porcelain strength standard deviation ≤10% of rated failure load1. 瓷件电气击穿强度≥30kV/mm；

Porcelain parts electric puncture strength≥30kV/mm1. 抗热震性能△T≥180K；

Thermal shock resistance △T≥180K1. 形成本地原料团体标准。

To formulate uniform standard of local raw material. |
| 时限要求 | 2024年6月前完成Finish before June 2024. |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 2500 万元。其中：愿意支付揭榜单位研发资金不少于 2500 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 在项目研究开发过程中取得的知识产权归技术需求和揭榜双方享有，未经双方许可，任何一方不得单独申请知识产权或向第三方转让知识产权申请权。双方均享有本项目下研究成果的使用权，但揭榜方仅能在技术需求方许可的范围内使用该研究成果。因使用该研究成果所产生的效益，由双方共同协商确定分配方式。The intellectual property rights obtained during the research and development of this project shall belong to the technology demand and undertaking parties. Without the permission of both parties, each party shall not apply for intellectual property rights alone or transfer the application right of intellectual property rights to a third party. Both parties enjoy the right to use the research results under this project, but the undertaking party can only use the research results to the extent permitted by the technology demander. The benefits arising from use of the research results shall be determined by the parties through mutual negotiation. |
| 企业承接转化后预期的经济、社会效益 | 随着项目技术在需求单位进行产业化示范应用，预计可新增销售收入30000万元；随着项目技术在芦溪电瓷产业集群内推广，将产生数十亿元二次经济效益；随着项目产品在输变电和铁路轨道交通中大规模应用，产生的间接经济效益将达到数百亿元。With the industrialization demonstration application of the project technology in companies with demand, it is expected to increase sales revenue of RMB 300 million; with the promotion of the project technology in Luxi electric porcelain industrial field, it will generate billions of secondary economic benefits; with the large-scale application of the project products in power transmission and transformation as well as railway rail transit , the indirect economic benefits will reach to RMB tens of billions.项目将对我国特高压和高铁两个国家战略的实施并走向世界，提供强有力的支撑作用。通过项目技术与相关装备的研究开发，形成一批具有自主知识产权的先进技术与装备，生产出符合相关标准的产品，打破国外在相关领域的技术垄断，为电瓷产业的快速发展奠定良好的基础。通过产业化项目相关技术与装备的推广应用，可为电瓷产业基地的快速发展提供良好支撑，带动地方电瓷产业的技术进步、转型升级和高质量发展。The project will provide strong support for the implementation of China's two national strategies of ultra-high voltage and high-speed rail, introducing it to the world. Through project technology and related equipment R&D, a batch of advanced technology and equipment with independent intellectual property rights will be formed to produce products in line with relevant standards, breaking the foreign technological monopoly in related fields, and laying a good foundation for the rapid development of electric porcelain industry. Through the promotion and application of relevant technology and equipment of industrialization project, it can provide good support for the rapid development of electric porcelain industrial base and drive the technological progress, transformation and upgrading and high-quality development of local electric porcelain industry. |

**“揭榜挂帅”企业重大技术需求榜单（8）**

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| --- | --- | --- | --- |
| 所属产业领域或产业链 | 铜压延加工 | 细分方向 | 铜基新材料 |
| 重大技术需求项目名称 | 阳极泥中有价金属的绿色高效回收关键技术 |
| 技术需求提出企业 | 贵溪市鑫浩泰环保科技有限公司 |
| 技术需求牵头企业联系人 | 姓名 | 李样才 | 职务 | 主任 | 手机：13970162358 | 邮箱：577584953@@com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 贵溪华晋铜业有限公司 | □龙头企业☑骨干企业□战略性新兴产业企业☑高新技术企业□科技型中小企业 |
| 2 | 贵溪中星铜业有限公司 | □龙头企业☑骨干企业□战略性新兴产业企业☑高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 |  随着工业的发展，全球都面临着有色金属资源逐渐匮乏的问题，对二次资源进行回收利用开始受到愈来愈多的关注。铜、镍阳极泥是一种含有大量有价金属的二次资源，利用价值高，是提取金、银等贵重金属极其重要的原料。江西贵溪有我国最大的铜冶炼、加工基地，其中相关的铜、镍阳极泥二次资源丰富，开展阳极泥中有价金属的绿色高效回收关键技术的开发对于提高资源利用率，促进地方经济的发展有重大的意义。 目前，国内外用于铜、镍阳极泥的处理主要有三大工艺。一是全湿法工艺，流程为“铜阳极泥加压浸出铜、碲-氯化浸出硒、金-碱浸分铅-氨浸分银-金银电解“二是以湿法为主，火法为辅的（半）湿法工艺，目前为国内大多数厂家所采用。主流程为“铜阳极泥硫酸化焙烧蒸硒-稀酸分铜-氯化分金-亚钠分银-金银电解”；三是以火法为主、湿法为辅的（半）火法流程，主流程为“铜阳极泥加压浸出 铜、碲-火法熔炼、吹炼-银电解-银阳极泥处理金”。但这些方法要么因工艺特点限制了原料来源，要么仍未克服银直收率低、环境污染问题大，部分工艺仍无法综合回收利用有价金属。本项目将克服目前阳极泥回收工艺中的问题，实现铜镍阳极泥的绿色高效回收。 |
| 技术难题概述 | 针对铜、镍电解阳极泥中的金、银、铂、钯贵金属和锡、锑、铜、镍开展绿色高效回收，主要内容包括：（1)阳极泥氯化分银工艺的研究氯化剂的选择、添加量、反应时间、温度的控制等；(2)金的还原工艺研究 还原剂的选择、添加量、反应时间、温度、酸度的控制等；(3)铂、钯的提取工艺研究络合剂、还原剂的选择、添加量、反应时间、温度、pH值的控制等；(4)锑、锡和贵金属的分离工艺研究 锑、锡水解条件研究、时间、温度、pH值的控制等。拟解决的核心技术在于：氯化分银工艺和锑、锡和贵金属的分离工艺。确保金、银的回收率达到99%，锡和锑得到有效的回收，不会产生新的废渣、废液。主要创新点：采用强化浸出分银工艺，确保了金银的回收率，对锡和锑得到有效的回收。 |
| 技术攻关后希望达到的预期技术目标 | 开发的铜镍阳极泥回收工艺，金的回收率不小于99%，铂的回收率不小于96%，钯的回收率不小于98%，银的回收率不小于99%；不会造成铑、铱等稀贵金属的流失，锡、锑、铜、镍得到有效的回收，废水循环利用，不会产生废渣污染。 |
| 时限要求 | 2023年12月前完成 |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 600 万元。其中：愿意支付揭榜单位研发资金不少于300 万元。 2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 申请发明专利1项，实用新型专利3项。知识产权双方共享。科研成果由我方无偿使用。 |
| 企业承接转化后预期的经济、社会效益 | 通过本项目的实施，研发出适用范围广、高效环保的阳极泥中有价金属绿色高效回收关键技术，用于铜、镍阳极泥的回收，完善贵溪市鑫浩泰环保科技有限公司综合回收的产业链，对于公司发展、地方产业的带动有积极的社会、生态效益。新技术操作时间短，金属积压少，能耗低，提取铂、钯、金的试剂成本控制在6000元/吨（干料）；新工艺中分银渣中金含量小于15g/T，铂含量小于10g/T，钯含量小于5g/T，银含量大于1000g/T；不会造成铑、铱等稀贵金属的流失，从阳极泥提取出铂、钯、金的时间周期为5~6天，能够为企业带来可观的经济效益。新技术具有投入小、建设快、无污染、生产周期短的优点，对带动整个有色金属行业可再生资源的综合利用具有积极意义。 |

**“揭榜挂帅”企业重大技术需求榜单（9）**

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| 所属产业领域或产业链 | 新材料 new material | 细分方向 | 有色金属 Non-ferrous metal |
| 重大技术需求项目名称 | 高精高效微晶磷铜球全自动产线关键技术研发与应用Research and application of key technologies of high precision and high efficiency full-automatic production line for microcrystalline phosphorus copper ball |
| 技术需求提出企业 | 江西保太有色金属集团有限公司Jiangxi Baotai Non-ferrous Metal Co. , Ltd. |
| 技术需求牵头企业联系人 | 姓名 | 赵梓含ZihanZhao | 职务 | 办公室主任 Chief of staff | 手机：18907019538 | 邮箱：pbt1234@126.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 江南新材料Jiangnan New Material Technology Co. , Ltd. | ☑龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 铜球作为阳极PCB材料来使用，由于磷铜在点解过程中形成一层黑色的CuP膜，这层膜具有导电性，改变了铜阳极溶解过程中的一些反应步骤，对镀层的质量和工艺稳定性起到了重要作用。随着电子技术的飞速发展，各种电路板的生产需求量大大增加，磷铜球作为电镀阳极的主要材料也大大增加，磷铜球产品应用于电力、家用电器、汽车、建筑、电子仪器仪表、国防、交通运输、海洋工程等多个市场和多个行业，占据铜材高端市场。该产业在国内的分布以长江三角洲、珠江三角洲最为集中。国内已形成了以江南铜业、金川镍都、承安铜业、福田金属、金洲精工等为代表的具有相当规模的磷铜球生产企业，据我们估计国内年产销高品质磷铜球的总消费量约在 30-40万吨左右。**目前，在国内磷铜球生产大多采用浇铸或者日本二手设备生产，并且都是单机生产磷铜球，生产完成后抛光、清洗、包装都为手工作业，极大的浪费人力资源。且劳动强度大，生产工人密集，包装误差大，品质提升困难，晶体结构疏散，产量低，高耗能。****磷铜球全自动生产线目前是全球领先的无人化生产线了，但是在国内还没有企业进行此项技术的研发**，**手工作业带来的误差还在浪费着金属资源与劳动资源。**因此，急需一套自动化程度高，操作简单，且生产的磷铜球产品优良的生产设备进入市场。助力鹰潭打造全国最大的微晶铜材制造基地，并为全国铜加工行业率先树立智能制造示范，打造鹰潭磷铜产业加工先进智能制造先例，加速鹰潭从“世界铜都”迈入“智能铜都”的步伐。Copper balls are used as anode PCB materials. Because of the formation of a Black Cup film in the process of phosphorus-copper breakdown, the film has conductivity, which changes some reaction steps in the process of copper anodic dissolution, it plays an important role in coating quality and process stability. With the rapid development of electronic technology, the production demand of various circuit boards has increased greatly, and the phosphorus copper ball as the main material for electroplating anodes has also increased greatly, phosphorus copper ball products are used in electric power, household appliances, automobiles, construction, electronic instruments, national defense, transportation, marine engineering and other markets and industries, occupying the high-end copper market.The industry is most concentrated in China in the Yangtze River Delta and the Pearl River Delta. A considerable scale of phosphorus copper ball production enterprises has been formed in China, represented by Jiangnan copper industry, Jinchuan nickel capital, Jōan copper industry, Futian metal, Jinzhoiko, etc. , according to our estimation, the total consumption of high-quality phosphor copper balls is about 300-400,000 tons.At present, the domestic production of phosphor copper ball mostly uses casting or Japan second-hand equipment production, and are single production of phosphor copper ball, after the completion of production polishing, cleaning, packaging are manual work, a great waste of human resources. And Labor intensity, production workers intensive, packaging error, difficult to improve quality, crystal structure evacuation, low output, high energy consumption.Phosphorus copper global automatic production line is currently the world’s leading unmanned production line, but there is no enterprise in the domestic research and development of this technology, manual error is still wasting metal resources and labor resources. Therefore, the urgent need for a high degree of automation, simple operation, and the production of phosphorus copper ball products excellent production equipment to enter the market. To help Yingtan build the largest microcrystalline copper manufacturing base in the country, and to set an intelligent manufacturing example for the country’s copper processing industry, setting an advanced intelligent manufacturing precedent for Yingtan’s phosphorus copper processing industry, accelerating Yingtan’s march from “World copper capital”to “Smart copper capital”. |
| 技术难题概述 | 1、全自动液压镦球机的液压成型技术，在液压成型的同时还要兼顾切断，成型，高速生产，零部件的强度等问题；2、收集器在物料堆积时，会出现起拱，和控制物料流出不均匀的现象；3、研磨时的磨料，会造成表面粗糙等问题；4、清洗机，要控制温度、净水纯度和连续生产单位密度，需要找寻完美的脱水方式；5、称重系统方面，要克服重量要求高、冲击力大、精度不易控制的高技术难点；6、包装系统要防呆防错，致密处理，三重称把关等高标准才能自动流入下工序；7、采用真空包装、激光喷码的技术，使包装更加牢固便捷，实现生产班次、批次可以追塑；8、研发机器人码垛搬运铜球技术，打破了国外机器人对国内市场的垄断；9、AGV机器人的激光导航技术，要求从码垛机器人后，自动搬运产品到仓库指定位置，且遇到障碍物可自动停止，转移方向。1. The hydraulic forming technology of the full-automatic hydraulic tting ball machine, while the hydraulic forming, the problems of cutting, forming, high-speed production, the strength of the parts and so on must be taken into account;2. When the material is piled up, the collector will appear to arch, and control the flow of materials out of uneven phenomenon, 3.grinding Abrasive, will cause surface roughness and other problems,4.cleaning machine, to control the temperature, purity of water and continuous production unit density, need to find a perfect dewatering way; 5.weighing system, to overcome the weight requirements, the impact of large, precision is not easy to control the high-tech difficulties;6. packaging system must be anti-stuffiness, error-proof, dense processing, triple-weighing check and other high standards can automatically flow into the next process;7. Adopt the technology of vacuum packing and laser spurting code, make the packing more firm and convenient, realize the production shift and batch can be plastic-chasing; 8. Develop the technology of robot palletizing and handling the copper ball, break the foreign robot monopoly on the domestic market; 9. The laser navigation technology of AGV robot requires that after the palletizing robot, the products can be automatically transported to the designated position of the warehouse, and the obstacles can be automatically stopped and the direction can be shifted. |
| 技术攻关后希望达到的预期技术目标 | **目前，在国内磷铜球生产大多采用浇铸或者日本二手设备生产，并且都是单机生产磷铜球，生产完成后抛光、清洗、包装都为手工作业，极大的浪费人力物力资源。**针对我国磷铜球现有生产方式存在的共性问题，积极应对全行业对低能耗、高效率的发展需求，拟**通过快速铸坯工艺的创新、全自动液压镦球机及模具优化设计，全自动清洗生产线开发、全自动集料抛光、全自动包装线的研制和AGV机器人的激光导航技术，以及采用并流水线打通主要工序，大幅节约场地和减少生产周期，显著提高生产效率，满足其化学成分、外观、结晶组织、致密度、分布均匀性等高质量要求，且采用真空包装，防潮，定型不易散开，节约纸箱，压缩成本，减少劳动定员。**本关键技术的突破将**填补国内磷铜行业智能化全自动生产线的空白**，阻拦国外对此项智能设备的把控，确立鹰潭市在阳极铜材领域的技术引领地位，单位能耗（含熔铸环节，微晶磷铜材≤720kwh/吨；普通磷铜球≤550kwh/吨）、生产定员数（≤8人/5万吨）、成品率（≥99.8%）综合成本等达到国际领先水平，填补行业空白。将助力鹰潭打造全国最大的微晶铜材制造基地，并为全国铜加工行业率先树立智能制造示范，打造鹰潭铜加工先进制造品牌。At present, the domestic production of phosphor copper ball mostly uses casting or Japan second-hand equipment production, and are single production of phosphor copper ball, after the completion of production polishing, cleaning, packaging are manual work, a great waste of human and material resources.In view of the common problems existing in the current mode of production of phosphor copper balls in China, and in response to the development requirements of low energy consumption and high efficiency in the whole industry, the author intends to optimize the design of the full automatic hydraulic tting ball machine and die through the innovation of the rapid casting process, dEVELOPMENT OF AUTOMATIC CLEANING PRODUCTION LINE, automatic aggregate polishing, development of automatic packaging line and laser navigation technology of AGV robot, as well as adoption of parallel assembly line to cut through the main processes, greatly saving the site and reducing the production cycle, it can improve the production efficiency, meet the high quality requirements of chemical composition, appearance, crystal structure, density and even distribution, and adopt vacuum packaging, damp-proof, shape-setting is not easy to spread, save carton, compress cost and reduce labor.The breakthrough of this key technology will fill the blank of intelligent automatic production line in domestic phosphor-copper industry, block foreign control of this intelligent equipment, and establish Yingtan city’s leading position in the field of anode copper technology, the unit energy consumption (including melting and casting link, microcrystalline phosphor copper material ≤720 kwh/ton, ordinary phosphor copper ball ≤550 Kwh/ton) , fixed number of production (≤8 persons/50,000 tons) , rate of finished product (≥99.8%) reached the international leading level and filled up the blank of the industry. Yingtan will help build the country’s largest microcrystalline copper manufacturing base, and for the country’s copper processing industry to take the lead in establishing intelligent manufacturing model, Yingtan copper processing advanced manufacturing brand. |
| 时限要求 | 2023年12月完成The 2023 was completed in December |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 1200 万元。其中：愿意支付揭榜单位研发资金不少于 500 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 知识产权归双方共同所有，研究成果将直接运用到保太集团的年产15万吨铜材项目。The intellectual property rights are jointly owned by the two sides, and the research results will be directly applied to the annual output of 150,000 tons of copper products of Baotai group. |
| 企业承接转化后预期的经济、社会效益 | 经济效益：项目承接转化后，可延长本公司的铜产品智能化产业链，**生产磷铜产品5万吨/年，总产值达到37.8亿元，创造税收2.64亿元**。社会效益：项目可成就国内首批在微晶磷铜球行业具有专业知识和先进智能化生产技术的研发人员和操作队伍，**填补了磷铜行业国内智能化设备及研发人员的空白，提升我国在智能化铜材产业的国际竞争力**。生态效益：单位产品能耗约为 61. 4千克标煤／吨，熔铸工序单耗约为 32. 52 千克标煤／吨，达到铜及铜合金棒材加工企业产品（紫铜）熔铸工序单耗先进值< 40千克标煤／吨要求；具有优秀的节能效益，**达到江西省绿色生态产品的相应标准，为行业内“双碳”事业做出技术性突破**。Economic Benefits: After the transformation of the project, the company can extend the intelligent industrial chain of copper products, producing 50,000 tons of phosphor copper products per year, with a total output value of 3.78 billion yuan and tax revenue of 264 million yuan. Social Benefits: The project CAN ACHIEVE THE FIRST BATCH OF R & D personnel and operation teams with professional knowledge and advanced intelligent production technology in the micro-crystal phosphor copper ball industry in China, filling the gap of domestic intelligent equipment and R & D personnel in the phosphor copper industry, improving the international competitiveness of intelligent copper industry in China. Ecological efficiency: Energy consumption per unit product is about 61. 4 kg Standard Coal/ton, melting and casting process consumption is about 32. 52 kg of standard COAL/TON, meeting the advanced value & Lt; 40 kg of standard coal/ton in melting and casting process of copper and copper alloy bar processing enterprise products (red copper) ; having excellent energy-saving benefit, meeting the corresponding standard of green ecological products in Jiangxi Province, for the industry “Double carbon”cause to make a technical breakthrough. |

**“揭榜挂帅”企业重大技术需求征集表（10）**

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| 所属产业领域或产业链 | 新材料New materials | 细分方向 | 铝合金Aluminum alloys |
| 重大技术需求项目名称 | **基于再生铝的新能源汽车高强韧免热处理铸造铝合金及制备关键技术**Lightweight, high strength and toughness, heat-treatment-free casting aluminum alloys and key technologies for new energy vehicles based on recycled aluminum |
| 技术需求提出企业 | **江西万泰铝业有限公司**Jiangxi Wantai Aluminum Co., Ltd. |
| 技术需求牵头企业联系人 | 姓名 | 廖光明Guangming Liao | 职务 | 副总经理Assistant general manager | 手机：18979453788 | 邮箱：1372738397@qq.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 江西宏成铝业有限公司Jiangxi Hongcheng Aluminum Co., Ltd. | □龙头企业☑骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 | 万泰新材料(包头)有限公司Wantai New Materials (Baotou) Co., Ltd. | □龙头企业□骨干企业☑战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 再生铝资源循环经济产业是可持续发展的绿色产业。在国家“双碳”战略背景下，再生铝与电解铝相比，每吨再生铝相当于节能3443千克标准煤，节水22立方米，减少固体废物排放20吨，CO2排放仅为原铝的2.1%；而且可以有效缓解铝矿供需矛盾，降低铝矿资源对外依赖度。随着新能源汽车产业的蓬勃发展，轻量化技术是提升新能源汽车续航里程的核心技术之一。铝合金材料凭借其轻量化、高强韧、耐腐蚀、可循环等优势，作为汽车轻量化的首选材料被广泛应用，汽车轻量化成为拉动铝消费的重要增长动力。尤其是特斯拉一体化成形技术的出现，将成为新能源汽车部件的发展大趋势，实现以铝代钢以铸代锻（例如，特斯拉可实现将原70多个冲锻件一体化铸造为1个铸件），拥有独特优势。一体化压铸成形产品尺寸大、形状复杂，铸件不能通过热处理改善性能，因此高强韧免热处理铸造铝合金成为一体化压铸成形的发展瓶颈之一，也是铝合金铸造产业的共性“卡脖子”问题。免热处理铸造铝合金被国家工业和信息化部列为《重点新材料首批次应用示范指导目录（2021年版）》，也是江西省有色金属进一步发展的难题。目前，传统利用原铝生产的铝合金材料综合性能已满足不了要求，尤其是在强度和韧性方面，差距更大，且原铝生产产生的CO2等温室气体排放量非常大。因此使用再生铝生产新能源汽车轻量化高强韧免热处理铸造铝合金，成为我国铝合金产业关键研发方向。The recycling economy industry of recycled aluminum resources is a sustainable green industry. Under the background of the national "dual carbon" strategy, compared with electrolytic aluminum, per ton of recycled aluminum is equivalent to saving 3,443 kg of standard coal, 22 cubic meters of water, and 20 tons of solid waste emissions, CO2 emission is only 2.1% of primary aluminum; Moreover, it can effectively alleviate the contradiction between supply and demand of aluminum ore and reduce the external dependence of aluminum ore resources. With the vigorous development of the new energy vehicle industry, lightweight technology is one of the core technologies to improve the cruising range of new energy vehicles. Due to its advantages of light weight, high strength and toughness, corrosion resistance, and recyclability, aluminum alloy is widely used as the preferred material for automobile lightweight, and automobile lightweight has become an important growth driving force for aluminum consumption. In particular, the emergence of Tesla's integrated forming technology will become a general trend in the development of new energy vehicle parts, realizing the substitution of aluminum for steel and casting instead of forging (for example, Tesla can integrate components more than 70 original stamping and forging parts into 1 casting), has unique advantages. The integrated die-casting products are large in size and complex in shape, and the performance of the castings cannot be improved by heat treatment. Therefore, the high-strength and toughness heat-free cast aluminum alloy has become one of the development bottlenecks of the integrated die-casting, and it is also a common "neck" problem in the aluminum alloy casting industry. Heat-treatment-free cast aluminum alloys are listed by the Ministry of Industry and Information Technology of the People's Republic of China as the "Guidance Catalog for the First Batch of Application Demonstrations of Key New Materials (2021 Edition)", which is also a problem for the further development of non-ferrous metals in Jiangxi Province.At present, the comprehensive properties of aluminum alloys traditionally produced from primary aluminum can no longer meet the requirements, especially in terms of strength and toughness. Therefore, the use of recycled aluminum to produce lightweight, high-strength, and heat-free cast aluminum alloys for new energy vehicles has become the key research and development direction in aluminum alloy industry in China. |
| 技术难题概述 | **1、再生铝制备高品质铸造铝合金比较困难，主要体现在：**（1）再生铝的原材料含有多种杂质及溶解性有害元素，造成再生铝含氢高，有害第二相较多，显著降低再生合金的各项性能。（2）再生铝原材料由于来源混杂，制备中熔体呈现显微分层的亚稳定胶状粒子，保存着原材料的组织特征，成为冶金组织遗传性的载体，明显改变再生铝的结晶条件和凝固后铝锭的组织和性能。（3）再生铝在制备过程中极易产生卷入性缺陷，形成气孔、缩孔和双层膜等铸造缺陷，严重影响再生铝锭的组织和性能。**2、制备轻量化高强韧免热处理Al-Si铸造铝合金比较困难，主要体现在：**（1）Al-Si系铸造铝合金，综合力学性能较低，但新能源汽车对Al-Si系高强韧铸造铝合金的需求非常迫切。（2）高强韧免热处理Al-Si铸造铝合金微观组织结构调控技术，有效调控共晶组织和富-Fe相等凝固析出第二相。（3）高品质高强韧免热处理Al-Si铸造铝合金铸锭制备技术，有效调控气孔、缩孔和双层膜等铸造缺陷。**1、It is difficult to prepare high-quality casting aluminum alloys from recycled aluminum, which is mainly reflected in:**(1) The raw materials of recycled aluminum contain a variety of impurities and soluble harmful elements, resulting in high hydrogen content and many harmful second phases in recycled aluminum alloys, which can significantly reduce the mechanical properties.(2) Due to the mixed sources of raw materials for recycled aluminum alloys, the melt during preparation shows micro-layered metastable colloidal particles, which preserve the organizational characteristics of the raw materials and become the hereditary carrier of metallurgical structure, which significantly influence solidification microstructure and mechanical properties of recycled ingots.(3) During the preparation of recycled aluminum alloys, it is very easy to produce entrapment defects, forming casting defects such as pores, shrinkage cavities and bifilms, which seriously affect microstructure and mechanical properties of recycled aluminum alloy ingots.**2、It is significantly difficult to prepare lightweight, high-strength, and heat-treatment free Al-Si casting aluminum alloys, which mainly includes:**(1) Al-Si cast aluminum alloys have low comprehensive mechanical properties, but new energy vehicles have an urgent demand for Al-Si cast aluminum alloys with high strength and toughness.(2) The microstructure control technology of high strength and toughness heat treatment-free Al-Si cast aluminum alloys, which can effectively control the eutectic microstructure and precipitation of second phases such as rich-Fe phase during solidification.(3) The preparation technology of high-quality, high-strength, and heat treatment-free Al-Si cast aluminum alloy ingots, which can effectively control casting defects such as pores, shrinkage cavities and bifilms. |
| 技术攻关后希望达到的预期技术目标 | **1、目前的技术指标参数：** 目前市场使用的轻量化高强韧免热处理铸造铝合金主要以特斯拉和美铝开发的为主体，抗拉强度≥230MPa，屈服强度≥100MPa，延伸率≥10%，凝固体收缩和线收缩较高，制备时基本采用电解铝，受到知识产权的约束。**2、攻关后要求达到的技术参数：**（1）高强韧免热处理Al-Si铸造铝合金，抗拉强度≥270MPa，屈服强度≥140MPa，折弯角度≥92o，凝固体收缩和线收缩与A356铸造铝合金相当。边界条件：自主知识产权，拥有发明专利支撑；不含Cr；不含稀土元素；Fe含量>0.15wt.%；不采用延伸率衡量韧性。（2）新能源汽车轻量化高强韧免热处理铸造铝合金产业化制备技术，年产4万吨轻量化新能源汽车高强韧免热处理铸造铝合金新材料产业化生产线1条，达到国际先进水平。边界条件：再生铝使用占比≥30%，免热处理铸造铝合金铸锭拉伸性能和折弯性能的韦布尔模量>30。**1、Current technical target qualification:**At present, the lightweight, high-strength, and heat-free cast aluminum alloys used in the market are mainly developed by Tesla and Alcoa. Technical target qualification includes：Tensile strength ≥230MPa, yield strength ≥100MPa, elongation ≥10%； Relatively higher solidification volume shrinkage and linear shrinkage; Prepared mainly from electrolytic aluminum；Constrained by intellectual property rights.**2、Technical target qualification required to be achieved after research:**（1）High strength and toughness heat treatment-free Al-Si cast aluminum alloy Tensile strength ≥270MPa, yield strength ≥140MPa, bending angle ≥92o； Solidification volume shrinkage and linear shrinkage comparable to A356 cast aluminum alloy；Boundary conditions: independent intellectual property rights, supported by invention patents； no addition of Cr； no addition of rare earth elements; Fe>0.15wt.%； toughness can not be measured by elongation。1. Industrialized preparation technology of lightweight, high-strength, and heat treatment-free cast aluminum alloys for new energy vehicles, one industrial production line of high-strength and toughness heat treatment-free casting aluminum alloys with an annual output of 40,000 tons for lightweight new energy vehicles. The above technologies would reach the international advanced level. Boundary conditions: The used recycled aluminum in the target ingot is more than 30%, and the Weibull modulus of tensile properties and bending properties of heat treatment-free cast aluminum alloy ingots is more than 30.
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| 时限要求 | 2024年6月前完成To be completed by June 2024 |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 2200 万元。其中：愿意支付揭榜单位研发资金不少于 200 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 项目各方共同完成的成果，所有权共同所有，成果的转让须在各方协商同意前提下实施，任何一方不得私自进行；各方独立完成的研究成果，所有权归各自所有。The achievements jointly completed by all parties in the project are jointly owned, and the transfer of the achievements must be carried out under the premise of consultation and consent of all parties, and neither party may do it privately; The research achievements independently completed by each party are owned by them。 |
| 企业承接转化后预期的经济、社会效益 | 推动江西省优势产业转型发展，为高端铝合金提供技术支撑，为江西省培高技术人才，对推动汽车轻量化、节能减排、促进江西省新能源汽车发展等方面将发挥引领作用，具有显著社会效益。 研发的轻量化免热处理铸造铝合金新材料与现有产品相比较性能有显著提升，2024年实现产值1.13亿元，利润800万元；2025年实现产值2亿元，利润1500万元。再生铝是电解铝碳排放的2.1%；再生铝合金的能耗仅为电解铝5%，生产1吨再生铝相当于节约3.4吨标准煤，节水22立方米，减少固体废物排放20吨，而且可以有效缓解铝矿供需矛盾，降低铝矿资源对外依赖度。“揭榜挂帅”技术目致力于使用再生铝生产新能源汽车轻量化高强韧免热处理Al-Si系铸造铝合金，将为“碳达峰”“碳中和”做出贡献，将促进江西省废铝再生产业和循环经济的发展。Promote the transformation and development of advantageous industries in Jiangxi Province, provide technical support for high-end aluminum alloys, cultivate high-tech talents for Jiangxi Province, and play a leading role in promoting lightweight vehicles, energy conservation and emission reduction, and promoting the development of new energy vehicles in Jiangxi Province. social benefit, finally has significant social benefits.Compared with the existing products, the new developed lightweight heat-treatment-free cast aluminum alloys have significantly improved performance. In 2024, it will achieve an output value of 113 million yuan and a profit of 8 million yuan; in 2025, it will achieve an output value of 200 million yuan and a profit of 15 million yuan.Recycled aluminum is 2.1% of the carbon emission of electrolytic aluminum; the energy consumption of recycled aluminum alloy is only 5% of electrolytic aluminum. The production of 1 ton of recycled aluminum is equivalent to saving 3.4 tons of standard coal, saving 22 cubic meters of water, and reducing solid waste emissions by 20 tons. Moreover, it can effectively alleviate the contradiction between supply and demand of aluminum ore and reduce the external dependence of aluminum ore resources.The technical project of "Revealing the List" is committed to using recycled aluminum to produce lightweight, high-strength, and heat-free Al-Si cast aluminum alloys for new energy vehicles, which will contribute to "carbon peaking" and "carbon neutrality", and will promote the development of aluminum recycling industry and circular economy in Jiangxi province. |

**“揭榜挂帅”企业重大技术需求榜单（11）**

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| 所属产业领域或产业链 | 新材料New material | 细分方向 | 新材料New material |
| 重大技术需求项目名称 | 新型无锂耐热陶瓷材料技术研发New Lithium free heat resistant ceramic materials technology development |
| 技术需求提出企业 | 江西帮企陶瓷股份有限公司Jiangxi Bangqi Ceramics Co., LTD |
| 技术需求牵头企业联系人 | 姓名 | 李启帮Li Qibang | 职务 | 总经理General Manager | 手机：13907943273 | 邮箱：bangqitaoci@163.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 江西康舒陶瓷股份有限公司JiangxiKangshu Ceramics Co., LTD | ☑龙头企业□骨干企业□战略性新兴产业企业☑高新技术企业☑科技型中小企业 |
| 2 | 江西九州陶瓷有限公司Jiangxi Jiuzhou Ceramics Co., LTD | ☑龙头企业□骨干企业□战略性新兴产业企业☑高新技术企业☑科技型中小企业 |
| 项目需求的背景与意义 | 被誉为江西“第二瓷都”的黎川县系中国日用耐热陶瓷产业基地，2019年12月18日被中国轻工业联合会和中国陶瓷工业协会授予“中国陶瓷煲都·黎川”称号。该县生产的日用耐热瓷煲占全国市场份额的65%以上，并出口到欧美等 50 多个国家和地区。江西帮企陶瓷股份有限公司位于黎川县陶瓷工业园区，是一家集研发、生产、销售及物流配送于一体，以生产 650℃以上高温耐热瓷煲为主的现代化企业。国内市场占有率处龙头地位，全球市场占有率处领先地位。 所产产品深煲、浅锅、土锅、汤锅、异型锅、电磁炉煲等六大系列200多个品种在全国各省、市多个城市建立了稳定、健全的销售网络，日用瓷煲单品在淘宝、天猫、拼多多等电商平台稳居销量第一。公司先后被评为银行A级信用企业、纳税信用等级A级；荣获“江西省瞪羚企业”、“制造业单项冠军产品培育企业”、“高新技术企业”、“科技型中小企业”、“专精特新企业”、“江西省电子商务示范企业”等称号及荣誉。目前，由于行业内生产高导热陶瓷材料产品的锂辉石和透锂长石不仅对环境污染严重，能源消耗很大，而且价格飞涨，受制于人，严重影响企业的持续发展。为了最大程度地减少对大气污染，降低企业成本，作为生产砂锅、瓷煲的“中国煲都”黎川迫不及待地需要开展新型无锂耐热陶瓷材料技术研发，利用新型无锂陶瓷原材料替代透锂长石和锂辉石超高温耐热材料，这样，不仅可以促进企业的永续发展，节能降耗，满足市场多样化需求，提升居民生活品质，而且还可以抢占未来陶瓷工业核心技术的制高点，掌握未来高技术陶瓷发展主导权，提高陶瓷产业的国际竞争力，增强国家的技术创新能力，通过对核心技术、标准和专利的掌控，进而控制陶瓷产业链中高附加值的部分，获取高额利润，实现我国陶瓷工业的伟大复兴。 Known as the "second porcelain capital" in Jiangxi province, Lichuan County is China's daily heat-resistant ceramics industry base. On December 18, 2019, Lichuan County was awarded the title of "China Ceramic Pot Capital · Lichuan" by China Light Industry Association and China Ceramic Industry Association.The daily heat-resistant porcelain POTS produced in this county account for more than 65% of the national market share, and are exported to more than 50 countries and regions such as Europe and America.Jiangxi Bangqi Ceramics Co., Ltd. is located in Lichuan Ceramic Industrial Park, is a collection of research and development, production, sales and logistics distribution in one, to produce more than 650℃ high temperature heat resistant porcelain POTS based on modern enterprises.Domestic market share in a leading position, global market share in a leading position. The products of deep pot, shallow pot, clay pot, soup pot, shaped pot, induction cooker cooker and other six series of more than 200 varieties have established a stable and sound sales network in various provinces and cities across the country, the daily porcelain pot single products in Taobao, Tmall, Pin-duo duo and other e-commerce platforms in the sales of the first.The company has been rated as A bank grade A credit enterprise, tax credit grade A;It has won the titles and honors of "Jiangxi Gazelle Enterprise", "Manufacturing Single Champion Product Cultivation Enterprise", "High-tech Enterprise", "Science and technology Small and Medium-sized Enterprise", "Specialized new Enterprise", "Jiangxi E-commerce Demonstration Enterprise" and so on.At present, due to the production of high thermal conductivity ceramic materials in the industry spodumene and through spodumene not only serious environmental pollution, energy consumption is very large, and the price skyrocketed, controlled by others, seriously affect the sustainable development of enterprises.In order to minimize the air pollution, reduce the enterprise cost, as the production of casseroles, porcelain clay pot "China clay pot" Li Chuan eager need to research and develop the new lithium heat resisting ceramic material technology, ceramic raw materials instead of using the new lithium petalite and lithium fai Shi Chao high temperature materials, in this way, not only can promote the sustainable development of the enterprise, saving energy and reducing consumption, Meet the demand of market diversification,upgrade the quality of life of residents, but also conquers the highest position in the future ceramic industry core technology, grasp the future high technology ceramics development initiative, improve the ceramic industry's international competitiveness, strengthen the country's technological innovation ability, through control of core technology, standards and patents, and control part of the ceramic industry chain and high added value, Obtain high profit, realize the great revival of China's ceramic industry. |
| 技术难题概述 | 卡脖子问题难解。过去，锂辉石和透锂长石是生产陶瓷煲的主要原料之一，是支撑黎川“中国陶瓷煲都”耐热煲产业发展的核心材料。多年来，黎川乃至全国各地生产耐热陶瓷的企业都需要从澳大利亚或者津巴布韦进口锂辉石和透锂长石。由于国际形势复杂多变，企业多次面临断供的风险，严重影响企业的正常生产。由此，需要研发新的超高温耐热无锂新材料替代锂辉石和透锂长石原料，解决企业长期以来挥之不去的“卡脖子问题”。进口价格飙升。随着新能源汽车的高速发展，国际市场对含锂矿物需求激增，其价格呈现一路上涨趋势，导致耐热陶瓷生产企业成本急剧上升。目前能够实现450℃耐热的陶瓷原料成本已突破33000元每吨，居高不下的原料成本使得相关企业苦不堪言。可以预见，随着锂资源被各大国际巨头垄断，锂质原料的价格必将继续攀升。由此，需要研发新的超高温耐热无锂新材料替代锂辉石和透锂长石原料，解决企业生产成本居高不下的问题。产品质量难以提高。鉴于复杂的国际形势，目前，一些企业由于买不到所需的原料，迫不得已，试着采用一些低锂或无锂原料生产耐热陶瓷煲，但急冷急热造成的炸裂率和吸水率难以解决，因此，需要研发新的超高温耐热无锂新材料替代锂辉石和透锂长石原料，解决企业生产技术难题。研发新型无锂耐热材料迫不及待。耐热陶瓷是一种能够经受高温急冷及热而不开裂的陶瓷炊具产品，当前国内外的耐热煲毫无例外都是基于锂辉石和透锂长石等锂质原料，锂成分的多少直接决定了陶瓷的耐热程度。特别是近两年是受疫情影响及澳大利亚等国家断供锂质矿物所迫，当前优质锂质矿物原料已有价无市，众多耐热陶瓷企业已处于停产边缘，部分勉强经营的企业亦是在苦苦支撑中。如何降低耐热陶瓷的原料成本，研发新型无锂耐热陶瓷材料，杜绝国外企业对锂质原材料的“卡脖子”，是耐热陶瓷行业急需解决的技术瓶颈。1、The bottleneck problem is difficult to solve.In the past, spodumene and transspodumene are one of the main raw materials for the production of ceramic POTS, and are the core materials to support the development of the heat-resistant pot industry of Lichuan "China ceramic Pot Capital".For many years, the enterprises producing heat-resistant ceramics in Lichuan and even all over the country need to import spodumene and transspodumene from Australia or Zimbabwe.Due to the complex and volatile international situation, enterprises have repeatedly faced the risk of supply cuts, which has seriously affected the normal production of enterprises.Therefore, it is necessary to develop new ultra-high temperature heat resistant lithium free materials to replace spodumene and transspodumene raw materials, and solve the "neck problem" that has long been lingering in enterprises.2.Import prices have soared.With the rapid development of new energy vehicles, the demand for lithium minerals in the international market surges, and its price shows a rising trend, leading to a sharp rise in the cost of heat-resistant ceramics manufacturers.At present, the cost of ceramic raw materials that can achieve 450℃ heat resistance has broken through 33,000 yuan per ton, and the high raw material cost makes relevant enterprises suffer unutterable.It can be predicted that the price of lithium raw materials will continue to rise as lithium resources are monopolized by major international giants.Therefore, it is necessary to develop new ultra-high temperature heat resistant lithium free materials to replace spodumene and transspodumene raw materials to solve the problem of high production costs of enterprises3.It is difficult to improve the quality of products.In view of the complicated international situation, at present, some enterprises because of can't buy the raw materials, to try to adopt some low lithium or lithium raw material to produce heat-resistant ceramic pot, but caused by thermal shock crack rate and bibulous rate is difficult to solve, therefore, no need to develop new super high temperature lithium new materials to replace spodumene and petalite raw material, solve the enterprise production technical problems.4.Can't wait to develop new lithium free heat resistant materials.Heat-resistant ceramics is a kind of ceramic cookware products that can withstand high temperature, rapid cooling and heat without cracking. At present, heat-resistant cookers at home and abroad are based on lithium materials such as spodumene and through lithium feldspar without exception. The number of lithium components directly determines the heat-resistant degree of ceramics.Especially in the past two years, affected by the epidemic and Australia and other countries cut off the supply of lithium minerals, the current high quality lithium mineral raw materials have no market price, many heat-resistant ceramic enterprises have been on the edge of production, part of the reluctantly managed enterprises are struggling to support.How to reduce the raw material cost of heat-resistant ceramics, research and develop new heat-resistant materials without lithium, and put an end to the "jam neck" of foreign enterprises on lithium raw materials are the technical bottleneck of heat-resistant ceramics industry.  |
| 技术攻关后希望达到的预期技术目标 | 1. 通过科技创新，利用学科交叉实现新型耐热陶瓷材料技术，研究开发无锂耐热陶瓷材料新技术并实现产业化，在彻底摆脱国外关键原材料的基础上实现原料成本的显著降低，同时产品性能完全满足耐热陶瓷国家标准。
2. 要求所研发产品满足《精细陶瓷烹调器》标准QB/T2580-2018，达到450℃至20℃热交换一次胎不开裂的耐热能力。
3. 新型无锂耐热陶瓷坯体的原料成本不高于5000元/吨。
4. 新型耐热陶瓷的釉料要求完全采用无锂原料，获得与坯体相匹配的透明釉及黑釉制备技术。
5. 研发出无需施釉的耐热陶瓷自析釉技术。
6. Through scientific and technological innovation, the use of interdisciplinary realization of new heat-resistant ceramic material technology, research and development of lithium-free heat-resistant ceramic material technology and industrialization, in the complete get rid of foreign key raw materials on the basis of achieving a significant reduction in raw material costs, while the product performance fully meet the national standards for heat-resistant ceramics.

2.The products are required to meet the standard QB/T2580-2018 of Fine Ceramic cookware, and reach the heat resistance of 450℃ to 20℃ heat exchange without cracking.3.The raw material cost of the new lithium-free heat-resistant ceramic body is no more than 5000 yuan/ton.4.The glazes of the new heat-resistant ceramics should be completely made of lithium free materials, and the transparent glazes and black glazes matching the body can be obtained. 5.Developed self-evolution technology of heat-resistant ceramic glaze without glaze application. |
| 时限要求 | 项目任务要求在揭榜后2年内完成，结题时间最晚不迟于2024年底。The project is required to be completed within 2 years after the list is unveiled, and the deadline for completion is no later than 2024. |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 2400 万元。其中：愿意支付揭榜单位研发资金不少于 600 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 项目执行期内与项目相关的技术成果由出资方和研发方共同所有，知识产权双方共同署名，研发方可以通过技术入股方式参与企业生产经营和利润分成，具体方式后期再行协商。During the execution period of the project, the technical achievements related to the project shall be jointly owned by the investor and the r&d party, and the intellectual property rights shall be jointly signed by both parties. The R&D party may participate in the enterprise's production and operation and profit sharing by means of technology shareholding, and the specific methods shall be negotiated later. |
| 企业承接转化后预期的经济、社会效益 | 一直以来，含锂矿物质堪称陶瓷行业，特别是生产高温耐热陶瓷煲企业的“稀土”和“芯片”，研发具有替代含锂矿物质新型材料具有划时代意义，不仅能彻底改变企业原材料短缺，停产待料，受制于国外企业对锂质原材料的“卡脖子”状态，更能大幅度降低企业的生产成本，实现企业降耗增效的目的。据初步测算：企业承接该项技术成果后，仅透锂长石、锂辉石每吨价格将由现在的30000元和25100元，下降到6000元和5000元，降幅达到24000和20100余元。按企业年耗透锂长石、锂辉石3600吨计算，每年降低生产成本15876万元。如果全县30多家陶瓷企业都采用替代含锂矿物质新型材料，不仅成本降耗巨大，难以估量，而且还将实现黎川陶瓷产业发展质的飞跃，为振兴县域经济作出更大贡献。For a long time, lithium mineral in ceramic industry, especially in the production of high temperature heat-resistant ceramic pot enterprises "rare earth" and "chips", research and development of new material substitution lithium mineral landmark, not only can completely change enterprise shortage on raw materials, production work, subject to foreign enterprises "their" status of lithium quality raw materials, It can greatly reduce the production cost of enterprises and achieve the purpose of reducing consumption and increasing efficiency.According to preliminary calculation: after enterprises undertake the technical achievements, only the price of spospoxene and spospoxene per ton will drop from the current 30000 yuan and 25100 yuan to 6000 yuan and 5000 yuan, with a decrease of 24000 yuan and 20100 yuan.According to the annual consumption of 3600 tons of spospoxene and spospoxene, the annual production cost is reduced by 158.76 million yuan.If more than 30 ceramic enterprises in the county adopt new materials containing lithium minerals instead, not only the cost reduction is huge, it is difficult to estimate, but also will achieve a qualitative leap in the development of Lichuan ceramic industry and make greater contributions to the revitalization of the county economy. |

**“揭榜挂帅”企业重大技术需求榜单（12）**

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| 所属产业领域或产业链 | 新能源 / New energy | 细分方向 | 源网荷储一体化 / Integration of source, load and storage |
| 重大技术需求项目名称 | “双碳”背景下源网荷储一体化系统综合配置策略关键技术研究及系统研发 /Research on Key Technologies and System Development of Integrated Configuration Strategy of Source-Network-Load-Storage System under the Background of "Double Carbon" |
| 技术需求提出企业 | 中国电建集团江西省电力设计院有限公司 / China Power Construction Group Jiangxi Electric Power Design Institute Co., Ltd. |
| 技术需求牵头企业联系人 | 姓名 | 李华昌 / Li Hua Chang | 职务 | 能源规划研究中心副主任 / Deputy Director of Planning Research Center | 手机：13870097895 | 邮箱：13870097895@163.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 |  | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 |  | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 全球化石能源紧缺已成为全世界焦点问题，与此同时，化石能源燃烧所产生的温室气体导致恶劣气候和温室效应的环境问题也频繁发生。为了缓解碳排放量，2020年中国提出了“碳达峰”“碳中和”战略，倡导绿色、环保、低碳的生活方式，大力发展新能源。但新能源出力的间歇性、波动性特征给其输电通道带来严重的阻塞问题，难以满足新形势下新能源并网需求。因此，新能源出力预测是一项保障电力系统高效、经济、稳定运行的重要技术措施。随着电网智能化水平的进一步提高，海量分布式资源规模化接入，电力行业正面临着电力体制改革和以新能源为主体的新型电力系统建设的艰巨任务。在此背景下，国家发展改革委、国家能源局发布《关于推进电力源网荷储一体化和多能互补发展的指导意见》。源网荷储一体化旨在通过优化整合本地资源，以先进技术突破和体制机制创新为支撑，探索源网荷储高度融合的电力系统发展路径，强调发挥负荷的需求响应能力、就地就近灵活坚强发展及激发市场活力、引导市场预期，源网荷储一体化将在市场引导下提升能源的综合利用效率，促进新能源消纳。源网荷储一体化的协调运行具有诸多优点，然而，现有研究：1）往往只关注了“源网荷储”中的一部分，没有综合考虑各种可控资源，无法充分发挥各种资源协调互补优势；2）鲜有考虑新能源出力的随机性，给电力系统安全稳定运行造成一定威胁；3）往往只关注系统运行的经济性，忽略了系统运行的碳排放特性，低碳运行水平有待进一步提高。The global shortage of fossil energy has become the focus of the world. At the same time, the greenhouse gases produced by the burning of fossil energy cause severe climate and greenhouse effect, and environmental problems also occur frequently. To alleviate carbon emissions, China put forward the "peak carbon dioxide emissions" and "carbon neutral" strategy in 2020, advocating a green, environmentally friendly and low-carbon lifestyle and vigorously developing new energy sources. However, the intermittent and fluctuating characteristics of new energy output bring serious congestion to its transmission channel, which is difficult to meet the demand of new energy grid connection under the new situation. Therefore, the forecast of new energy output is an important technical measure to ensure the efficient, economic and stable operation of power system.With the further improvement of the intelligent level of power grid and the large-scale access of massive distributed resources, the power industry is facing the arduous task of power system reform and new power system construction with new energy as the main body. Under this background, the National Development and Reform Commission and the National Energy Administration issued the Guiding Opinions on Promoting the Integration of Power Source Network, Load Storage and Multi-energy Complementary Development. The integration of source, grid, load and storage aims to explore the development path of power system with high integration of source, grid, load and storage by optimizing and integrating local resources, supported by advanced technological breakthrough and institutional mechanism innovation. It emphasizes giving full play to the demand response ability of load, flexible and strong local development, stimulating market vitality and guiding market expectation. Under the guidance of the market, the integration of source, grid, load and storage will improve the comprehensive utilization efficiency of energy and promote the consumption of new energy.The coordinated operation of the integration of source, network, load and storage has many advantages. However, the existing research: 1) often only pays attention to a part of the "source, network and load storage", without comprehensive consideration of various controllable resources, and cannot give full play to the coordinated and complementary advantages of various resources; 2) The randomness of new energy output is seldom considered, which poses a certain threat to the safe and stable operation of power system; 3) We often only pay attention to the economy of the system operation, ignoring the carbon emission characteristics of the system operation, and the low-carbon operation level needs to be further improved. |
| 技术难题概述 | 以新能源为主的新型电力系统及源网荷储一体化系统建设过程中仍面临许多亟须解决的问题。（1）首先，如何实现新能源大量接入下的就地消纳是在新型电力系统建设中需要关注的重要问题。由于风光等新能源发电受自然条件、天气等诸多因素制约，输出功率具有明显的波动性、间歇性和随机性，这往往造成其电能在电力系统中存在消纳困难的问题，进而导致部分地区出现弃风弃光现象。（2）其次，如何借助源网荷储一体化系统的协同配合切实降低碳排放，助力国家实现双碳目标同样值得关注。社会经济的快速发展和电力需求的蓬勃增长促使电源侧发电量增加，传统火电机组碳排放量呈上升趋势，同时为了应对新能源的强随机性和波动性，传统火电机组需承担更多的备用容量，限制了电力系统降低碳排放水平的能力。（3）此外，如何实现在保障电网安全的前提下提升系统运行经济性，进一步实现系统的综合效能最优对新型电力系统的建设具有实际的指导意义。随着柔性负荷、储能系统等设备的接入，电力系统由传统的“源随荷动”的模式逐渐向“源荷互动”模式转变，需充分协调源、网、荷、储各侧的可控资源，提高电力系统整体运行的经济性，减小新能源波动对系统安全稳定运行的影响。There are still many problems that need to be solved urgently in the process of building a new power system based on new energy sources and an integrated system of source network, load and storage.(1) First of all, how to realize the local consumption of new energy with a large number of connections is an important issue to be paid attention to in the construction of new power system. Due to the constraints of natural conditions, weather and other factors, the output power of new energy sources such as wind and light has obvious volatility, intermittence and randomness, which often leads to the problem that its electric energy is difficult to be absorbed in the power system, and then leads to the phenomenon of wind and light abandonment in some areas.(2) Secondly, it is also worth paying attention to how to effectively reduce carbon emissions and help the country achieve the goal of "double-carbon" with the cooperation of the integrated system of source, network, load and storage. With the rapid development of social economy and the vigorous growth of power demand, the power generation at the power supply side has increased, and the carbon emissions of traditional thermal power units are on the rise. At the same time, in order to cope with the strong randomness and volatility of new energy, traditional thermal power units need to bear more reserve capacity, which limits the ability of power system to reduce carbon emissions.(3) In addition, how to improve the operation economy of the power system on the premise of ensuring the security of the power grid and further optimize the comprehensive efficiency of the system has practical guiding significance for the construction of new power system. With the access of flexible load, energy storage system and other equipment, the power system has gradually changed from the traditional mode of "source moving with the load" to the mode of "source-load interaction". It is necessary to fully coordinate the controllable resources of source, network, load and storage, improve the economy of the overall operation of the power system, and reduce the impact of new energy fluctuations on the safe and stable operation of the system. |
| 技术攻关后希望达到的预期技术目标 | 本项目拟针对上述新能源消纳不足、电源侧碳排放量持续增长以及传统电力系统经济运行成本过高等问题，采用源网荷储一体化协调调度方法，通过优化整合本地资源，发挥负荷的需求响应能力，构建源网荷储高度融合的电力系统，有效提升能源的综合利用效率。（1）首先，针对新能源消纳不足的问题，通过建立精确的新能源随机出力模型，降低新能源出力的不确定性对系统的影响，调整新能源与传统机组容量配置比例，合理安排电源侧机组出力。同时储能根据系统的调度指令快速调整充电和放电功率，降低新能源出力波动的影响，提高新能源消纳能力。（2）其次，针对电源侧碳排放过高的问题，引入碳市场交易机制，增加碳排放限额约束，通过价格激励发电商积极参与碳市场交易，限制传统机组出力，提高新能源发电比例，实现减排目标。（3）最后，针对现阶段电力系统经济运行成本过高的问题，通过合理分配源网荷储的可调度资源，荷侧根据源侧电价调整负荷，挖掘负荷的需求响应能力，实现负荷削峰填谷；同时源侧根据荷侧实际负荷调整发电量，优化新能源机组和传统机组的出力，通过源荷协调互动降低发电成本和用户用电成本；协调储能快速充放电，利用其“低储高发”特性，提高系统运营的经济性。Aiming at the above problems of insufficient consumption of new energy, continuous increase of carbon emissions on the power supply side and high economic operation cost of traditional power system, this project plans to adopt the coordinated dispatching method of integration of source, grid, load and storage, optimize and integrate local resources, give full play to the demand response ability of load, and build a power system with high integration of source, grid, load and storage, so as to effectively improve the comprehensive utilization efficiency of energy.(1) Firstly, aiming at the problem of insufficient consumption of new energy, by establishing an accurate random output model of new energy, the influence of uncertainty of new energy output on the system is reduced, the capacity allocation ratio of new energy and traditional units is adjusted, and the output of power supply units is reasonably arranged. At the same time, the energy storage can quickly adjust the charging and discharging power according to the scheduling instruction of the system, reduce the influence of the fluctuation of new energy output, and improve the new energy consumption capacity.(2) Secondly, aiming at the problem of excessive carbon emission on the power supply side, the carbon market trading mechanism is introduced, the carbon emission limit constraint is increased, and the power generation companies are encouraged to actively participate in carbon market trading through price, so as to limit the output of traditional units, increase the proportion of new energy generation, and achieve the emission reduction target.(3) Finally, aiming at the problem of high economic operation cost of power system at the present stage, the load side adjusts the load according to the electricity price of the source side by rationally distributing the schedulable resources of the source network load storage, tapping the demand response capacity of the load, and realizing load peak cutting and valley filling; At the same time, the source side adjusts the power generation according to the actual load of the load side, optimizes the output of new energy units and traditional units, and reduces the power generation cost and user electricity cost through the coordination and interaction between the source and the load; Coordinate the rapid charge and discharge of energy storage, and make use of its "low storage and high incidence" characteristics to improve the economy of system operation. |
| 时限要求 | 2024年12月前完成 /Completed before December 2024 |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 500 万元。其中：愿意支付揭榜单位研发资金不少于 100 万元。 2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | （1）申请或授权发明专利2项；（2）发表或录用核心或三大检索论文2篇；（3）申请软件著作权1项；（4）《“双碳”背景下源网荷储一体化系统综合配置策略关键技术研究及系统研发》研究技术报告1份。以上成果知识产权归中国电建集团江西省电力设计院有限公司所有。(1) apply for or authorize 2 invention patents;(2) Publishing or hiring 2 core or three major search papers;(3) Apply for one software copyright;(4) 1 research technical report of Key Technology Research and System R&D of Integrated Configuration Strategy of Source-Network-Load-Storage System under the Background of "Double Carbon".The intellectual property rights of the above achievements belong to Jiangxi Electric Power Design Institute Co., Ltd. of China Power Construction Group. |
| 企业承接转化后预期的经济、社会效益 | 建立源网荷储一体化系统用户需求侧响应和碳排放模型，实现源网互动，挖掘用户侧需求响应潜力，实现系统经济、绿色运行。同时针对不确定性的新能源出力建模展开研究，相关研究成果可降低新能源功率的波动性和不稳定性对电力系统的冲击，进而在保证电网运行安全可靠性的前提下达到运行成本降低的效果。通过构建计及需求响应及碳排放的源网荷储协调优化调度模型，合理优化不同时间尺度下系统的可控资源，提高系统的低碳运行水平，降低系统运行风险和运行成本，促进清洁能源消纳。根据优化模型进行工程应用示范，并实现推广应用，将推动清洁能源的发展，提高清洁能源在终端能源消费中的比重，加快以新能源为主体的新型电力系统建设。Establish the user demand side response and carbon emission model of the integrated system of source, network, load and storage, realize the interaction between source and network, tap the potential of user demand response, and realize the economic and green operation of the system. At the same time, the modeling of uncertain new energy output is studied, and the related research results can reduce the impact of the fluctuation and instability of new energy power on the power system, thus achieving the effect of reducing the operating cost on the premise of ensuring the safety and reliability of power grid operation. By constructing a coordinated optimal scheduling model of source network load and storage considering demand response and carbon emissions, the controllable resources of the system in different time scales can be rationally optimized, the low-carbon operation level of the system can be improved, the operation risk and cost of the system can be reduced, and the consumption of clean energy can be promoted. Demonstration of engineering application according to the optimized model and its popularization and application will promote the development of clean energy, increase the proportion of clean energy in terminal energy consumption, and speed up the construction of new power system with new energy as the main body. |

**“揭榜挂帅”企业重大技术需求榜单（13）**

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| 所属产业领域或产业链 | 新能源 | 细分方向 | 微电网 |
| 重大技术需求项目名称 | 多源智能微电网供电系统开发及其关键技术研究 |
| 技术需求提出企业 | 江西清华泰豪三波电机有限公司 Jiangxi Tsinghua Tellhow Sanbo Motor Co., LTD |
| 技术需求牵头企业联系人 | 姓名 | 罗云行 | 职务 | 副总工 | 手机：13970890735 | 邮箱：lyx@tellhow.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 中船重工712所China Shipbuilding Industry 712 | ■龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 | 北京群菱能源科技有限公司Beijing Qunling Energy Technology Co. , LTD. | □龙头企业□骨干企业□战略性新兴产业企业■高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 国家发改委、能源局发布《能源技术革命创新行动计划（2016-2030）》，指出“可再生能源正逐步成为新增电力重要来源，电网结构和运行模式都将发生重大变化”是世界能源科技发展的大趋势。目前，国防装备供电电源主要采用常规石化能源，面临石化能源短缺、环境污染、能源单一、就地取“源”、作战效能低、静默红外隐身性差等问题。因此，研发以光伏、氢燃料电池和储能等清洁能源为主，隐身电站为辅的多源智能微电网供电系统，已成为国防某重点装备电源的当务之急。多源智能微电网供电系统复合多种形式可再生能源、储能和柴发等分布式能源，利用智能能量管理和分配技术，建立小规模、分布式、智能化微电网。该供电系统既可以离网孤岛运行，也可以连接大电网，直接把分布式能源、电力网络和用户联系在一起，可实现多种能源形式智能联保联供，显著提高能源利用效率，降低能源系统对环境的依赖，提升能源保障的可靠性和稳定性。多源智能微电网供电系统项目不仅涵盖清洁能源与柴发等分布式能源并网开发，而且融入电网智能控制，属于国家发改委公告《战略性新兴产业重点产品和服务指导目录》（2017年第1号）所明确的“6.4 智能电网中的分布式电源并网及控制系统”领域，且响应《江西省“十四五”制造业高质量发展规划》中新能源重点产业和全国新能源产业重要基地的发展需求。因此，该项目符合国家与我省节能减排和新能源发展战略，对提升国防军事实力，实现“碳达峰、碳中和”双碳目标，均具有重要意义。Renewable energy is gradually becoming an important source of new electricity, leading to significant changes of the grid structure and operation mode, as pointed out by the Energy Technology Revolution and Innovation Action Plan (2016-2030) issued by National Development and Reform Commission (NDRC) and National Energy Administration (NEA). However, conventional petrochemical energy is still the main power supply of national defense equipment, resulting in problems such as shortage of petrochemical energy, environmental pollution, low combating effectiveness and poor infrared stealth performance. Therefore, the research and development of multi-source intelligent micro grid power supply system (MSIMGPSS), which employs photovoltaic, hydrogen fuel cell, energy storage and other clean energy as main power source and stealth power station as auxiliary source, has become an urgent demand for power supply of national defense key equipment.MSIMGPSS, as small-scale, distributed and intelligent micro grid, is established based on various renewable energy, intelligent energy management and distribution technology. In MSIMGPSS, each distributed power module can run independently or connect to a large power grid. Owing to direct connection of distributed clean energy, power networks and users, MSIMGPSS is promising to realize intelligent joint power supply of multiple forms energy, to improve energy efficiency significantly, reduce the dependence of energy system on the environment and to enhance the reliability and stability of energy supply.MSIMGPSS project, which includes not only the grid-connected development of distributed energy such as clean energy and diesel power, but also the intelligent control of power grid. For our nation, the project belongs to the field of "6.4 Distributed power Grid connection and Control System in smart Grid" specified in the Guidance Catalogue of Key Products and Services of Strategic Emerging Industries (No. 1, 2017) announced by the NDRC. For Jiangxi province, the project is focused on the development needs of the key new energy industry and the important base of the national new energy industry, as put in the Jiangxi Province “14th Five-year” Plan for High Quality Development of Manufacturing. Therefore, the project is in line with both the national and provincial strategy of energy conservation, emission reduction and new energy development, with great significance to the improvement of national defense strength and realization of “carbon peak and carbon neutral” goals.  |
| 技术难题概述 | 随着新能源和电力电子技术的迅速发展，多源智能微电网供电系统的功能与优势日益显著，应用需求日益广泛，但其仍面临诸多理论与技术挑战。本项目具体的技术难点如下：**1、多形式能源组网/独立供电和市电快速切换技术难题**：实现多种形式能源快速组网和独立供电，且要求系统可与市电快速切换，切换时间≤40ms，切换过程中供电电压无闪断；**2、高功率密度能源装置热管理与降噪技术难题**：在JY1标准集装箱有限空间内，同时保障隐身电站单元正常工作温度范围和静默性能，要求距离装置1米处噪声强度≤56dB(A)；**3、红外隐身技术难题**：要求电站单元在9倍目标可视面积背景下，在方位角0～360°和仰角15～90°威胁区域范围内，达到以下红外隐身技术指标：1）箱体可视表面平均辐射温度与所处优势背景平均辐射温度之差<4℃；2）箱体可视表面最高辐射温度与所处优势背景平均辐射温度之差<10℃；3）隐身电站排气、排烟对周围地物辐射温度升高≤6℃。**4、电池包热插拔不掉电技术难题**：储能及能量管理单元中30kWh储能电池拆分为60个便携式智能光储充电电源箱小模块（容量为0.5kWh），要求系统可任意热插拔1～10个便携式智能光储充电电源箱小模块，且系统在额定功率范围内不掉电。With the rapid development of new energy and power electronics technology, MSFMGPSS has more and more significant functions and advantages, contributing to more and more extensive application. However, MSIMGPSS is still faced with theoretical and technical challenges as follows:**1. Multi-form energy networking, independent power supply and quick switching technology challenge**. It is big challenge to achieve rapid networking and independent power supply of multiple forms of energy. Moreover, it is required that the system can quickly switch between the micro-grid and mains power supply, meeting the specifications including that the switching time should be no more than 40ms and power supply voltage cannot flash off during the switching process.**2. Thermal management and noise reduction technology challenge of high power density energy devices.** In the limited space of JY1 standard container, the normal operating temperature and silent performance of stealthy power station unit are required to be guaranteed. Specifically, the noise intensity measured 1m away from the energy device must be no more than 56dB(A).**3. Infrared stealth technology challenge.** In the range of 0 ~ 360° azimuth and 15 ~ 90° elevation angle under the background with 9 times area of the visible target, MSIMGPSS is required to achieve the following infrared stealth technical indicators:1) The difference between the average radiation temperature of the visible box surface and the average radiation temperature of the dominant background is less than 4℃;2) The difference between the maximum radiation temperature of the visible box surface box and the average radiation temperature of the dominant background is less than 10℃;3) The radiation temperature increases of the surrounding objects caused by the exhaust and smoke from the stealth power station is no more than 6℃.**4. Battery pack hot swap technology challenge.** In the MSIMGPSS, the 30kWh energy storage battery in the energy storage and energy management unit is divided into 60 small modules of portable field light storage and charging power box (each capacity is 0.5kwh). It is a big challenge to hot swap 1 to 10 small modules of the portable field optical storage power box from the system, simultaneously ensuring that the power supply cannot be off within the normal power range. |
| 技术攻关后希望达到的预期技术目标 | **1. 基本功能**1）可与市电进行切换；2）各单元可级联组网供电，也可以独立对外供电；3）可对负荷优先级进行控制，共三路输出接口，分别连接三级负荷；4）可与多个其它多源智能供电系统联网；5）各单元储能电池均采用便携式智能光储充电电源级联组成且可快速无损互换互用；6）燃料电池单元、隐身电站单元和储能及能量管理单元具有红外隐身功能。**2. 产品性能**1）最大输出功率15kW，额定输出电压为单相交流230V和三相交流400V，额定频率为50Hz。2）交流输出电气性能指标满足GJB 235A-97中I类电站的指标要求；3）并离网切换时间≤40ms，切换过程中供电电压零闪断；4）整体展开/撤收时间≤5min/6人；5）1米处最大噪声值≤56dB(A)；6）燃料电池单元、隐身电站单元和储能及能量管理单元，在9倍目标可视面积背景下，在方位角0°～360°、仰角15°～90°威胁区域范围内，应能达到以下红外隐身技术指标：* 箱体可视表面平均辐射温度与所处优势背景平均辐射温度之差< 4℃；
* 箱体可视表面最高辐射温度与所处优势背景平均辐射温度之差< 10℃；
* 隐身电站排气、排烟对周围地物辐射温度升高≤6℃。

**1. Fundamental functions:**1) The system can quickly switch between the micro-grid and mains power supply;2) Each energy unit can not only be connected to the micro grid, but also supply power independently;3）The system can control the priority of three levels load connected to three output interfaces;4) The system can be networked with other multi-source field power supply systems;5) The energy storage battery of each unit of the system is composed of a cascade of portable field light storage and charging power supply, which can be exchanged with each other quickly and without loss;6) The fuel cell unit, stealth power station unit and energy storage and energy management unit have infrared stealth function. **2. Product performance**1) Maximum output power, rated output voltage and rated frequency are 15kW, single-phase AC 230V or three phase AC 400V and 50Hz respectively;2) The output electrical performance meets the index requirements of class I power station in GJB 235A-97;3) The switching time should be no more than 40ms and power supply voltage cannot flash off during the switching process;4) The overall development and withdrawal time is no more than 5min/6 persons;5) The noise intensity measured 1m away from the energy device must be no more than 56dB(A);6) In the range of 0 ~ 360° azimuth and 15 ~ 90° elevation angle under the background with 9 times area of the visible target, MSIMGPSS is required to achieve the following infrared stealth technical indicators:* The difference between the average radiation temperature of the visible box surface and the average radiation temperature of the dominant background is less than 4℃;
* The difference between the maximum radiation temperature of the visible box surface box and the average radiation temperature of the dominant background is less than 10℃;
* The radiation temperature increases of the surrounding objects caused by the exhaust and smoke from the stealth power station is no more than 6℃.
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| 时限要求 | 根据公司发展战略规划，项目技术攻关从2022年5月开始实施，至2024年5月前完成；整个项目技术研究实施周期为2年。According to the company’s development strategy, the project will be implemented from May 2022 to May 2024, lasting for 2 years. |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于700万元。其中：愿意支付揭榜单位研发资金不少于 300 万元。 2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 项目技术研究开发过程中形成的相关技术，积极申请知识产权保护；所获得的知识产权均归江西清华泰豪三波电机有限公司所有。Intellectual property should be applied actively based on relevant technologies developed in the project. All intellectual property rights obtained are owned by Jiangxi Tsinghua Tellhow Sanbo Motor Co., LTD. |
| 企业承接转化后预期的经济、社会效益 | 预期成功研发出多源智能微电网供电系统，转化形成年产400台的生产能力。预计达产年实现销售收入4.3亿元，利润总额9600万元。形成完善的多源智能微电网供电系统制造技术与生产工艺，性能不低于国外同类产品指标，弥补国内现有多源智能微电网供电系统在野外实战条件下的机动性、隐身性、可靠性和模块化等方面的不足，并进一步增加南昌高新技术开发区特种新能源装备研发、制造与应用企业数量，壮大先进装备制造与自动化产业规模，还可吸纳引进多源智能微电网产业高端技术人才20人，促进南昌市乃至我省多源智能微电网装备制造的发展。项目成果产业化后，可带动富余劳动力就业50人，辐射带动新材料、软件开发、新能源光伏和储能电池零部件等相关产业发展。MSIMGPSS is expected to be developed successfully, with an annual production capacity of 400 units. It is estimated that the annual sales revenue and total profit can reach RMB ¥ 430000000 and ¥ 96000000 yuan respectively.It is expected to form a complete manufacturing technology and mass production process of MSIMGPSS with performance no lower than similar foreign products. The project results will remedy the weaknesses of the existing domestic power supply system in mobility, stealth, reliability and modularization under field conditions. Furthermore, the number of enterprises focused on special new energy equipment R&D, manufacturing and application in Nanchang High-tech Development Zone will be increased significantly, contributing to the expansion of the scale of advanced equipment manufacturing and automation industry. In addition, the project can absorb at least 20 top technical talents in the multi-source field micro-grid industry, promoting the development of multi-source field micro-grid equipment manufacturing in Nanchang city and even the whole province.The industrialization of the MSIMGPSS project results will contribute to the employment of more than 50 surplus workers and the development of new materials, software development, new energy photovoltaic, energy storage battery parts and other related industries. |

**“揭榜挂帅”企业重大技术需求榜单（14）**

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| 所属产业领域或产业链 | 航空/Aviation | 细分方向 | 关键共性零部件/ Critical Generic Parts |
| 重大技术需求项目名称 | 直升机轻量化用纳米均匀弥散增强铝基复合材料关键技术研究/ Study on the key technology of nanometer homogeneous dispersion reinforced aluminum matrix composite for helicopter weight reduction  |
| 技术需求提出企业 | 北京通用航空江西直升机有限公司/BEIJING GENERAL AVIATION JIANGXI HELICOPTER CO., LTD. |
| 技术需求牵头企业联系人 | 姓名 | 徐朝起/Xu Chaoqi | 职务 | 部长/Director | 手机：18979882792 | 邮箱：xuchaoqi@jiangxihelicopter.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 中航工业昌河飞机工业（集团）有限责任公司/AVIC CHANGHE AIRCRAFT INDUSTRY (GROUP) CORPORATION LTD. | ☑龙头企业☑骨干企业☑战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 | 航空工业直升机设计研究所/CHINA HELICOPTER RESEARCH AND DEVELOPMENT INSTITUTE | ☑龙头企业☑骨干企业☑战略性新兴产业企业☑高新技术企业□科技型中小企业 |
| 3 | 江西昌兴航空装备股份有限公司/JIANGXI CHANGXING AVIATION EQUIPMENT CO., LTD. | □龙头企业□骨干企业☑战略性新兴产业企业☑高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 飞行器的轻量化研究工作一直是国内外航空航天领域研究的重点之一。数据表明，飞机结构重量每减轻1%，飞机性能就能提高3%～5%。在满足直升机性能和使用寿命等需求的前提下，如何减轻直升机结构材料的质量是产品创新、降本增效以及节能减排的关键之举。民用轻型直升机作为一种低空交通工具，轻量化意味着机身更轻，油耗更少，更加灵活方便。在满足一定的强度、刚度和寿命的前提下，为了设计出结构质量更轻的直升机，研发纳米增强铝合金材料迫在眉睫，研发成果将非常有利于扩展民用直升机市场，经济和社会效益巨大，应用前景广阔。The research on the weight reduction of aircraft is always one of the focuses in the aerospace field all over the world. Data shows that aircraft performance can be improved by 3% to 5% for every 1% reduction of the structural weight of the aircraft. On the premise of meeting the requirements of helicopter performance and service life, how to reduce the weight of the helicopter structural materials is the key for product innovation, cost reduction and energy conservation and emission reduction. Civil light helicopter as a low-altitude vehicle, lightweight of which means lighter fuselage, less fuel consumption, and more flexible and convenient. On the premise of meeting the requirements of a certain strength, stiffness and service life, in order to design a lighter helicopter, it is extremely urgent to develop nano-reinforced aluminum alloy materials. The research and development results will be very beneficial to expand the civil helicopter market, with huge economic and social benefits and broad application prospects.  |
| 技术难题概述 | 飞行器的轻量化研究工作一直是国内外航空航天学科研究的重点之一。数据表明，飞机结构重量每减轻1%，飞机性能就能提高3%～5%，因此重量是衡量飞机设计先进性的重要指标之一。在满足飞行任务前提下，降低飞行器的重量是民用轻型直升机设计者永恒追求的目标。轻量化意味着机身更轻，油耗更少，更加灵活方便，从而能够拥有更大的市场前景。因此，作为北汽集团通用航空板块南方直升机产业基地，我们希望在满足一定的强度、刚度和寿命的前提下，研发强度更高的纳米增强铝合金材料以设计出结构质量更轻的直升机。The research on the weight reduction of aircraft is always one of the focuses in the aerospace field all over the world. Data shows that aircraft performance can be improved by 3% to 5% for every 1% reduction of the structural weight of the aircraft. Therefore, weight is one of the important indicators to measure the advancement of the aircraft design. On the premise of satisfying the flight tasks, reducing the weight of the aircraft is the eternal pursuit of civil light helicopter designers. Lightweight means lighter fuselage, less fuel consumption, more flexibility and convenience, thus results in bigger market prospects. Therefore, as the Southern helicopter industry base of BAIC General Aviation plate, we hope to develop nano-reinforced aluminum alloy materials with higher strength to design helicopters with lighter structural weight on the premise of meeting certain strength, stiffness and life span requirements.  |
| 技术攻关后希望达到的预期技术目标 | 减轻直升机自重量：10-20kg；抗拉强度：560-655MPa；屈服强度：500-520MPa；刚度≧70Gpa；延伸率≧8%；焊缝强度≧540MPa；航空铝结构件一次性压铸成型。科技成果指标：申请发明专利4-6项，实用新型专利8-10项。发表国内外高水平论文5-7篇。相关科研成果实现产业化。Reduce helicopter weight: 10-20kg; Tensile strength: 560-655MPa; Yield strength: 500-520MPa; Stiffness ≧ 70 Gpa; Elongation ≧8%; Weld strength ≧540MPa; Aircraft aluminum structure one-time die casting. Index of scientific and technological achievements: Apply for 4-6 invention patents and 8-10 utility model patents. Publish 5-7 papers of high level at home and abroad. Relevant scientific research achievements are industrialized.  |
| 时限要求 | 2023年12月前完成 Before December 2023 |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 520 万元。其中：愿意支付揭榜单位研发资金不少于 100 万元。 2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 成果归提出技术需求单位所有The achievements belong to the unit who puts forward the technical demand |
| 企业承接转化后预期的经济、社会效益 | 纳米增强铝合金材料特性对直升机轻量化而言至关重要，研发新型强度更高的纳米增强铝合金材料结构件不仅是在积极响应国家节能减排、低碳生活号召，更重要的是能够有效降低航空企业运营成本，技术创新有利于打响品牌，由此可实现年新增直升机销售100架，新增产值2亿元，新增利税6000万元，直接带动就业100人。Nanometer reinforced aluminum alloy material characteristics is crucial for helicopter weight reduction. To develop new higher strength nanometer reinforced aluminum alloy material structure not only is the positive response to a call for national energy conservation and emissions reduction, low carbon life, but also to effectively reduce operating costs of the aviation enterprises above all. Technology innovation can make a good start of the brand, thus which can realize newly increase of 100 helicopters annual sales, 200 million RMB output value, and 60 million RMB profits and taxes, and directly create 100 jobs.  |

**“揭榜挂帅”企业重大技术需求榜单（15）**

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| 所属产业领域或产业链 | 绿色食品/Green food | 细分方向 | 保健、健康产品研发Research and development of natural health products |
| 重大技术需求项目名称 | 蔓三七降尿酸药食健康新产品研发与产业化Development and industrialization of new medicine and food health products of *Gynura procumbens* for reducing uric acid |
| 技术需求提出企业 | 江西蔓三七健康科技有限公司Jiangxi mansanqi Health Technology Co., Ltd |
| 技术需求牵头企业联系人 | 姓名 | 傅水根Fu Shui-Gen | 职务 | 法人、总经理/general manager | 手机：13507910519 | 邮箱：hjw\_u@126.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 江中食疗科技有限公司Jiangxi Jiangzhong Food Therapy Technology Co., Ltd. | **■**龙头企业□骨干企业□战略性新兴产业企业**■**高新技术企业□科技型中小企业 |
| 2 | 江西金薄金生态科技有限公司Jiangxi Jinbojin Ecological Technology Co. , Ltd. | **■**龙头企业□骨干企业□战略性新兴产业企业**■**高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 痛风是人体嘌呤代谢紊乱、尿酸生成过多或排出减少引起高尿酸血症，进而形成的尿酸盐结晶（MSU）沉积在皮下、关节及关节周围软组织引起红肿热痛的急性关节炎。流行病学数据显示，痛风的发病率在世界范围内呈逐年上升的趋势，2020年在中国东部，其患病率达到2.55%，且呈年轻化趋势，在全球1.8亿痛风患者中，我国已占据9000万。蔓三七（Gynura procumbens（Lour. Merr.），学名平卧菊三七，2012年5月被我国卫生部批准为新资源食品，2019年批准为普通食品。近代药理研究表明蔓三七具有消炎、降压、降糖、降脂、抗菌等药理活性。本企业研发的蔓三七含片在用于治疗消炎等症状时，发现痛风患者的痛风症状得到明显改善，经过多年的研究，目前公司已研发出第一代降尿酸产品，并从原料种植、降尿酸功效成分的筛选和鉴定、产品开发等方面形成了自主知识产权和完善的产业发展供应链。公司现有蔓三七种植基地1000亩，位于信丰县，基地实行“基地带动、种植户入股、政府扶持”的产业发展新模式，按1500元/亩股金，每户农民可获得劳务收入和农田租金2万多元。该模式得到了当地政府的充分肯定，正大力支持基地做大做强，蔓三七种植已成为信丰县最具区域特色的代表性产业之一。同时，本项目也将为加快推进中医药强省建设作出应有的贡献，进一步增强我省食疗和医疗产业链供应链自主创新能力建设，推动我省绿色食品产业转型升级。Gout is an acute arthritis in which the disorder of purine metabolism, excessive or reduced excretion of uric acid cause hyperuricemia, and then the urate crystal (MSU) is deposited under the skin, joints and soft tissues around joints, resulting in redness, swelling, heat and pain. Epidemiological data show that the incidence rate of gout is increasing year by year in the world. In eastern China in 2020, the prevalence rate reached 2.55% and was younger. In the world, 180 million of gout patients had occupied 90 million.*Gynura procumbens* (Lour.) Merr. is called Mansanqi in China. The National Health Commission of the PRC also approved G. procumbens as a new food resource in 2019. Recently, pharmacologic studies have reported that G. procumbens has antioxidant, anti-herpes simplex, anti-hyperglycemic, anti-hyperlipidemic, anti-inflammatory, analgesic, and reduced blood hypertension properties.Mansanqi buccal tablets developed by our company are mainly used to treat inflammation, Gout patients accidentally found that the symptoms of gout had been significantly improved when taking man San Qi buccal tablets. After years of research, the company has developed the first generation of uric acid reducing products. At the same time, the company has formed its own intellectual property rights and a supply chain with perfect industrial development from the aspects of raw material planting, screening and identification of uric acid reducing effective components, product development and so on. At present, The company has a 1000 mu planting base of *G. procumbens* in Xinfeng County. The base implements a new industrial development model of "base driven, growers' equity participation and government support". At a share price of 1500 yuan / mu, each farmer can obtain labor income and farmland rent of more than 20000 yuan. This model has been fully affirmed by the local government and strongly supported the base to become bigger and stronger. *G. procumbens* has become one of the most representative and important industries with regional characteristics in Xinfeng County. At the same time, the project will make due contributions to accelerating the construction of a strong province of traditional Chinese medicine, enhance the construction of independent innovation capacity of uric acid reducing diet therapy and medical industry chain supply chain, and promote the transformation and upgrading of green food industry in our province. |
| 技术难题概述 | 本企业研发的第一代降尿酸产品给高尿酸痛风人群（60名）试用14天后，通过检测食用前后尿酸含量的变化，80%的试用人群结果良好，但是，他们对本产品提出了更高的要求：所研发的产品（“第二代”产品）效果能否更明显，即起作用的时间更短？能否缓解由高尿酸引起的剧痛？如何解决患者在服用蔓三七产品中存在个体差异，且差异率显著等问题？因此，针对上述问题，企业正积极攻关，主要内容如下：1、借鉴中医的“君臣佐使”关系组合，采用体外降尿酸活性的实验方法，筛选出与蔓三七为伍具有产品效果更明显和缓解由高尿酸引起的剧痛的“药食用源”动植物种类，初步确定“第二代”产品的配方。2、突破原材料质量控制、活性组分高效制备等技术瓶颈，自主研发和组装生产核心设备，创制新产品的多种剂型、核心工艺和技术、关键设备，实现基于缓解痛风系列健康新产品的规模化生产。3、进一步通过人体实验和动物实验，确定“第二代”产品配方中各物质的用量关系，并确定终端产品的配方。因此，本项目的完成和实施，有望从根本上解决高尿酸痛风患者对西药的依赖，并进一步降低其毒副作用等“卡脖子”技术问题。After taking the first generation of uric acid lowering products for 14 days, 80% of the gout patients with high uric acid (60 people) tested the changes of uric acid content before and after consumption, and the results were good. However, they put forward higher requirements for this product: can the developed products (the "second generation" products) have more obvious effects, that is, can they work for a shorter time? Can it alleviate the severe pain caused by high uric acid? How to solve the problems of individual differences and significant difference rate in patients taking *G. procumbens* products? Therefore, in view of the above problems, enterprises are actively studying, and the specific contents are as follows:1. Referring to the relationship combination of "monarch, Minister and assistant envoy" of traditional Chinese medicine, and adopting the experimental method of reducing uric acid activity in vitro, the species of animals and plants of "medicinal edible source" combined with *G. procumbens* have more obvious product effect and alleviate the severe pain caused by high uric acid, and the formula of "second generation" products is preliminarily determined.2. Break through the technical bottlenecks such as raw material quality control and efficient preparation of active components, independently develop and assemble production core equipment, create a variety of dosage forms, core processes, technologies and key equipment of new products, and realize the large-scale production of new health products based on gout relief series.3. Further, through human experiment and animal experiment, determine the dosage relationship of various substances in the formula of "second generation" products, and determine the formula of end products.The implementation of this project can well solve the problem that patients with gout with high uric acid can only be prevented and treated by taking synthetic drugs, and can solve the "neck sticking" technology that synthetic drugs bring huge toxic and other side effects to patients. |
| 技术攻关后希望达到的预期技术目标 | 1、自主研发或集成创新产品制造技术（原材料质量控制、活性组分高效制备、原料提取与浓缩技术及相关设备等），使活性组分提取率达物料原有含量的95 %以上；获得产品纯度95 %以上且具有高活性、结构明确功效因子3-5个。2、建立生产线1条，产能达5000-10000吨/年以上，产值达2-4亿元/年以上的系列产品；3、申请发明专利5-7件；发表高质量论文7-9篇以上；4、项目成果预期获得国家级或省部级高等次科技奖项。5、企业现有1000亩原料种植基地，已有一条原料干燥生产线，同江西省科研机构和高校合作，联合开展技术攻关。1. Independent research and development or integration of innovative product manufacturing technology (raw material quality control, efficient preparation of active components, raw material extraction and concentration technology and related equipment, etc.), so that the extraction rate of active components can reach more than 95% of the original content of materials; The purity of the product is more than 95%, and has 3-5 efficacy factors with high activity and clear structure.2. A series of products with a production line with a production capacity of more than 5000-10000 tons / year and an output value of more than 200-400 million yuan / year;3. Apply for 5-7 invention patents; Published more than 7-9 high-quality papers;4. The project achievements are expected to win national or provincial and ministerial high-level science and technology awards.5. The enterprise has a 1000 mu seed value base of raw materials and a raw material drying production line. It cooperates with scientific research institutions and universities in Jiangxi Province to carry out research on technical difficulties. |
| 时限要求 | 本项目技术攻关于2024年12月前完成/ The technical development of the project is to be completed before December 2024. |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 500 万元。其中：愿意支付揭榜单位研发资金不少于 200 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 本项目在执行期内取得的各项成果由企业所有，成果管理和合作权益分配等事项严格按相关文件执行。 All the achievements of the project during the implementation period are owned by the enterprise, and the achievements management, cooperation rights and interests distribution and other matters shall be implemented in strict accordance with the relevant documents. |
| 企业承接转化后预期的经济、社会效益 | 本项目实施后，拟兴建产能达5000-10000吨/年以上，产值达2-4亿元/年以上的系列蔓三七产品。目前，在全球1.8亿痛风患者中，我国已占据9000万，且呈年轻化趋势，而治疗痛风多采用促尿酸排泄药、抑制尿酸生成药、肾上腺皮质激素、非甾体类抗炎药、秋水仙碱等药物，这些药物虽然短期内疗效良好，但易产生肝肾毒性、恶心和成瘾性等不良毒副作用。所以，迫切需要安全、无毒的药食用源的降尿酸物质代替上述西药的带来的副作用。本公司研发的蔓三七降尿酸产品已通过动物实验和人群试验证明能起到显著的作用，且对人体无任何毒副作用，同时，对“尿酸值达到上限的的亚健康人群”（男性是149-416 μmol/L，女性是89-357 μmol/L），食用此产品后，能较好的控制在正常尿酸值范围内，显著降低痛风的风险。因此，本项目实施后具有显著的经济和社会效益。After the implementation of the project, it is planned to build a series of products with a production capacity of more than 5000-10000 tons / year and an output value of more than 200-400 million yuan / year. At present, among the 180 million gout patients in the world, China has accounted for 90 million, and shows a younger trend. Most gout patients are treated with uric acid excreting drugs, uric acid production inhibiting drugs, adrenocortical hormones, non steroidal anti-inflammatory drugs, colchicine and other drugs. Although these drugs have good curative effect in a short period, they are prone to adverse side effects such as hepatorenal toxicity, nausea and addiction. Therefore, there is an urgent need for safe and non-toxic drugs to replace the side effects of the above-mentioned western drugs with uric acid reducing substances from edible sources. The uric acid lowering product of *G. procumbens* has been proved to play a significant role through animal experiments and population experiments, and has no toxic and side effects on human body. At the same time, it is effective for "sub-healthy people whose uric acid value reaches the upper limit" (men are 149-416) μ Mol / L, 89-357 for women μ Mol / L), after taking this product, it can be better controlled within the range of normal uric acid value and significantly reduce the risk of gout. Therefore, the implementation of the project has significant economic and social benefits. |

**“揭榜挂帅”企业重大技术需求榜单（16）**

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| 所属产业领域或产业链 | 绿色食品/ Green food | 细分方向 | 油脂副产物综合利用/ Comprehensive utilization of oil by-products |
| 重大技术需求项目名称 | 植物甾（烷）醇酯高效制备及其应用关键技术The Efficient Manufacture of phytosterol（stanol）esters and its application |
| 技术需求提出企业 | 宜春大海龟生命科学有限公司/ Yichun Dahaigui Life Science Co.,Ltd.  |
| 技术需求牵头企业联系人 | 姓名 | 代志凯/Dai zhikai | 职务 | 技术总监/ technical director | 手机：15167531103 | 邮箱：daizhikai@163.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 无/none | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 | 无/none | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 植物甾醇被科学家们誉为“生命的钥匙”，有良好的降血脂作用，有效预防心脑血管疾病。但是，植物甾醇不溶于水，在油脂中溶解度仅约1%，很难添加到食品基质中，也难以被人体吸收，限制了其在食品工业中的应用。植物甾醇酯化为甾（烷）醇酯是最重要的改性手段之一，可以大大拓宽植物甾（烷）醇酯的应用。我国目前对植物甾（烷）醇酯的开发研究较少，关键技术和水平仍大大落后于国外，尤其是植物甾醇酯合成技术及其在食品领域中的应用基础数据。因此开发操作简便，绿色高效、可定向化的植物（烷）甾醇酯合成技术具有十分重要意义。同时，亟需大力开展植物甾（烷）醇酯混合物及单体组分消化吸收、营养功能和食品定向添加应用基础研究，突破植物甾（烷）醇酯主要应用于油脂制品的技术瓶颈，切实解决我省功能性油脂产业重大共性关键技术难题。Phytosterols are known as “the key of life” and have a good hypothetical effect to prevent cardiovascular and cerebrovascular diseases. However, phytosterols are insoluble in water and only about 1% soluble in oil. Featuring these characteristics, it is difficult to add phytosterols to food and they can hardly be absorbed by human body, which limit their applications in food industry. Through esterification, phytosterols can be converted to stanol esters and this process is one of the most important modifications of phytosterols, which greatly widened the use of phytosterol (stanol) esters. Currently, the research on phytosterol (stanol) esters in China lags far behind that in foreign countries in many key technical areas, such as phytosterol synthesis. To make things worse, the lack of basic application data in food industry greatly confines their use.Therefore, it is of vital importance to develop a simple, highly-efficient and purpose-specific synthesis method of phytosterol (stanol) esters. In the meantime, in order to break the technical bottleneck of the application of phytosterol (stanol) esters in lipid products and solve the common technical problem of functional lipids existing in our province, there is an urgent need for us to strengthen our basic research of phytosterol (stanol) ester mixtures or monomers in the areas of absorption and digestion, nutritional functions and food additives. |
| 技术难题概述 | 当前植物甾（烷）醇酯制备的技术及应用难点：1、传统化学合成法，副产物多，转化率低，纯化过程引入大量酸碱废液和有机溶剂，严重危害环境，不符合绿色化学的发展趋势；2、产品品质差，残留物多，制备过程需添加的催化剂（特别是重金属催化剂）及溶剂难以完全除去，导致产品颜色和气味也不够友好，严重影响植物甾醇酯作为功能食品的安全；3、体内代谢及转化基础数据缺失，在大众饮食如牛奶、饮料及烘焙食品中添加量及添加方式不清晰不明确，与水、碳水化合物、蛋白质等配伍稳定性差，严重制约了植物甾（烷）醇酯的推广和应用。 Here are some difficulties in the manufacture and application of phytosterol (stanol) esters: firstly, when phytosterol (stanol) esters are synthesized in the traditional method, big amounts of by products will be produced and the return rate is very low. More than that, good quantities of acids, bases and other wastes will be an unavoidable result, which cause environmental damages and go against the “green production” tendency. Secondly, high quality can’t be secured, because it is difficult to remove all the catalysts, especially the metal catalysts and other solutes, which not only affect the appearances but also the safety of the foods to which the phytosterol (stanol) esters are added. Thirdly, owing to the lack of basic metabolic and conversion data in body, it is not clear about the methods and the quantities to be added to milks, proteins, drinks or other baking foods. More than that, the instability of phytosterol (stanol) esters after matching with carbohydrates greatly limits their publication and application in food industry.本项目拟首先从不同的天然来源植物甾醇出发，研制植物（烷）甾醇酯的操作简便、绿色高效、可定向化绿色氢化及合成技术；其次针对目前植物（烷）甾醇酯应用研究缺乏理论数据，其在人体内转化不清晰、不明确等难题，开展机体内的消化吸收规律，评估其在体内对血糖、血脂调节作用；最后开展植物甾（烷）醇酯混合配方产品在乳制品、饮料及焙烤制品定向添加及稳定性技术，扩大植物甾醇的应用范围，更好的服务于人民健康需求。该技术属于行业“卡脖子”技术及现实应用场景。Basing on different types of natural phytosterols, this project intends to find an easy to operate, environmental-friendly, highly efficient and purpose-specific method of synthesis and hydrogeneration. Facing with the difficulties of the lack of basic theoretic data and unclear working mechanism in the body, experiments will be conducted to find out the absorption pattern and the mechanism of blood sugar and blood lipids adjustment. After that, research on stability will be advanced and formulas featuring phytosterol (stanol) esters for baking foods, drinks and milk products will be designed to widen the application of phytosterol (stanol) esters to service the health of the mass. This project aims to solve “bottleneck” problem and above are the corresponding application scenarios.  |
| 技术攻关后希望达到的预期技术目标 | 通过项目实施，预计取得以下成效：1、建立植物甾（烷）醇酯高效制备关键技术1-2套，获得植物甾（烷）醇酯工业化生产技术和工艺参数，转化率达到95%以上，产品纯度97%以上，开发具有良好功能特性的植物甾醇酯配方1-2个。2、申请高质量发明专利1-2项，发表高水平论文1-2篇。3、建立1 条年产100吨规模的中试生产线。Through project implementation, the following results are expected:1. Obtain 1-2 set(s) of fully matured phytosterol (stanol) ester manufacture techniques and corresponding manufacturing parameters; the purity of final products should be no less than 97% and the conversion rate should be no less than 95%; 1-2 mature and function-impressive formula(s) should be established.
2. 1-2 patent(s) will be applied and 1-2 high lever essay(s) should be published.
3. 1 mid-test production line of 100 tons be established.
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| 时限要求 | 要求2024年12月前完成/ Completion before December 2024 required |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 1000 万元。其中：愿意支付揭榜单位研发资金不少于 100 万元。 2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 1.双方均享有申请专利的权利，但专利方案不得公开具体技术秘密。2.甲乙双方如向任意第三方转让取得的专利权，需经另一方书面同意（专利转让所得分配另行书面约定。）3.专利权双方共有，甲方为第一专利权人，乙方为第二专利权人。专利申请、审查及维护费用由甲方承担。甲方有优先购买本技术全部专利权的权利。1. All parties have the right to apply for patents, but the patent program shall not disclose specific technical secrets.2. Written confirmation from the other party is required when any of the two parties want to transfer the patent to any third party.3. Patent right will be shared by the two parties. Party A is the primary patent owner and Party B is the secondary party owner. The application and maintenance cost of patents will be shared between the two parties and Party A enjoys priority in purchasing all the patents from the project. |
| 企业承接转化后预期的经济、社会效益 | 该技术突破后将打破国外植物甾（烷）醇酯合成及应用技术的垄断，全面取代国内植物甾（烷）醇酯的市场供应，推动国内植物甾（烷）醇酯产业迅速发展，填补国内植物甾（烷）醇酯生产技术的空白，带动植物甾醇及其酯下游产业如保健品、轻质食品及化妆品等领域的发展，形成完善的产业链。企业对该项目实施成果转化后，预计实现新增年度营收5000万元以上，推动全省绿色食品产业的发展，促进人们饮食健康水平的提高。When the goals of the project fulfilled, it will break the foreign monopoly of synthesis and application of phytosterol (stanol) esters and fully replace foreign suppliers in domestic market. By doing this, the void in domestic phytosterol (stanol) , filling domestic market will be fulfilled and the corresponding industries will be promoted, which will further promote the development of downstream industries like supplementary foods, light food and cosmetics, forming a complete industrial chain.After the project achievements are put into practical use, it is expected to bring 50 million yuan more annually to this company, promoting the development of the green food industry in the province and people's eating health. |

**“揭榜挂帅”企业重大技术需求榜单（17）**

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| 所属产业领域或产业链 | 现代农业/modern agriculture | 细分方向 | 肉类食品加工/Meat food processing |
| 重大技术需求项目名称 | 带骨白羽鸡肉熟化前淤血防控技术攻关与产品研制/Prevention and control technology and product development of chicken with bone |
| 技术需求提出企业 | 江西圣农食品有限公司/Jiangxi Sunner Food Co., Ltd |
| 技术需求牵头企业联系人 | 姓名 | 黄平/Huang Ping | 职务 | 副总/Deputy General Manager | 手机：18179427373 | 邮箱：snsp107@sunnersp.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 福建圣农食品有限公司/Fujian Sunner Food Co., Ltd | ☑龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 | [正大食品企业(青岛)有限公司](https://aiqicha.baidu.com/detail/compinfo?pid=xlTM-TogKuTwzy5fKUgRqgAIAvG5uR2yxAmd&rq=es&pd=ee&from=ps" \t "https://www.baidu.com/_blank)/Zhengda Food Enterprise (Qingdao) Co., LTD | □龙头企业☑骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 1.产业规模及发展现状2021年，圣农制定了十四五规划，包括继续做大食品深加工板块、将养殖规模数量提升至匹配深加工板块未来规模的10亿羽、布局上游白羽肉鸡种鸡市场、做优圣农品牌和打造数字圣农等方面。2022年将继续在产能建设上进行投资，新建多个食品深加工工厂，实现产能和产量的进一步提升。继续致力于实现产业链到价值链的提升。“鲜品化、熟食化、品牌化”是企业重要的发展战略，食品深加工是第二发展曲线，会继续逆势投资，在提升中国鸡肉食品深加工市场占有率的同时，不断提升经营效率。2.对我省经济社会发展、增强产业链供应链自主可控能力、推动我省产业转型升级等重大战略意义放眼省内乃至全国，公司有义务发挥圣农的优势来巩固食品深加工板块全渠道布局的领先地位，在加强重点客户增长的同时侧重新品的开发与整合，不断打造策略性大单品和渠道大单品，继续保持各个渠道的稳定增长。3.实施项目的重要性、必要性和紧迫性在品牌提升与创新营销模式的升级方面，线上及新零售业务的增长最为迅速，近三年复合增长率达到300%左右。其中线上和新零售的销售收入占C端比重超过50%，新推出的“脆皮炸鸡”和“嘟嘟翅”两产品亦均成功实现单月销售额破千万。可以预见，翅类产品在促进消费增长升级有着不可替代作用，而品质又是重中之重。此项目实施对改善白羽鸡带骨肉系列的品质，填补国内外鸡肉深加工共性难题之空白具有极为重要意义。1. Industrial scale and development status

In 2021, Sunner formulated the 14th Five-Year Plan, including continuing to expand the food deep processing plate, increasing the number of breeding scale to 1 billion feathers matching the future scale of the deep processing plate, layout the upstream white feather broiler breeding market, optimizing the Sunner brand and building digital Sunner.In 2022, we will continue to invest in production capacity construction, build a number of new food deep processing plants, and achieve a further increase in production capacity and output.Continue to be committed to improving the industrial chain to the value chain."Fresh food, cooked food and brand" is an important development strategy of the enterprise, food deep processing is the second development curve, will continue to invest against the trend, to improve the market share of China's chicken food deep processing, and constantly improve the operating efficiency.1. It is of great strategic significance to the economic and social development of our province, enhancing the independent and controllable ability of the industrial chain and supply chain, and promoting the industrial transformation and upgrading of our province.

Looking at the province and even the whole country, the company has the obligation to give full play to the advantages of Sunner to consolidate the leading position in the omni-channel layout of the food deep processing sector, focus on the development and integration of key customers while strengthening the development and integration of new products, constantly create strategic large single products and channel large single products, and continue to maintain the stable growth of each channel.1. The importance, necessity, and urgency of the project implementation

In terms of brand improvement and innovative marketing model upgrading, online and new retail businesses grew the most rapidly, with a compound growth rate of about 300% in the past three years.Among them, the sales revenue of online and new retail accounted for more than 50% of the C-end, and the newly launched "crispy fried chicken" and "Dudu wing" products also successfully achieved monthly sales exceeding 10 million.It can be predicted that wing products play an irreplaceable role in promoting consumption growth and upgrading, and quality is the top priority.The implementation of this project is of great significance to improve the quality of white feather chicken with bone and meat series, and to fill the common problems of chicken deep processing at home and abroad. |
| 技术难题概述 | 1.技术难题鸡翅、鸡腿等制成速冻调理产品，或者裹粉油炸制品，进行蒸烤或者油炸等熟化方式食用时，咬开或者撕开肌肉组织，会在骨肉结合处出现明显的黑色淤血，此类现象在原料是冰鲜品或者冻品时都会出现，而冻品原料(-18℃以下冻存)尤其严重，约占到八九成，冰鲜品(-5~-2℃环境储存和运输等的原料)会稍好于冻品，但比例也有5-6成，此类现象严重影响了食品感官品质。同时经过追溯，在有黑色淤血的部位，其对应的原料通过肉眼观察是无明显淤血现象的，导致无法事先筛选和避免此类原料的使用。2.技术攻关方向速冻调理类带骨鸡肉熟化淤血防控技术攻关和工业化解决方案：寻求原料在预处理阶段，通过科技手段，借助相关仪器设备进行内部探伤或淤血事先感知，从而剔除，最终达到分类分级，达到原料最佳利用度，实现新产品开发和工业化流程的创新设计。1. Technical problems

Chicken wings, chicken legs, such as frozen conditioning products, or powder Fried products, steamed or fried cooked way, bite or tear muscle tissue, will appear in bone and obvious black congestion, this phenomenon in raw materials are frozen or frozen ingredients (-18℃) especially serious, about ninety percent, ice (-5~ -2℃ environment storage and transportation materials) will be slightly better than frozen, but also has 5-6, this phenomenon seriously affects food sensory quality.At the same time, after traceability, in the parts with black congestion, the corresponding raw materials have no obvious congestion phenomenon observed by the naked eye, resulting in the inability to screen and avoid the use of such raw materials in advance.1. Direction of technical breakthroughs

Frozen conditioning class with bone chicken ripening congestion prevention and control technology research and industrial solutions: seeking raw materials in the pretreatment stage, through scientific and technological means, with the help of relevant instruments and equipment for internal detection or congestion in advance, in order to eliminate, finally achieve classification, achieve the optimal utilization of raw materials, realize the new product development and industrialization process innovation design. |
| 技术攻关后希望达到的预期技术目标 | 技术攻关后，预期目标如下：1、引入相关技术设备或现有设备进行技改，冻、鲜原料内部淤血探伤鉴定和辨识准确率≥90%；2、探索淤血形成机理及后处理工艺，化解淤血留存技术攻关，熟化后产品淤血面积1-2cm2占比≤3-5%，淤血面积3-5cm2占比≤2-3%，无淤血占比90%以上；3、采用辨识或探伤、化解淤血留存手段实施完成后，不会对肉质、口感、理化指标及食品安全等引入负面影响。After the technical breakthrough, the expected objectives are as follows:1. Introduce relevant technical equipment or existing equipment for technical transformation, and the silt detection and identification and identification of frozen and fresh raw materials is 90%;
2. Explore the congestion formation mechanism and post-treatment process, and solve the congestion retention technology. After ripening, the congestion area of 1-2cm2 accounts for 3-5%, the congestion area of 3-5cm2 is 2-3%, and the congestion area accounts for more than 90%;
3. After the implementation of identification or detection and congestion retention, no negative impact will be introduced on meat quality, taste, physical and chemical indicators and food safety.
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| 时限要求 | 2022年10月30日前完成核心技术机理的研究和试验设备的购置；2022年12月31日前完成工艺攻关小试和车间生产线加工处理设备的定制；2023年6月30前完成中试工艺技术验证、产品技术指标实验室测试评估；2023年12月31前完成产业化技术开发、产品开发、批量产品测试和示范线投资，项目验收。Complete the research of the core technology mechanism and the purchase of the test equipment before October 30,2022;Complete the process test of 2022 and workshop production line processing equipment before December 31,2022;Complete the pilot process technology verification and laboratory test and evaluation of product technical indicators by June 30,2023;Complete industrialization technology development, product development, batch product testing, demonstration line investment by December 31,2023. |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 1200 万元。其中：愿意支付揭榜单位研发资金不少于 160 万元。 2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 合作前各方各自所拥有的技术归属权不变；对于合作开发的新技术、新工艺、新方法等共同成果，由技术攻关单位共同申报，相关专利申请权及所有权共有；需对外转让或者许可的，各方依据权利人要求另行协商，具体依据实际投入（以财务归集，第三方评估确认为准）按比例分享。For the cooperation, the parties shall jointly declare the new technologies, new process and new methods and the relevant patent application rights and ownership; for external transfer or permission, the parties shall negotiate according to the actual input (subject to financial collection and third-party evaluation). |
| 企业承接转化后预期的经济、社会效益 | 1.形成的核心技术、重要工艺和研制的专用设备，为成果的成功转化提供了必要保障，增强了企业发展的核心竞争力。2.技术产品用于白羽鸡肉调理类产品熟化前分类分级，避免二等品及以下一系列加工资源的浪费，实现原料最佳利用率，可有效服务客户，市场空间大。3.成功转化后，预计可实现销售20000万，利税2400万。新增就业120余人，年耗用带骨鸡肉原料7万吨，农民增收5000万元。产品有效提高目标产品的商品感官和品质价值，拓宽原料鸡肉的应用领域，增加了产品科技含量和附加值，节约原料及后续加工所需资源，提升了生产效率，为江西省的白羽鸡肉高效利用开拓出高附加值的应用空间，也顺应绿色农业循环经济理念。1. The formed core technologies, important processes and special equipment developed provide a necessary guarantee for the successful transformation of achievements and enhance the core competitiveness of enterprise development.
2. Technical products are used for the classification and classification of white feather chicken conditioning products before ripening, to avoid the waste of second-class products and the following series of processing resources, to realize the best utilization rate of raw materials, can effectively serve customers, and have a large market space.
3. After successful transformation, it is expected to achieve sales of 200 million yuan and profits and taxes of 24 million yuan.More than 120 new jobs were created, with the annual consumption of 70,000 tons of raw chicken with bone, increasing farmers' income by 50 million yuan.

Products effectively improve the target product commodity sense and quality value, broaden the application of raw material chicken, increase the product technology content and add value, saving raw materials and subsequent processing resources, improving the production efficiency,and the efficient utilization of Jiangxi province chicken developing high value-added application space, and also complying with the green agriculture circular economy concept. |

**“揭榜挂帅”企业重大技术需求榜单（18）**

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| 所属产业领域或产业链 | 绿色食品Green food | 细分方向 | 传统食品加工Traditional food processing |
| 重大技术需求项目名称 | 罗城扎粉生产工艺的标准化及绿色安全装备改进Standardization of Luocheng Rice Noodles Production Process and Improvement of Green Safety Equipment |
| 技术需求提出企业 | 江西锦江酒业有限责任公司 |
| 技术需求牵头企业联系人 | 姓名 | 熊睿志刘兆材 | 职务 | 联络人总经理 | 1582058102413970526040 | rz\_xiong@163.com6717431@qq.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 万载县罗城扎粉食品有限公司 | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业√科技型中小企业 |
| 2 |  | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 罗城扎粉是江西省宜春市万载县地方特产，全省第三批省级非物质文化遗产，以其特殊的香味闻名。罗城扎粉是以当地盛产的高产早稻米为原料，经浸泡、洗米、磨浆、沉淀、去上清水、装袋、压榨去水、揉团、煮粉团、揉粉、装榨、挤丝、煮粉、冷却、盘粉、晒粉、扎粉、包装而成的米粉产品。目前，罗城扎粉主要是农户小作坊式经营，生产条件比较落后，无法取得经营许可证，导致产业发展受限，无法形成品牌效应。为了扎粉产业的进一步发展，应充分结合罗城扎粉传统生产工艺和现代食品加工技术，优化扎粉生产工艺参数，结合宜春万载县罗城镇黎明村的产业现状和目前黎明村目前经济条件和投入能力，设计一条罗城扎粉的标准化生产示范线。引入食品生产安全规范和现代加工技术，将助推罗城扎粉产业规模化、绿色化发展，带动宜春市万载县罗城镇及周边乡镇经济发展，为乡村振兴提供技术支持。Luocheng Rice Noodles is a local specialty of Wanzai County, Yichun City, Jiangxi Province, the third batch of provincial intangible cultural heritage in the province, and is famous for its special fragrance.Luocheng Rice Noodles is a rice noodle product made of high-yield early rice that is abundant in the local area and produced by soaking rice, washing rice, grinding rice into rice milk, settling, removing water, bagging, pressing to remove water, kneading, cooking dough, kneading, filling, squeezing, cooking, cooling, spreading, drying, tying and packaging.At present, Luocheng Rice Noodles is mainly operated by farmers in small workshops with relatively backward production conditions and unable to obtain business licenses, resulting in limited industrial development and inability to form a brand effect.In order to further develop the Luocheng Rice Noodles industry, we should fully combine the traditional production technology of Luocheng Rice Noodles and modern food production technology to optimize the production parameters of the Luocheng Rice Noodles.A standardized production demonstration line of Luocheng Rice Noodles should be designed based on the industrial status of Liming Village, Luocheng Town, Wanzai County, Yichun, and the current economic conditions and investment capacity of Liming Village.The introduction of food production safety standards and modern processing technology will boost the large-scale and green development of the Luocheng Rice Noodles, drive the economic development of Luocheng Town and surrounding townships in Wanzai County, Yichun City, and provide technical support for rural revitalization. |
| 技术难题概述 | 当前罗城扎粉产业发展主要受到以下几个因素的限制：（1）扎粉生产在浸泡过程中需要自然发酵一段时间（冬季10~20天，夏季5~6天），容易混入杂菌，存在食品安全隐患，导致无法获得食品生产许可证，而浸泡发酵是保证扎粉品质的关键，也是罗城扎粉的特色工艺步骤，为罗城扎粉带来了特殊的风味，无法规避。（2）缺乏统一的工艺参数指导生产，扎粉的品质完全取决于制粉师傅的技艺水平，各户生产出的扎粉质量参差不齐，不利于品牌建设。（3）晒粉过程中对天气要求较高，既要有日照，又要避免曝晒，遇阴雨天气和酷暑无法生产，使扎粉生产受到限制。（4）煮粉团和煮粉过程中采用烧柴火的方式加热，用于大规模生产将对环境产生较大污染。（5）包装方式简陋，大多采用普通塑料袋包装，不利于运输贮存以及品牌建设。故此次技术需求为建成一条罗城扎粉特色生产示范线，通过工艺参数优化和生产线设备设计解决发酵容易混入杂菌、产品质量参差不齐、晒粉天气限制、加热烧柴污染、包装简陋等一系列问题。The current development of Luocheng Rice Noodles industry is mainly limited by the following factors:(1) The production of Luocheng Rice Noodles requires natural fermentation for a period of time during the soaking process (10-20 days in winter and 5-6 days in summer), which is easy to mix with miscellaneous bacteria and has potential food safety hazards, which makes it impossible to obtain a food production license.Soaking and fermenting is the key to ensuring the quality of Luocheng Rice Noodles, and it is also a characteristic process step of Luocheng Rice Noodles, which brings a special flavor to Luocheng Rice Noodles, so it cannot be avoided.(2) There is a lack of unified process parameters to guide production. The quality of the rice noodles is completely dependent on the skill level of the rice noodle master. The quality of the rice noodles produced by each household is uneven, which is not conducive to brand building.(3) The weather requirements are relatively high in the process of drying rice noodles. It is necessary to have sunshine and avoid exposure to the sun. In case of rainy weather and extreme heat, it cannot be produced, which limits the production of powdered powder.(4) In the process of cooking dough and rice noodles, the method of burning wood is used for heating, which will cause great pollution to the environment when used in large-scale production.(5) The packaging method is simple, and most of them are packaged in ordinary plastic bags, which is not conducive to transportation, storage and brand building.Therefore, the technical requirement this time is to build a special production demonstration line of Luocheng Rice Noodles, and to solve a series of problems such as easy mixing of miscellaneous bacteria in fermentation, uneven product quality, weather restrictions on rice noodles drying, pollution from heating and burning wood, and poor packaging through optimization of process parameters and design of production line equipment. |
| 技术攻关后希望达到的预期技术目标 | 1.结合并优化罗城扎粉的传统制作工艺，解决浸泡阶段杂菌污染以及产品质量参差不齐问题，同时保留传统工艺扎粉特色风味和品质。2.设计并建立一条罗城扎粉特色生产示范线。3.保证罗城扎粉的食品安全：符合GB 2713-2015 食品安全国家标准 淀粉制品、GB 2762-2017 食品安全国家标准 食品中污染物限量等食品安全标准。1. Combine and optimize the traditional production process of Luocheng Rice Noodles, solve the problems of bacterial pollution and uneven product quality in the soaking stage, and at the same time retain the characteristic flavor and quality of traditional technology.2. Design and build a special production line of Luocheng Rice Noodles.3. Guarantee the food safety of Luocheng Rice Noodles: meet the food safety standards such as GB 2713-2015 National Standard for Food Safety Starch Products, GB 2762-2017 National Standard for Food Safety Limit of Contaminants in Food. |
| 时限要求 | 2025年 12 月前完成Completion by December 2025 |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 500万元。其中：愿意支付揭榜单位研发资金不少于 200 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 本项目知识产权双方共同所有，万载县罗城扎粉食品有限公司可在合作框架内无偿使用。The intellectual property rights of this project are jointly owned by both parties, and Wanzai County Luocheng Zhafen Food company can be used free of charge within the cooperation framework. |
| 企业承接转化后预期的经济、社会效益 | 经济效益：实现企业的扎粉业务增长，收入预期年均增长 7%左右;社会效益：带动罗城扎粉产业规模化、绿色化发展，助推乡村振兴。Economic benefits: Realize the growth of the company's rice noodles business, with an expected average annual growth of about 7% in revenue;Social benefits: Drive the large-scale and green development of Luocheng Rice Noodles industry, and boost rural revitalization. |

**“揭榜挂帅”企业重大技术需求榜单（19）**

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| 所属产业领域或产业链 | 生物医药（中医药）/Biomedicine (traditional Chinese Medicine) | 细分方向 | 化学药制剂/Chemicalpreparation |
| 重大技术需求项目名称 | 3类新药厄贝沙坦氨氯地平片的III期临床试验研究/Phase III clinical study of Irbesartan amlodipine tablets |
| 技术需求提出企业 | 江西施美药业股份有限公司/Jiangxi Shimei Pharmaceutical Co. , Ltd. |
| 技术需求牵头企业联系人 | 姓名 | 陈淑萍/Shuping chen | 职务 | 研发部副部长/Head ofresearch and development | 手机：18970479567 | 邮箱：jxsmzy@163.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | / | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 | / | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 高血压是临床常见慢性病，可伴有心、脑、肾等器官的功能或器质性损害，是心脑血管最主要的危险因素，已成为影响全球死亡率的第二大危险因素。高血压作为慢性病，无法根治，需要长期用药以控制血压平稳。虽然我国高血压患者的知晓率（51.5%）、治疗率（46.1%）和控制率（16.9%）近年来有所提高，但总体仍处于较低水平。厄贝沙坦氨氯地平片由日本住友制药株式会社研究开发，于2012年09月28日在日本获批上市，商品名为アイミクス®、Aimix®，规格为100mg/10mg、100mg/5mg，目前尚未在中国上市。厄贝沙坦氨氯地平片是由血管紧张素Ⅱ受体拮抗剂（ARB）厄贝沙坦和钙通道阻滞剂（CCB）苯磺酸氨氯地平组成的复方制剂，其药理作用来自单方和二者联合的协同，临床适用于高血压的治疗，该固定剂量复方用于治疗单用厄贝沙坦或氨氯地平不能有效控制血压的患者。厄贝沙坦抑制血管收缩和醛固酮的释放，产生降压作用，苯磺酸氨氯地平有抗高血压及抗心绞痛作用，二者组成的复方制剂可协同降压，优势互补，能更好地平稳控制患者血压在正常范围。针对厄贝沙坦氨氯地平片的仿制药研发，2015年国内有我公司及海南中济医药科技、上海家化医药科技、江苏恒瑞医药股份等共4家企业申报该项目并获批临床，目前仅我司1家企业完成该产品的BE（生物等效性）试验，于2020年4月24日国家药品监督管理局注册申报受理，受理号分别为CYHS2000299、CYHS2000300，该产品注册资料已通过国家药品审评中心已审核，于2021月1日26日颁发厄贝沙坦氨氯地平片（I）100mg/5mg和厄贝沙坦氨氯地平片（II）100mg/10mg进行药物III期临床试验批准通知书，我公司正在准备进行临床试验工作（两项Ⅲ期临床；登记号：CTR20211191，对比厄贝沙坦片；登记号：CTR20211193，对比苯磺酸氨氯地平片）。目前厄贝沙坦氨氯地平片尚未在中国上市。我公司的厄贝沙坦氨氯地平片如果成功获批上市，我司将成为全球第二家、全国第1家生产该品种的企业，可提高该药品的可获得性和可及性，替代进口，填补国内空白，未来十年可独占市场，为公司和我省带来非常可观的经济和社会效益。 Hypertension is a common clinical chronic disease that can be accompanied by functional or organic damage to the heart, brain, kidneys and other organs, and is the most important cardiovascular risk factor, which has become the second most important risk factor affecting global mortality. As a chronic disease, hypertension cannot be cured and requires long-term medication to control blood pressure smoothly. Although the awareness rate (51.5%), treatment rate (46.1%) and control rate (16.9%) of hypertensive patients in China have improved in recent years, the overall level is still relatively low.Irbesartan Amlodipine Tablets were researched and developed by Sumitomo Pharmaceutical Co., Ltd. and approved for marketing in Japan on September 28, 2012 under the trade names of Aimix® and Aimix®, with specifications of 100mg/10mg and 100mg/5mg, and are not yet available in China. Irbesartan Amlodipine Tablets is a combination of angiotensin II receptor antagonist (ARB) Irbesartan and calcium channel blocker (CCB) Amlodipine Benzoate, whose pharmacological effects are derived from the synergy of the single and the combination of the two, clinically indicated for the treatment of hypertension, this fixed dose combination is used to treat patients whose blood pressure cannot be effectively controlled by Irbesartan or Amlodipine alone. Irbesartan inhibits the release of vasoconstriction and aldosterone to produce antihypertensive effects, while amlodipine besylate has anti-hypertensive and anti-anginal effects. The combination of the two can synergistically lower blood pressure and complement each other to better control the patient's blood pressure in the normal range. For the generic drug development of Irbesartan Amlodipine Tablets, in 2015, there are 4 domestic enterprises including our company and Hainan Zhongji Pharmaceutical Technology, Shanghai Jahwa Pharmaceutical Technology, Jiangsu Hengrui Pharmaceutical Company, etc. declared the project and were approved clinically. CYHS2000299, CYHS2000300, the product registration information has passed the National Drug Review Center has been reviewed, in 2021 1 26 issued Irbesartan Amlodipine Tablets (I) 100mg/5mg and Irbesartan Amlodipine Tablets (II) 100mg/10mg for drug phase III clinical trials approval notice, our company is We are preparing to conduct clinical trials (two Phase III clinical trials; registration number: CTR20211191, comparing Irbesartan Tablets; registration number: CTR20211193, comparing Amlodipine Benzoate Tablets).Irbesartan amlodipine tablets are not yet available in China. If our Irbesartan Amlodipine Tablets are successfully approved for marketing, our company will become the second company in the world and the 1st company in the country to produce this variety, which can improve the accessibility and availability of this drug, replace imports, fill the gaps in China, and bring very considerable economic and social benefits to our company and our province in the next ten years. |
| 技术难题概述 | 目前，我公司为国内第1家取得厄贝沙坦氨氯地平片（I）100mg/5mg及厄贝沙坦氨氯地平片（II）100mg/10mgIII期临床试验批准通知书（见国家局批准通知书扫描件），获批开展III期临床研究企业。一、本项目计划开展的厄贝沙坦氨氯地平片III期临床研究，计划临床试验内容如下:1、验证厄贝沙坦氨氯地平片药效优于单方厄贝沙坦片及单方苯磺酸氨氯地平片：服用150mg单方厄贝沙坦片无效的患者，服用100mg/5mg或100mg/10mg的厄贝沙坦氨氯地平片可有效控制血压；服用5mg单方苯磺酸氨氯地平片无效的患者，服用100mg/5mg的厄贝沙坦氨氯地平片可有效控制血压。2、验证厄贝沙坦氨氯地平片安全性优于单方厄贝沙坦片及单方苯磺酸氨氯地平片：服用厄贝沙坦氨氯地平片的患者，较服用单方厄贝沙坦片及单方苯磺酸氨氯地平片患者的不良反应更小。3、拓展厄贝沙坦氨氯地平片的潜在适应症，收集试验数据，初步验证本品用于糖尿病肾病的可行性。二、在准备厄贝沙坦氨氯地平片III期临床研究的过程中，我司遇到以下技术难题，期望与专业公司及知名专家合作并共同解决：1、与专业的临床CRO公司合作，解决以下技术难题：1) 临床方案的设计。本项目与普通新药临床方案的设计相比，要求更高：普通新药临床方案设计要求与安慰剂（模拟空白片，无有效药物成分，无临床疗效）相比，达到临床有效即可；而本项目要求与已上市的经典抗高血压药物（厄贝沙坦片、氨氯地平片）相比，达到临床优效，即临床降压效果较经典抗高血压药物（厄贝沙坦片、氨氯地平片）更强，且安全性更好，不良反应更少。试验难度更高，因此对临床方案的要求更高。2）临床过程的管理。本项目由两个试验组成，试验周期长，所需受试者例数多，且受试者易脱落（脱落达到一定比例将影响试验结果），因此需要经验丰富的PM（项目经理）对整个试验进行管理及把控，协调各方，及时解决试验过程中出现的各种问题。此外，试验过程中的出现的AE（不良事件）及SAE（严重不良事件），也需要经验丰富的CRC与患者及PI之间及时沟通处理，以免影响药物的安全性评价。3）统计结果的计算。本项目能否获得成功，最终取决于是否达到统计学意义的优效。因此优秀的统计学专家对该项目至关重要。试验数据集的划分，各受试者试验数据的纳入与剔除等技术难点，直接关系到试验的统计学结果，关系到试验的成败。 4）潜在适应症的数据收集。通过临床专家的评估，及专业CRO公司的试验设计，可在本试验中同步收集潜在适应症的部分数据，为本项目新适应症（糖尿病肾病）的拓展提供重要的数据评估，达到事半功倍的效果。参照普通3期临床试验，该部分费用预计需1200万左右。2、与心脑血管疾病治疗经验丰富的临床机构及PI（临床专家、试验研究者）合作，尤其在应用复方降高血压药物治疗高血压方面，PI不仅应具有丰富的临床实践经验，更应具有独到的见解，能够以丰富临床经验及试验经验，把控整个试验，完成对试验的全生命周期管理，同时为产品将来上市后的市场推广打好坚实的学术基础。研究机构及PI的选择与合作，与临床CRO公司业务能力相关。3、与研发排名靠前、抗高血压药物研发经验丰富的专业药学CRO公司合作，药学CRO公司应严格按照国家局CDE的审评要求，参照ICH及FDA标准及注册要求，以比原研药更高的药学标准，完成本项目产品的研发、申报及后续国家局要求的其他补充工作。参照普通新药研发经验，该部分费用预计需1000万左右。三、通过三期临床试验，我司期望突破以下行业共性“卡脖子”技术：1、验证低剂量复方降压药的有效性、安全性均优于高剂量单方降压药，为临床降压用药提供新的用药思路，为国内抗高血压仿制药的开发提供新方向。2、收集本试验中受试者的血糖数据，初步验证厄贝沙坦氨氯地平片可用于治疗糖尿病肾病，为后期拓展厄贝沙坦氨氯地平片新适应症做准备。充分发掘本品潜在适应症，通过试验验证本品为集降压、降糖、心脑肾靶器官保护为一体的明星产品，满足高血压合并糖尿病患者的临床用药需求，降低该部分患者的用药负担，提高其服药依从性。3、通过试验收集日本与中国的人种差异信息，为今后中日临床试验的桥接提供方向和依据综上，根据原研信息及文献资料可知，厄贝沙坦和苯磺酸氨氯地平二者组成的复方厄厄贝沙坦氨氯地平片制剂可协同降压，优势互补，能更好地平稳控制患者血压在正常范围，改善用药依从性，用量小，降压效果显著，同时具有降糖护肾的潜在临床用途。为填补国内空白，满足国内尚未满足的临床需求，我司迫切需要开展厄贝沙坦氨氯地平片的III期临床试验，验证以上内容，以期获得生产批件，减轻医保压力及我国患者的用药负担，同时为当地政府和我司建立品牌优势，并带来切实的经济效益。At present, our company is the first company in China to obtain Phase III clinical trial approval notice for Irbesartan Amlodipine Tablets (I) 100mg/5mg and Irbesartan Amlodipine Tablets (II) 100mg/10mg (see scanned copy of the approval notice from the National Bureau), and is approved to conduct Phase III clinical study.I. The Phase III clinical study of Irbesartan Amlodipine Tablets planned for this project, the planned clinical trial content is as follows:1. Verify the efficacy of Irbesartan Amlodipine Tablets over Irbesartan Mono Tablets and Amlodipine Mono Tablets: Patients taking 150mg Irbesartan Mono Tablets are ineffective, taking 100mg/5mg or 100mg/10mg Irbesartan Amlodipine Tablets can effectively control blood pressure; patients taking 5mg Amlodipine Mono Tablets are ineffective, taking 100mg/5mg Irbesartan Amlodipine Tablets can effectively control blood pressure. Irbesartan amlodipine tablets were effective in controlling blood pressure in patients who did not respond to 5mg of amlodipine mono-sulfate.2、Verify the safety of Irbesartan Amlodipine Tablets is better than Irbesartan Mono and Amlodipine Mono Benzoate Tablets: Patients taking Irbesartan Amlodipine Tablets have less adverse reactions than those taking Irbesartan Mono and Amlodipine Mono Benzoate Tablets.3. To expand the potential indications of Irbesartan Amlodipine Tablets and collect trial data to initially verify the feasibility of this product for diabetic nephropathy.During the preparation of Phase III clinical study of Irbesartan Amlodipine Tablets, our company encountered the following technical problems, which we expect to cooperate with professional companies and famous experts and solve together.1. Cooperate with professional clinical CRO companies to solve the following technical difficulties.1) Design of clinical protocol. Compared with the design of the clinical protocol of ordinary new drugs, this project has higher requirements: the design of the clinical protocol of ordinary new drugs requires that it is clinically effective when compared with placebo (simulated blank tablets, no active drug ingredients, no clinical efficacy); while this project requires that it is clinically effective when compared with the classical anti-hypertensive drugs (Irbesartan tablets, Amlodipine tablets) already on the market, i.e. the clinical antihypertensive effect is higher than the classical anti-hypertensive drugs (Irbesartan tablets, Amlodipine tablets) (Irbesartan Tablets, Amlodipine Tablets), with better safety and fewer adverse effects. The trial is more difficult, so the requirements for the clinical protocol are higher.2) Management of the clinical process. This project consists of two trials, the trial period is long, the number of subjects required is large, and the subjects are easy to fall off (a certain percentage of fall off will affect the trial results), so an experienced PM (project manager) is needed to manage and control the whole trial, coordinate all parties, and solve various problems in the trial process in a timely manner. In addition, AEs (adverse events) and SAEs (serious adverse events) that occur during the trial also require timely communication between experienced CRCs and patients and PIs to avoid affecting the safety evaluation of the drug.3) Calculation of statistical results. The success of this project ultimately depends on achieving statistically significant superior efficacy. Therefore excellent statisticians are crucial to the project. The technical difficulties such as the division of the trial data set and the inclusion and exclusion of the trial data of each subject are directly related to the statistical results of the trial and to the success or failure of the trial. 4) Data collection for potential indications. Through the evaluation of clinical experts and the trial design of professional CRO companies, some data of potential indications can be collected simultaneously in this trial, which can provide important data evaluation for the expansion of new indications (diabetic nephropathy) of this project and achieve the effect of twice the effort with half the effort.Referring to the general phase 3 clinical trial, the cost of this part is estimated to be about 12 million.2. Cooperate with clinical institutions and PI (clinical experts and trial investigators) with rich experience in the treatment of cardiovascular and cerebrovascular diseases. They should be able to control the whole trial and complete the whole life cycle management of the trial with rich clinical experience and trial experience, and at the same time lay a solid academic foundation for the future marketing of the product.The selection and cooperation of research institutions and PIs are related to the business ability of clinical CRO companies.3. Cooperate with professional pharmacy CRO companies with high R&D ranking and experience in the development of anti-hypertensive drugs. The pharmacy CRO companies should strictly follow the review requirements of CDE of the National Bureau, refer to the ICH and FDA standards and registration requirements, and complete the development, declaration and other supplementary work required by the National Bureau afterwards for the products of this project with higher pharmacy standards than the originator drugs.With reference to the general new drug development experience, the cost of this part is expected to be about 10 million.Through the phase III clinical trial, we expect to break through the following common "neck" technology in the industry.1、Verify that the effectiveness and safety of low-dose compound antihypertensive drugs are better than high-dose single antihypertensive drugs, provide new ideas for clinical antihypertensive drugs, and provide new directions for the development of domestic antihypertensive generic drugs.2. To collect the blood glucose data of the subjects in this trial, initially verify that Irbesartan Amlodipine Tablets can be used for the treatment of diabetic nephropathy and prepare for the expansion of new indications of Irbesartan Amlodipine Tablets in the later stage. We will fully explore the potential indications of this product, and verify through the trial that this product is a star product integrating antihypertensive, hypoglycemic and target organ protection of heart, brain and kidney, to meet the clinical medication needs of hypertensive and diabetic patients, to reduce the medication burden of these patients and to improve their medication adherence.3. Collecting information on the ethnic differences between Japan and China through the trial to provide direction and basis for future clinical trials between China and JapanIn conclusion, based on the original research information and literature, it can be seen that the combination of Irbesartan and Amlodipine besylate can synergistically lower blood pressure and complement each other, which can better control patients' blood pressure in the normal range, improve medication compliance, with small dosage and significant antihypertensive effect, and also have the potential clinical use of hypoglycemia and kidney protection. In order to fill the gaps in China and meet the unmet clinical needs in China, we urgently need to conduct the phase III clinical trial of Irbesartan Amlodipine Tablets to verify the above content, with a view to obtaining the manufacturing approval, reducing the pressure of medical insurance and the burden of medication for our patients, and at the same time establishing brand advantages for the local government and our company and bringing tangible economic benefits. |
| 技术攻关后希望达到的预期技术目标 | 一、目前技术指标参数目前厄贝沙坦氨氯地平片尚未在中国上市。日本原研上市前开展临床试验为：1）以厄贝沙坦100mg单药治疗血压控制不佳的原发性高血压患者为对象，进行了厄贝沙坦/氨氯地平100mg/0mg、100mg/5mg或100mg/10mg联合给药8周的双盲比较试验；2）以氨氯地平5mg单药治疗血压控制不佳的原发性高血压患者为对象，进行了厄贝沙坦/氨氯地平0mg/5mg或100mg/5mg联合给药8周的双盲比较试验。二、攻关后要求达到的技术目标1、与原研制剂药学质量一致。2、与原研制剂达到体内生物等效且稳定性等同或优于原研品。3、与单方厄贝沙坦片原研制剂及单方苯磺酸氨氯地平片原研制剂相比，降压效果具备优效性，不良反应具备优势，替代原研单方制剂。 4、验证厄贝沙坦氨氯地平片药效优于单方厄贝沙坦片及单方苯磺酸氨氯地平片：服用150mg单方厄贝沙坦片无效的患者，服用100mg/5mg或100mg/10mg的厄贝沙坦氨氯地平片可有效控制血压；服用5mg单方苯磺酸氨氯地平片无效的患者，服用100mg/5mg的厄贝沙坦氨氯地平片可有效控制血压。5、验证厄贝沙坦氨氯地平片安全性优于单方厄贝沙坦片及单方苯磺酸氨氯地平片：服用厄贝沙坦氨氯地平片的患者，较服用单方厄贝沙坦片及单方苯磺酸氨氯地平片患者的不良反应更小。6、探索原研制剂适应症，充分发掘本品潜在优势，满足国内尚未满足的临床需求。三、目标技术参数实现条件1、对比厄贝沙坦片Ⅲ期临床试验厄贝沙坦氨氯地平片（对比厄贝沙坦片）Ⅲ期临床试验为获得临床试验批准通知书（2021年01月26日）后的试验，2021年04月27在北京医院伦理委员会进行伦理审查，2021年05月18日通过伦理审查并获得伦理批件（审查结论：同意），临床试验登记号：CTR20211191。2、对比苯磺酸氨氯地平片Ⅲ期临床试验厄贝沙坦氨氯地平片（对比苯磺酸氨氯地平片）Ⅲ期临床试验为获得临床试验批准通知书（2021年01月26日）后的试验，2021年04月27在北京医院伦理委员会进行伦理审查，2021年05月18日通过伦理审查并获得伦理批件（审查结论：同意），临床试验登记号：CTR20211193。I. Current technical index parametersIrbesartan amlodipine tablets are currently not available in China. The clinical trials conducted prior to the launch of the original Japanese study were: 1) a double-blind comparative trial of irbesartan/amlodipine 100mg/0mg, 100mg/5mg or 100mg/10mg co-administration for 8 weeks in patients with essential hypertension with poor blood pressure control treated with irbesartan 100mg monotherapy; 2) a double-blind comparative trial of amlodipine 5mg monotherapy in patients with essential hypertensive patients with poorly controlled blood pressure, a double-blind comparative trial of irbesartan/amlodipine 0mg/5mg or 100mg/5mg co-administration for 8 weeks was conducted.Second, the technical objectives required to be achieved after the attack1. Consistent with the pharmacological quality of the original development agent.2, and the original development of the agent to achieve in vivo bioequivalence and stability equivalent or better than the original product.3. Compared with the original development of Irbesartan Tablets and Amlodipine Benzoate Tablets, the antihypertensive effect is superior and the adverse reactions are superior, replacing the original single-formulation. 4. Verify that Irbesartan Amlodipine Tablets are more effective than Irbesartan Mono and Amlodipine Mono: Patients who take 150mg Irbesartan Mono are not effective, take 100mg/5mg or 100mg/10mg Irbesartan Amlodipine Tablets can effectively control blood pressure; patients who take 5mg Amlodipine Mono are not effective, take 100mg/5mg Irbesartan Amlodipine Tablets. If 5mg of amlodipine besylate tablets are not effective, 100mg/5mg of Irbesartan amlodipine tablets can effectively control blood pressure.5、Verify the safety of Irbesartan Amlodipine Tablets is better than single Irbesartan Tablets and Amlodipine Mono-sulfate Tablets: Patients taking Irbesartan Amlodipine Tablets have less adverse reactions than those taking single Irbesartan Tablets and Amlodipine Mono-sulfate Tablets.6. Explore the indications of the original development agent, fully explore the potential advantages of this product, and meet the unmet clinical needs in China.III. Conditions for achieving the target technical parameters1、Comparison of Irbesartan Tablets Phase III clinical trialPhase III clinical trial of Irbesartan Amlodipine Tablets (Contrast Irbesartan Tablets) is a trial after obtaining the notification of clinical trial approval (January 26, 2021), ethical review was conducted at the Ethics Committee of Beijing Hospital on April 27, 2021, and ethical review was passed and ethical approval was obtained on May 18, 2021 (review conclusion: consent), clinical trial registration number. CTR20211191.2. Comparison of Amlodipine Benzoate Tablets Phase III Clinical TrialPhase III clinical trial of Irbesartan Amlodipine Tablets (Contrast Amlodipine Benzoate Tablets) was conducted after obtaining the clinical trial approval notice (January 26, 2021), ethical review was conducted at the Ethics Committee of Beijing Hospital on April 27, 2021, and ethical review was passed and ethical approval was obtained on May 18, 2021 (review conclusion: consent), clinical trial registration number: CTR20211193. CTR20211193. |
| 时限要求 | 厄贝沙坦氨氯地平片应在2023年12月份前完成三期临床试验资料的整理并完成申报.Irbesartan Amlodipine Tablets should be ready for Phase III clinical trial data and filing by December 2023. |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 1100 万元。其中：愿意支付揭榜单位研发资金不少于 1100 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 实施本项目过程中而产生的全部知识产权均归需求方所有。All intellectual property rights arising from the implementation of this project are the property of the demander. |
| 企业承接转化后预期的经济、社会效益 | 目前厄贝沙坦氨氯地平片在国内无上市信息。我司是国内唯一一家获得国家批准该药III临床试验的企业，也是唯一一家申报注册生产的企业。如果我司该产品III期临床试验通过并获批生产，将成为全国独家生产该品种的企业，填补国内空白，未来十年均可独占市场，为公司和我省带来非常可观的经济效益，预计每年可新增销售收入1亿元，实现利税3000万元，新增就业人员80人，实现进口替代，使国内高血压患者能消费得起此类药品，每年可为国家节约医保资金1亿元以上，为国家医疗改革做巨大贡献，可进一步提升我国生物医药产业的核心竞争力，经济社会效益显著。At present, there is no marketing information of Irbesartan Amlodipine Tablets in China. Our company is the only company in China that has received national approval for the phase III clinical trial of this drug, and is also the only company that has declared registration for production. If our company's phase III clinical trial is approved and production is approved, we will become the exclusive manufacturer of this product in China, which will fill the gap in China and bring considerable economic benefits to our company and our province, with an expected annual sales revenue of 100 million yuan, profit tax of 30 million yuan, 80 new employees, import substitution, so that domestic hypertensive patients can consume these drugs. The company is expected to achieve import substitution, make such drugs affordable to domestic hypertension patients, save more than 100 million yuan of national health insurance funds each year, make great contributions to national medical reform, and further enhance the core competitiveness of China's biopharmaceutical industry, with significant economic and social benefits. |

**“揭榜挂帅”企业重大技术需求榜单（20）**

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| 所属产业领域或产业链 | 生物医药Biomedicine | 细分方向 | 医疗器械medical instruments |
| 重大技术需求项目名称 | 接触式激光光纤及刀头能量转换技术的研究与应用Research and application of contact laser fiber and scalpel energy conversion technology |
| 技术需求提出企业 | 江西麦帝施科技有限公司Jiangxi Medex Technology Co., Ltd. |
| 技术需求牵头企业联系人 | 姓名 | 郭洪伟Guo Hongwei | 职务 | 研发经理R&D manager | 手机：13751446639 | 邮箱：M015@jiangximedex.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 无/none | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 | 无/none | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 |  1、项目需求背景（1）激光医学以高精确度、良好疗效及安全可靠等特性，为临床诊治提供了新手段，成为现代医学重要分支。（2）全球医疗器械市场发展迅速，但美日德欧等国家和地区的医疗器械产业起步时间早、发展快、技术水平及质量较高，占据大份额市场。而我国医疗器材产品集中在中低端领域，高端市场大份额由外资企业占领。因此，国家发布和推行了一系列“推进医疗器械国产化”“推动高性能医疗器械突破发展”的政策。（3）在激光医疗领域，目前的激光产品（如美国科医人公司的各类激光、德国Lisa Laser Products OHG的Ho:YAG激光、中国镭健公司的Nd:YAG激光等）应用皆为非接触式，激光不直接接触人体组织，存在以下共性问题：1、难以控制照射的准确性；2、激光穿透力强，易造成组织损伤；3、光束照射易发生反射伤人；4、烟雾大，止血能力不理想。 2、项目意义（1）此项目将改变激光在临床中的作用方式，实现外科激光应用的可接触，填补我国国产接触式外科半导体激光系统的产品空白，属国内首创。（2）目前在精细复杂手术中，能满足手术需求的医疗器械十分有限，且医生需多次更换设备，影响手术效率。此项目成果将集消融、切割、止血多功能为一体，并解决非接触式激光应用中的问题，大大提高手术效率和安全性。（2）减少相关器械进口依赖性，增强产业链自主可控能力。助推我省高端医疗器械产品的技术发展，推动行业进步，带动关联配套产业的发展。在提高行业技术标准的同时，带动地区经济和社会发展。1. Background of project requirements(1) Laser medicine has provided a new method for clinical diagnosis and treatment with the characteristics of high precision, good curative effect, safety and reliability, and has become an important branch of modern medicine.(2) The global medical device market is developing rapidly, but the medical device industry in countries and regions such as the United States, Japan, Germany and Europe has an early start, rapid development, high technical level and high quality, and occupies a large market share. However, my country's medical equipment products are concentrated in the middle and low-end fields, and a large share of the high-end market is occupied by foreign-funded enterprises.Therefore, the state has issued and implemented a series of policies of "promoting the localization of medical devices" and "promoting the breakthrough development of high-performance medical devices".(3) In the field of laser medical treatment, the current applications of laser products (such as various lasers from American Keyiren, Ho:YAG laser from Lisa Laser Products OHG from Germany, Nd:YAG laser from China Leijian Company, etc.) Contact type, the laser does not directly contact human tissue, there are the following common problems: 1. It is difficult to control the accuracy of the irradiation; 2. The laser has strong penetrating power, which is easy to cause tissue damage; 3. The beam irradiation is prone to reflection and injury; 4. There are Larger smoke, the hemostatic ability is not ideal.2. Project meaning(1) This project will change the role of laser in clinical practice, realize the accessibility of surgical laser applications, and fill the product gap of domestic contact-type surgical semiconductor laser systems in my country, which is a domestic initiative.(2) At present, in the delicate and complex operation, the medical equipment that can meet the needs of the operation is very limited, and the doctor needs to replace the equipment many times, which affects the efficiency of the operation. The results of this project will integrate the functions of ablation, cutting and hemostasis, and solve the problems in the application of non-contact lasers, greatly improving the efficiency and safety of the operation.(2) Reduce the import dependence of related equipment and enhance the independent and controllable ability of the industrial chain. Boost the technological development of high-end medical device products in our province, promote the progress of the industry, and drive the development of related supporting industries. While improving the technical standards of the industry, it will drive regional economic and social development. |
| 技术难题概述 | 本项目拟解决激光医疗器械行业共性的“接触”难题，打破技术瓶颈，通过激光光纤及刀头能量转换技术，实现激光应用的可接触。技术难点：相关研究表明，激光直接照射组织时，组织中的水、血红蛋白和脂肪对激光波长的吸收系数不同，所发生的效应也不尽相同，这对临床手术的安全带来很大隐患。本项目研究一种可使激光在光纤及刀头终端（前端）直接转换成热能的接触式光纤及刀头能量转换技术。1．由于光纤和刀头的材质不同，激光在两者的接触面会发生反射，从而导致能量损耗，因此如何提升光纤到刀头的激光耦合效率是需解决的一个难题。2．接触式激光刀在临床应用中，应尽可能降低刀头前端（作用端）以外的其他区域的能量输出，从而减少对周围健康组织的损伤，提高产品安全性。因此如何减少刀头前端以外的激光能量散射输出，使激光准确地集中到前端输出是需要解决的另一个技术难题。 3．激光传输到刀头前端后，如何解决激光的内聚焦效应使刀头前端均匀受热是需要解决的另一个技术难题。 This project intends to solve the "contact" problem that generally exists in the laser medical device industry, break the technical bottleneck, and realize the accessibility of laser applications through laser fiber and scalpel energy conversion technology.Technical Difficulties:Relevant studies have shown that when the laser directly irradiates the tissue, the water, hemoglobin and fat in the tissue have different absorption coefficients for the laser wavelength, and the resulting effects are also different, which brings great hidden dangers to the safety of clinical operations. This project studies a contact fiber and scalpel energy conversion technology that can directly convert laser light into thermal energy at the fiber and scalpel terminal (front end).1. Due to the different materials of the optical fiber and the scalpel, the laser will be reflected on the contact surface of the two, resulting in energy loss. Therefore, how to improve the laser coupling efficiency from the optical fiber to the knife head is a difficult problem to be solved.2. In clinical application of contact laser scalpel, the energy output of other areas other than the front end (acting end) of the scalpel should be reduced as much as possible, thereby reducing damage to surrounding healthy tissue and improving product safety. Therefore, how to reduce the scattered output of laser energy outside the front end of the scalpel, so that the laser can be accurately concentrated to the output of the front end of the scalpel is another technical problem that needs to be solved.3. After the laser is transmitted to the front end of the scalpel, how to solve the internal focusing effect of the laser to make the front end of the scalpel evenly heated is another technical problem that needs to be solved. |
| 技术攻关后希望达到的预期技术目标 | 预期技术指标：1. 刀头前端仅2mm有热量输出。
2. 刀尖最小直径达0.2mm。
3. 热损伤范围≤0.5mm。
4. 侧面激光透射率＜30%。
5. 刀头材料满足耐高温至少1500℃。导热及导光性能好。

Expected technical indicators:1. The front end of the scalpel has only 2mm of heat output.2. The minimum diameter of the scalpel tip is 0.2mm.3. The thermal damage range is less than or equal to 0.5mm.4. The side laser transmittance is less than 30%.5. The material of the scalpel meets the high temperature resistance of at least 1500 ℃. Good thermal conductivity and light guiding performance. |
| 时限要求 | 2024年4月前完成To be completed by April 2024 |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 2600 万元。其中：愿意支付揭榜单位研发资金不少于 200 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 受托方需按期完成研究开发工作，交付研究开发成果，提供有关的技术资料和必要的技术指导。开发过程中所产生的专利归双方共有，开发过程中所产生的技术秘密由委托方所有。The entrusted party shall complete the research and development work , deliver the research and development results, and provide relevant technical information and necessary technical guidance on time. The patents generated during the development process are shared by both parties, and the technical secrets generated during the development process are owned by the entrusting party. |
| 企业承接转化后预期的经济、社会效益 | 公司承接转化后预期取得的效益：**经济效益：**新增销售收入50000.00万元， 新增利润15000.00万元。 **社会效益：**1、提升技术水平：带动江西省乃至全国的激光手术类医疗器械产业技术水平的提升，提高本行业的核心竞争力。2、建立行业标准：或将建立激光光纤及刀头/接触式激光应用等行业标准。3、满足市场需求：对于医方——满足临床的手术操作需求，提供更为精准、安全、高效的操作效果，降低手术风险，节省手术时间，节约医疗资源；对于患者——降低手术成本，减轻病人痛苦，减小手术损伤，加快术后愈合。4、增加就业机会：预计新增就业100人。并带动相关产业的发展。5、新增税收：预计新增税收5000.00万元。The expected benefits after the company undertakes the transformation:Economic benefits:The new sales income is 500 million yuan, and the new profit is 150 million yuan.Social benefits:1. Improve the technical level:Drive the improvement of the technical level of the laser surgery medical device industry in Jiangxi Province and even the whole country, and improve the core competitiveness of the industry.2. Establish industry standards:Industry standards such as laser fiber and cutter head/contact laser applications may be established.3. To meet market demand:For doctors—meet the needs of clinical operation, provide more accurate, safe and efficient operation effects, reduce operation risks, save operation time, and save medical resources;For patients - reduce the cost of surgery, reduce the pain of patients, reduce surgical damage, and speed up postoperative healing.4. Increase employment opportunities:100 new jobs are expected. And drive the development of related industries.5. New tax:It is estimated that the new tax will be increased by RMB 50,000,000. |

**“揭榜挂帅”企业重大技术需求榜单（21）**

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| 所属产业领域或产业链 | 优势产业/Preponderant industry | 细分方向 | 中医药/ Chinese medicine |
| 重大技术需求项目名称 | 鲜竹沥传统炮炙工艺关键装备与质量控制技术研发/Quality control and equipment developmentwith ancient roasted processing of succus bambusae |
| 技术需求提出企业 | 江西仁安药业有限公司/ Jiangxi RenAn Pharmaceutical Co., Ltd. |
| 技术需求牵头企业联系人 | 姓名 | 李代生/Daisheng Li | 职务 | 总经理/ General manager | 手机：13907922036 | 邮箱：532691544@qq.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 康恩贝集团 | 龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 | 南京金陵制药厂 | □龙头企业骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 鲜竹沥是由粉绿竹、净竹及同属数种植物的鲜竿经加热后自然沥出的液体，已有上千年的用药历史，是最具炮炙特色的一味代表性中药，具有清热化痰、镇惊利窍之功效，被誉为痰家圣药。鲜竹沥是单方制剂鲜竹沥和复方制剂复方鲜竹沥液的重要原料，年需求量高达10000吨，并且鲜竹沥原料和制剂生产企业80%在我省，年销售额达50亿元。此外，复方鲜竹沥已被中国中药协会专家组认定为治疗新冠患者痰多黏稠或咯痰不爽的推荐用药，市场前景非常广阔。传统鲜竹沥制作工艺为：取鲜竹，去两节，中间用火烧之，使竹子微管纤维束细胞膨胀挤压溢出竹汁。该工艺存在生产方式粗放、原材料消耗大、耗时长、收率低、环境污染严重等问题，已不符合国家产业和环保政策。目前，符合法定工艺和标准的鲜竹沥年产量不足3000吨，市场缺口巨大。此外，鲜竹沥现行质量标准较低，产品质量难以保证，严重制约了行业发展。2022年3月，江西省药品监督管理局发布了《关于进一步加强鲜竹沥中药饮片生产管理的通知》，对鲜竹沥生产加工及产品质量提出了更高要求。因此，亟待开展鲜竹沥炮炙工艺关键装备与质量控制技术研究，探明生产工艺参数对鲜竹沥产品质量的内在影响规律，建立符合其特点的产品质量标准，实现规模化、自动化、标准化生产，保证临床用药安全。本项目的开展有利于进一步做优做强鲜竹沥中药饮片及其制剂，提升赣产特色中药品牌价值，促进中药制药装备的现代化发展，为中药炮炙工艺研究提供良好示范，推动中医药产业创新发展。Succus bambusae is a liquid that is naturally drained from the fresh rods of phyllostachysglaucamccluve, phyllostachysnuda mc cluve and several plants of the same genus after being heated.Succus bambusae has a history of using medicine for thousands of years, and it is a representative traditional Chinese medicine with the most roasting characteristic.Succus Bambusaeregarded as the holy medicine for the treatment of phlegm by traditional Chinese medicine experts，which has the functions of clearing heat and resolving phlegm.Succus bambusae is an important raw material for single and compound preparation succus bambusae, and the annual demand is as high as 10,000 tons.Our province owns 80% of the enterprises that produce raw materials and preparations of succus bambusae, and the annual sales of these enterprises amount to 5 billion Yuan.In addition, succus bambusae has been recognized by the expert group of the China Association of Traditional Chinese Medicine as a recommended drug for the treatment of patients with new crowns with thick phlegm or unpleasant expectoration, thus the market prospect of succus bambusae is very broad.The traditional production process of succus bambusae is as follows: take fresh bamboo, remove two knots, and burn it with fire in the middle, so that the cells of the bamboo microtubule fiber bundles expand and squeeze to overflow the bamboo juice. This process has problems such as primitive production method, large consumption of raw materials, long time-consuming, low yield, serious environmental pollution, etc., and is no longer in line with the national industrial and environmental protection policies.At present, the annual output of succus bambusae that meets the legal requirements is less than 3,000 tons, and the market gap is huge.In addition, the current quality standard of succus bambusae is low, and the product quality is difficult to guarantee, which seriously restricts the development of the succus bambusae industry.In March 2022, the Jiangxi Provincial Drug Administration issued the "Notice on Further Strengthening the Production Management of Succus Bambusae Chinese Herbal Pieces", which put forward higher requirements for the production processing and product quality of succus bambusae.Therefore, it is urgent to carry out research on the key equipment and quality control technology of the roasted processing of succus bambusae, to find out the internal influence of the production process parameters on the product quality of succus bambusae, to establish product quality standards that meet its characteristics, and to achieve large-scale, automated, and standardized production to ensure the safety of clinical medication.The development of this project is conducive to further improving and strengthening the traditional Chinese medicine pieces and their preparations of succus bambusae, enhancing the brand value of Jiangxi's traditional characteristic Chinese medicine, promoting the modernization of traditional Chinese medicine pharmaceutical equipment, providing thecomprehensive demonstration for the research on traditional Chinese medicine roasted processing technology, and promoting innovation and development of traditional Chinese medicine industry. |
| 技术难题概述 | 目前，鲜竹沥生产企业采用的加工方法有直火法、干馏法、水蒸气蒸馏法、水煮法等方式，除直火法为传承千年的传统制作方法外，其余方法为现代工艺方法，不符合国家标准规定。但是，鲜竹沥传统制法存在：1）生产方式粗放，采用手工和半手工生产，加热温度、馏分收集时间等工艺参数尚不明确，人为控制，产品质量不稳定；2）原材料消耗大，耗时长，收率低，仅3-5%的得率，已无法满足市场需求；3）环境污染严重，不符合国家产业和环保政策。此外，鲜竹沥现行质量标准较低，产品质量难以保证，严重制约了行业发展，整个鲜竹沥行业面临古法难传，新法混乱的严峻挑战。本项目拟开展炮炙与传动系统装备、供热系统装置、以及收集和检测系统设备研制，影响鲜竹沥质量的加热温度、加热时间、馏分收集时间工艺参数优化以及工艺参数对鲜竹沥产品质量的内在影响规律等技术难题的研究，研制具备自动化、信息化和智能化的鲜竹沥生产装备，探明鲜竹沥炮炙机制，建立与效应物质关联的产品质量标准，进而解决鲜竹沥生产行业面临的共性“卡脖子”问题，为其他炮炙类中药生产装备研制、生产工艺开发和质量控制技术研究提供借鉴和示范，推动对中药制药行业高质量发展。At present, the processing methods adopted by the succus bambusae production company include direct fire method, dry distillation method, steam distillation method, water boiling method, etc. Except for the direct fire method, which is the traditional production method that has been passed down for thousands of years, the other methods are modern craft methods but do not meet the national standards.However, the traditional production method of succusbambusae has the following problems: 1) The production method is coarse, manual and semi-manual production is used, the process parameters such as heating temperature and fraction collection time are not yet clear, and the product quality is unstable. 2) The raw material consumption is large and time-consuming, the yield is low, only 3-5% yield, cannot meet the market demand. 3) The serious environmental pollution, does not meet the national industrial and environmental protection policies. In addition, the current quality standards of succus bambusae are relatively low, and the product quality is difficult to guarantee, which seriously restricts the development of the succus bambusae industry.This project plans to carry out the following key technologies: the development of roasting and transmission systems, heating systems, and collection and detection systems; The optimization of process parameters such as heating temperature, heating time, and fraction collection time, and the internal influence of the production process parameters on the product quality of succus bambusae.This project develops automatic, informatization and intelligent succus bambusae production equipment, explores the roasted processing mechanism of succus bambusae, establishes product quality standards related to effect substances, and then solves the common "stuck neckquestion" faced by the succus bambusae production industry. The research of this project provides reference and demonstration for the development of other traditional Chinese medicine production equipment, production process and quality control technology, and promotes the high-quality development of the traditional Chinese medicine industry. |
| 技术攻关后希望达到的预期技术目标 | 预期目标：通过技术攻关，建立一条年生产鲜竹沥3000吨以上的规模化、自动化、智能化、标准化生产线，实现环境友好，产品质量均一、稳定、可控。具体目标如下：1. 在现有设备基础上，实现自动上料、传动、运渣和产品质量初检；
2. 建立一条能量循环低损的设备线，在现有基础将能耗降低50%；
3. 阐明影响鲜竹沥质量的加热温度、加热时间、馏分收集时间工艺参数，实现自动化、智能化精准控制；
4. 阐明工艺参数对鲜竹沥产品质量的内在影响规律及其炮炙机制，并制定与效应物质关联的内控质量标准1项；
5. 在现有年产能2000吨基础上提升1倍以上，新生产装备投入成本不超过新增效益的50%；
6. 申请专利3-5项。

Through technical research, a large-scale, automatic, intelligent and standardized production line will be established with an annual production of more than 3,000 tons of succus bambusae, so as to achieve environmental friendliness and uniform, stable and controllable product quality. The specific objectives are as follows.1) To realize automatic feeding, transmission, slag transport and initial inspection of product quality on the basis of existing equipment.2) To establish an equipment line with low loss of energy cycle and reduce energy consumption by 50% on the basis of the existing one.3) To elucidate the heating temperature, heating time and fraction collection time process parameters that affect the quality of succus bambusae, and to realize automatic and intelligent precision control.(4) To clarify the intrinsic influence law of process parameters on the quality of succus bambusae and its gunning mechanism, and develop a internal control quality standard associated with the effecting substances.5) To increase more than 1 times of the existing annual production capacity of 2000 tons, and the cost of new production equipment input not exceeding 50% of the new benefit.6) To apply for 3-5 patents. |
| 时限要求 | 2025年7月前完成/Completion by July 2025 |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于1500万元。其中：愿意支付揭榜单位研发资金不少于600万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 项目执行过程中产生的科技成果（发表论文、申请发明专利和软件著作权等）由企业和揭榜单位共同所有。共同完成的技术秘密成果，各方均有独立使用的权利。未经其他各方同意，任何一方不得向第三方转让技术秘密。The scientific and technological achievements (published papers, application for invention patents and software copyrights, etc.) produced in the course of project execution are jointly owned by the enterprise and technology undertaking department. All parties have the right to use the technical secret results independently which are jointly completed. Without the consent of other parties, no party shall transfer the technical secrets to the third party. |
| 企业承接转化后预期的经济、社会效益 | 本项目预期技术成果能够在本企业实现就地转化，该成果的应用能够促使企业产能提升百分之80，年营业额增长3亿元，税收增长1500万元。此外，该技术的应用能够切实解决鲜竹沥生产行业面临的共性“卡脖子”问题，实现鲜竹沥高效、稳定、均一、高质量生产，同时也为其他炮炙类中药生产装备研制和生产工艺开发提供借鉴，对中药制药行业的现代化发展和中药走向世界具有一定的推动意义。The project is expected to achieve in situ transformation of the technical results in the enterprise, and the application of the results can lead to a80% increase in production capacity, an annual turnover increase of 300million Yuan, and a tax increase of 15million Yuan. In addition, the application of this technology can effectively solve the common "stuck neck question" faced by the succus bambusae production industry, and realize the efficient, stable, uniform and high-quality production of succus bambusae.The technical achievements of this project provides reference and demonstration for the development of other traditional Chinese medicine production equipment and production process, which has the significance in promoting the modernization of the Chinese medicine pharmaceutical industry and the introduction of Chinese medicine to the world. |

**“揭榜挂帅”企业重大技术需求榜单（22）**

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| --- | --- | --- | --- |
| 所属产业领域或产业链 | 中医药/Chinese herbal | 细分方向 | 中药饮片/Chinese herbal pieces |
| 重大技术需求项目名称 | 樟树中药炮制技艺标准的制定/Formulation of technical standard for preparation of Camphor Tree Traditional Chinese medicine |
| 技术需求提出企业 | 江西樟树天齐堂中药饮片有限公司/Jiangxi Zhangshu Tianqitang Chinese Herbal Pieces Co. , Ltd. |
| 技术需求牵头企业联系人 | 姓名 | 杨迎/Yangying | 职务 | 助理/[Assistant](https://fanyi.so.com/?src=onebox" \l "assistant" \t "https://www.so.com/_blank) | 手机：18079541258 | 邮箱：1334013028@qq.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 江西草木樟帮中药炮制研究院有限公司/Jiangxi CAOMU Zhangbang Chinese Medicine Processing & Research Institute Co. , Ltd. | □龙头企业□骨干企业☑战略性新兴产业企业□高新技术企业☑科技型中小企业 |
| 2 |  | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 中药饮片炮制具有悠久的历史，是中医药宝库中的重要组成部分，是我国独特的传统制药技术。饮片炮制是在中医药理论指导下，按中医辨证用药的原则及调剂、制剂的需要，将中药材炮制成饮片的方法和技术。饮片炮制方法规范与否，直接关系到药品质量和临床用药的安全有效，关系到中医药的继承与发展。樟树中药饮片炮制标准的制定是对国家药品标准中未收载的我省临床习用饮片品规和炮制方法的补充，是我省饮片加工、生产、经营、使用、检验、监督管理的法定依据，对继承与发扬祖国宝贵医药遗产，提高当地中药饮片的质量，保障人民身体健康，促进饮片产业发展起到了积极的作用。The processing of Chinese medicine decoction pieces has a long history, is an important part of the treasure house of Chinese medicine, is China's unique traditional pharmaceutical technology. Under the guidance of the theory of Traditional Chinese medicine and according to the principle of TCM syndrome differentiation and the need of dispensing and preparation, the processing of Chinese medicinal materials into yinpian is a method and technology. Whether the processing methods of decoction pieces are standardized or not is directly related to the quality of medicine, the safety and effectiveness of clinical medication, and the inheritance and development of Traditional Chinese medicine. Camphor tree Chinese medicine yinpian processing standards is not contains our province in the national drug standard clinical conventional yinpian product gauge and processing method of supplement, is our province yinpian processing, production, management, use, inspection, supervision and management of the legal basis, to inherit and carry forward the motherland medicine precious heritage, improve the quality of the local Chinese medicine yinpian, safeguard people's health, Promoting the development of decoction piece industry has played a positive role. |
| 技术难题概述 | 中药具有“多成分、多靶点”的作用特点，不同于化学药品成分的单一性。使用单一指标成分的定性、定量分析方法无法全面反映中药内在质量。因此，如何构建既能反映中药有效性核心质量、又能符合中药多成分协同作用特征的质量标准研究体系，是制约中药产业高质量发展的共性“卡脖子”技术难题。1. 辨识中药质量标志物，明确反映有效性的质控指标。以中医药理论为指导，以樟帮中药饮片为对象，运用二维液质联用技术、多维制备技术和靶向活性筛选技术等现代科学技术手段，全面解析樟帮中药饮片的物质组成，阐明其药效物质，揭示靶向质量标志物，建立传统药用功效、药效物质和质控指标之间的关联性，为质控方法开发和质量标准制定提供科学依据。2. 构建多维中药质量评价体系，发展符合中药多成分特征的质控方法，制定科学严谨的质量标准。基于整体观思路，以质量标志物为目标，发展以定量指纹图谱为核心的中药质量控制关键技术，包括性状标准（外观、色泽、气味、大小）、外源性物质限量标准（水分、灰分、杂质、农残、重金属等）、内源性物质含量标准（总提取物、多指标成分含量、指纹图谱），形成系统的、完善的中药材/饮片质量评价体系，制定樟帮中药饮片质量标准。Traditional Chinese medicine has the function characteristic of "multi-component and multi-target", which is different from the single composition of chemical drugs. Qualitative and quantitative analysis using single index component can not reflect the internal quality of Traditional Chinese medicine. Therefore, how to construct a quality standard research system that not only reflects the effective core quality of TCM, but also conforms to the synergistic characteristics of TCM multi-components is a common "bottleneck" technical problem that restricts the high-quality development of TCM industry.1. Identify the quality markers of TRADITIONAL Chinese medicine and define the quality control indicators reflecting the effectiveness. Guided by the theory of traditional Chinese medicine, is an object with camphor help Chinese medicine yinpian, using two-dimensional fluid mass spectrometry, multidimensional preparation technology and targeted screening technology and other modern means of science and technology, parsing the composition of camphor help Chinese medicine yinpian, illustrate its effectiveness substance, revealing the targeted quality markers, traditional medicinal efficacy, efficacy of material and quality control index, the connection between the It provides scientific basis for the development of quality control methods and quality standards.2. Construct multidimensional TCM quality evaluation system, develop quality control methods in line with multi-component characteristics of TCM, and establish scientific and rigorous quality standards. Based on the overall view thinking, markers for the target by quality, development with quantitative fingerprint as the core of traditional Chinese medicine quality control key technologies, including character standard (appearance, color, smell, size) and exogenous substances limitation standard (moisture, ash content, impurities, pesticide residues, heavy metals, etc.), endogenous substance content standards (and index component content and total extract fingerprint), Form a systematic and perfect quality evaluation system for Chinese medicinal materials/prepared slices, and establish quality standards for Zhangbang Chinese medicinal materials prepared slices. |
| 技术攻关后希望达到的预期技术目标 | 1.坚持继承和保护地方特色。樟帮中药炮制技艺是我省传统饮片炮制方法，保留其特有传统工艺。应继承、整理和挖掘我省炮制经验技术，总结长期在饮片生产第一线、具有丰富生产经验“老药工”的实践经验，收载有我省炮制特色或中医用药特点的饮片品规及其炮制技术，满足我省中医临床需求，标准制定后更加有效地传承和保护。2.坚持研究的科学性和严谨性。鼓励结合传统炮制方法和现代生产技术手段，开展中药饮片炮制技术研究，建立符合饮片特点的炮制技术规范。注重对药材种植、产地加工、市场流通、临床使用等的全过程调查，充分考虑影响饮片质量和炮制方法统一规范的因素，有针对性地确定规范的项目和内容，并研究建立专属性的质量控制方法和检测指标。3.坚持科技创新和发展。在传统炮制工艺的基础上，结合炮制机械设备的更新，开展对传统炮制工艺参数的优化；加强炮制辅料的研究；积极研制新的炮制机械设备，引入先进的监测技术、贮藏方法等，加快推进传统炮制工艺实现规范化、自动化、智能化的饮片现代生产模式。 1.Inheriting and protecting local characteristics. The processing technology of Zhanggang traditional Chinese medicine is the traditional processing method of sliced Chinese medicine in our province, and its unique traditional technology is retained. Should inherit our province processing experience, sorting and mining technology, summarize long-term in the production of the first line, has the rich production experience "old may use" the practical experience, contains has created in our province features or characteristics of medicine of traditional Chinese medicine yinpian product gauge and its processing technology, meet the demand of our province Chinese medicine clinical, more effectively protect and inherit after standards.2.Adhere to the scientific nature and rigor of research. Encourage the combination of traditional processing methods and modern production technology to carry out research on the processing technology of traditional Chinese medicine decoction pieces, and establish processing technology standards in accordance with the characteristics of decoction pieces. Pay attention to the investigation of the whole process of medicinal materials planting, producing area processing, market circulation, clinical use, etc., fully consider the factors that affect the quality of decoction pieces and the unified standard of processing methods, determine the standardized items and content, and study and establish specific quality control methods and detection indicators.3.Smart trashes On the basis of traditional processing technology, combined with the updating of processing machinery and equipment, the optimization of traditional processing technology parameters was carried out. Strengthen the research of processing excipients; Actively develop new processing machinery and equipment, introduce advanced monitoring technology, storage methods, etc., speed up the traditional processing technology to achieve standardization, automation, intelligent modern production mode of decoction pieces. |
| 时限要求 | 2025年10月前完成/By October 2025 |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 1600 万元。其中：愿意支付揭榜单位研发资金不少于 300 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 该项目产生的知识产权和成果主要包括专利、论文等，产权归属如下：专利的知识产权所有人为江西樟树天齐堂中药饮片有限公司和揭榜单位，发明人根据合作方贡献量协商决定。论文等成果需要征得合作方同意后发表，署名根据合作方贡献量决定。The intellectual property rights and achievements generated by the project mainly include patents, papers, etc., and the property rights are as follows:The intellectual property rights of the patent are owned by Jiangxi Zhangshu Tianqitang TCM Decoction Pieces Co., LTD and the disclosing unit, and the inventor shall be determined through consultation according to the amount of contribution of the partner.Papers and other achievements shall be published with the consent of the partner, and the signature shall be determined according to the contribution of the partner. |
| 企业承接转化后预期的经济、社会效益 | 公司承接转化后，相关的技术应用到生产中，可提高产品市场竞争力和销量，带动周边农户进行种植，增加农户收益;并且对相关樟帮老药工的关键技术进行保护。通过聘用名老药工为技术顾问、技术指导等方式，使名老药工关键技术、祖传秘方绝活不至于流失；通过召开座谈会、社会宣传等形式，宣传名老药工的历史功绩，表彰贡献大、乐于言传身教的名老药工，使樟树中药材炮制技艺这个祖国医药宝库中的瑰宝，更加绚丽夺目灿烂辉煌。After the company undertakes transformation, the relevant technology is applied to production, which can improve the market competitiveness and sales of products, drive the surrounding farmers to plant, and increase farmers' income; And to protect the key technology of related camphor gang old pharmaceutical industry. By employing the old medicine for technical consultants, technical guidance and other ways, so that the key technology of the old medicine, ancestral secret recipe will not be lost; Through holding symposiums, social propaganda and other forms, publicity of the historical achievements of the famous old pharmaceutical workers, in recognition of the contribution of big, willing to teach by word and example of the famous old pharmaceutical workers, so that camphor tree Chinese medicinal materials processing technology in the treasure house of the motherland's medicine, more brilliant brilliant. |

**“揭榜挂帅”企业重大技术需求榜单（23）**

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| 所属产业领域或产业链 | 节能环保Energy conservation and environmental protection | 细分方向 | 二氧化硅系列新材料Silica series new materials |
| 重大技术需求项目名称 | 芳烃吸附剂自动化关键技术研究Research on key automation technology of aromatics sorbent |
| 技术需求提出企业 | 江西八六三实业有限公司Jiangxi 863 Industrial Co., LTD |
| 技术需求牵头企业联系人 | 姓名 | 陈亚琴Chen yaqin | 职务 | 副总经理Deputy General Manager | 手机：18079951150 | 邮箱：chenasia1097@163.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 中国石化催化剂有限公司长岭分公司Sinopec Catalyst Co., LTD. Changling Branch | 龙头企业骨干企业战略性新兴产业企业高新技术企业科技型中小企业 |
| 2 | 京博石化股份有限公司Jingbo Petrochemical Co. LTD | 龙头企业骨干企业战略性新兴产业企业高新技术企业科技型中小企业 |
| 3 | 宁波科元石化有限公司Ningbo Keyuan Petrochemical Co. LTD | 龙头企业骨干企业战略性新兴产业企业高新技术企业科技型中小企业 |
| 4 | 浙江石油化工有限公司Zhejiang Petrochemical Co. LTD | 龙头企业骨干企业战略性新兴产业企业高新技术企业科技型中小企业 |
| 项目需求的背景与意义 | 《石油和化学工业“十四五”科技发展指南》提出了明确的目标、重点发展方向以及具体举措。行业在“十四五”期间科技创新的目标是要研发一批关键共性技术，新催化技术和新分离材料与技术是重点发展方向。《The 14th Five-year Scientific and Technological Development Guide for petroleum and Chemical Industry 》has put forward clear goals, key development directions and specific measures. The goal of scientific and technological innovation in the industry during the "14th Five-year Plan" is to develop a number of key generic technologies, and new catalytic technology and new separation materials and technologies are the key development direction.**新材料产业是支撑国民经济建设、社会进步和国防安全的战略性、基础性产业，对我国制造强国战略的实施具有重要意义。**十四五期间，江西省制定《江西省“十四五”新材料产业高质量发展规划》，明确提出开展关键核心技术攻关，加快发展先进化工新材料、先进无机非金属材料新型能源材料、先进纳米材料等前沿领域新材料。**New material industry is a strategic and fundamental industry that supports national economic construction, social progress and national defense security, and is of great significance to the implementation of China's manufacturing power strategy.** During the 14th Five-Year Plan period, Jiangxi province formulated the "14th Five-year Plan for High-quality Development of New Materials Industry in Jiangxi Province", which clearly proposed to carry out key core technology research and accelerate the development of advanced new chemical materials, advanced inorganic non-metallic materials, new energy materials, advanced nanomaterials and other cutting-edge new materials.**本项目芳烃吸附剂自动化成型技术属于国际首创技术，可将过剩的汽柴油品高效转化为化工品，具有流程短、投资低、成本低、化工品收率高、产品方案灵活等特点，契合国家碳中和政策导向和清洁低碳、安全高效的现代能源体系发展规划，具有持久的发展动力和巨大的经济社会效益。****This project aromatics adsorbent automation molding technology belong to the international initiative, excess of petrol and diesel product efficiency can be transferred to chemicals, a short process, low investment, low cost, chemical characteristics of high yield, flexible product solutions, fit the country carbon neutral policy guidance and clean low-carbon, safe and effective system of modern energy development plan, It has sustained driving force for development and huge economic and social benefits.**项目以江西省丰富的硅矿资源为原料，开发芳烃吸附剂等纳米材料生产工程技术，将宝贵的硅矿资源转化为先进纳米微米新材料，并将先进材料用于能源高效转化和加工过程，转化为生产力和经济效益，建设具有特色的省级纳米微米材料工程中心，助力hyv我国炼化产业转型升级。Project with rich silicon mineral resources in jiangxi province as raw material, development of aromatic nanomaterials production engineering technology such as adsorbent, convert precious silicon ore resources into advanced nano micron, new materials and advanced materials for energy efficient conversion and processing process, transformed into productivity and economic benefit, the construction of characteristic at the provincial level engineering center of micron materials, To help transform and upgrade China's refining and chemical industry. |
| 术难题概述 | 本项目的芳烃吸附剂是典型的介孔催化材料，在石油加工和吸附分离中具有广阔的应用前景。工业上应用的催化材料一般具备特定的形状和强度以满足长周期运行的要求，**介孔材料的加工成型是世界性难题，限制了介孔材料的应用，属于“卡脖子”技术。芳烃吸附剂传统的成型技术为滚球成型技术，具有成型合格率偏低，生产效率低，成型粘结剂用量多等缺陷，因此亟需开发具有自主知识产权的芳烃吸附剂自动化成型技术，从而提高产品合格率、生产效率、产品强度等性能。**Aromatics adsorbents in this project are typical mesoporous catalytic materials and have broad application prospects in petroleum processing and adsorption separation. Catalytic materials used in industry generally have specific shape and strength to meet the requirements of long period operation. **The processing and molding of mesoporous materials is a worldwide problem, which limits the application of mesoporous materials and belongs to the "stuck neck" technology. Traditional aromatics sorbent forming technology is ball forming technology, which has defects such as low molding qualification rate, low production efficiency and large amount of forming binder. Therefore, it is urgent to develop automatic aromatics sorbent forming technology with independent intellectual property rights, so as to improve product qualification rate, production efficiency, product strength and other properties.** |
| 技术攻关后希望达到的预期技术目标 | （目前的技术指标参数，攻关后要求达到的技术参数；如属于填补空白的“卡脖子”技术可不填目前的技术指标参数；说明新原理、新产品、新技术、关键部件等目标技术参数实现条件，如自然条件、工况环境、成本约束、行业监管等技术应用的边界条件，限500字以内。**技术攻关前芳烃吸附剂成型技术指标：一次成型合格率≤50%，强度指标抗压碎率≥5%，成型粘结剂用量≥10%。****Aromatics adsorbent molding technical indicators: a molding pass rate ≤50%, strength index crushing rate ≥5%, molding binder dosage ≥10%.****技术攻关后芳烃吸附剂成型**合格率提升，生产效率提升，强度提高，压碎率下降，成型粘结剂用量大幅度下降，**具体技术指标如下：一次成型合格率≥90%，强度指标抗压碎率≤3%，成型粘结剂用量≤3%**。**After technological breakthrough,** the qualified rate of aromatic adsorbent molding is improved, production efficiency is improved, strength is improved, crushing rate is decreased, and the amount of forming binder is greatly reduced. **The specific technical indicators are as follows: the qualified rate of one-time molding is ≥90%, the crushing rate of strength index is ≤3%, and the amount of forming binder is ≤3%.****项目一期将年均生产芳烃吸附剂6000吨，每年节约生产成本2.4亿元，在石油化工领域应用预计节省能源消耗8万吨/年，折合降低二氧化碳排放7.2万吨/年。****The first phase of the project will produce 6000 tons of aromatics sorbent annually, saving 240 million yuan in production cost annually. The application in the petrochemical industry is expected to save 80,000 tons of energy consumption per year, equivalent to reducing 72,000 tons of carbon dioxide emissions per year.****芳烃吸附剂自动化成型技术**将传统材料成型工艺过程实现高度自动化、连续化、稳定化，技术原理先进。自动化成型技术将持续提升芳烃吸附剂的应用效果，实现更高纯度的石油产品吸附提纯，同时大幅度降低分离能耗，实现绿色低碳发展，**该技术达到国际领先水平，解决芳烃吸附剂“卡脖子”技术难题。****The automatic forming technology of aromatics adsorbent** realizes highly automatic, continuous and stable forming process of traditional materials with advanced technology principle. Automatic molding technology will continue to improve the application effect of aromatics sorbents, achieve higher purity of petroleum products adsorption purification, and greatly reduce the separation energy consumption, achieve green and low-carbon development, **the technology has reached the international leading level, to solve the technical problem of aromatics sorbents "stuck neck".****芳烃吸附剂自动化成型技术**将应用纳米、微米材料的成型加工中，例如陶瓷材料自动化成型、环保填料自动化成型、催化剂材料自动化成型等，**填补国内空白。****Aromatics adsorbent automatic molding technology** will be applied in the molding processing of nano and micron materials, such as ceramic material automatic molding, environmental protection filler automatic molding, catalyst material automatic molding, etc., **to fill the domestic blank.** |
| 时限要求 | 2024年12月31日之前完成By December 31, 2024 |
| 需求企业出资承诺 | 1. 本企业愿意为该技术难题攻关提供研发资金不少于2000 万元。其中：愿意支付揭榜单位研发资金不少于2000万元。

1. The enterprise is willing to provide no less than RMB 20 million for the research and development of this technical problem. Among them: willing to pay no less than 20 million yuan of research and development funds.2、承诺研发资金和支付揭榜单位资金及时足额拨付。2. Commit to timely and full disbursement of research and development funds and funds for the disclosing unit |
| 产权归属 | 该项目取得的知识产权归双方共同享有，未经双方许可，任何一方不得单独申请知识产权或向第三方转让知识产权申请权。双方均享有本项目下研究成果的使用权，揭榜方在技术需求方许可下可使用该研究成果。其他研究成果所产生的效益，由双方共同协商确定。The intellectual property rights obtained by the project shall be jointly owned by both parties. Without the permission of both parties, neither party shall apply for intellectual property rights independently or transfer the application right of intellectual property rights to a third party. Both parties enjoy the right to use the research results under the project, and the disclosing party may use the research results with the permission of the technology demander. Benefits arising from other research achievements shall be determined by both parties through joint consultation. |
| 企业承接转化后预期的经济、社会效益 |  **项目产业化后一期将年均生产芳烃吸附剂6000吨，每年节约生产成本2.4亿元，具有良好的经济效益。采用自动化成型的吸附剂在石油化工领域应用预计节省能源消耗8万吨/年，折合降低二氧化碳排放7.2万吨/年，具有良好的经济效益。****After industrialization, the project will produce 6000 tons of aromatics sorbent annually, saving production cost 240 million yuan per year, with good economic benefits. The application of automatic forming adsorbent in petrochemical industry is expected to save energy consumption of 80,000 tons/year, equivalent to reducing carbon dioxide emission of 72,000 tons/year, with good economic benefits.**项目产业化将促进新材料工程技术深度研发，推动国内先进新材料工业化生产和工业应用，推动其在能源产业、石油化工、煤化工、精细化工、医药工业、环保产业等多个领域的应用，具有良好的社会效益。The industrialization of the project will promote the in-depth research and development of new material engineering technology, promote the industrial production and industrial application of advanced new materials in China, and promote its application in the energy industry, petrochemical industry, coal chemical industry, fine chemical industry, pharmaceutical industry, environmental protection industry and other fields, with good social benefits. |

**“揭榜挂帅”企业重大技术需求榜单（24）**

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| 所属产业领域或产业链 | 节能环保/Energy conservation and environmental protection | 细分方向 | 绿色制造关键技术/Key technologies of green manufacturing |
| 重大技术需求项目名称 | 波形钢骨组合剪力墙住宅智能建造成套技术/ A complete set of technology for intelligent construction of corrugated steel-reinforced shear wall residences  |
| 技术需求提出企业 | 中阳建设集团有限公司/ZhongYang Constructiong Group Co., Ltd |
| 技术需求牵头企业联系人 | 姓名 | 彭雄/PengXiong | 职务 | 研究院院长/ Director | 手机：13381063617 | 邮箱：13381063617@163.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 |  | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 |  | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 项目需求的背景与意义 | 装配式建筑已提升到了国家发展战略的高度，《国务院办公厅关于大力发展装配式建筑的指导意见》（国办发〔2016〕71号），提出建设国家级装配式生产基地，推动装配式建筑的快速发展。浙江、上海和湖南等省份均大力支持企业研发装配式新技术，并鼓励新技术成套输出。江西省近5年来装配式建筑蓬勃发展，抚州、赣州荣获国家装配式建筑示范城市，规划建设了装配式建筑产业基地，各县(市、区)出台了装配式建筑实施意见，并制定了发展规划。但我省至今没有自己独创的装配式技术体系，本地的装配式建筑企业都被国内知名企业技术辐射，无法占领市场竞争的制高点，只能成为技术的购买方，因此自主研发本土装配式技术体系和标准势在必行。当前，装配式建筑尚存在制约发展的系列关键性问题，包括装配式钢结构住宅的“三板”问题、预制PC剪力墙竖向连接质量控制等技术问题以及建筑产业链分散、建造成本较高、智能建造程度低等行业痛点。为进一步推动装配式建筑的提质降本增效，结合装配式钢结构/混凝土结构建筑的优点及智能建造的发展方向，拟开发波形钢骨组合剪力墙住宅智能建造成套技术。该技术既兼具钢结构便捷连接、高效安装和成熟标准化供应链的优势以及混凝土结构舒适的居住品质、良好的隔音和耐久性能，且显著提高智能建造水平。综上，自主研发我省独创的装配式技术体系，实现装配式住宅提质降本增效和智能化建造的目标，对推动我省新型建筑工业化的发展具有重要意义。Prefabricated buildings have been promoted to the level of the national development strategy. The guidance of the General Office of the State Council on powerfully developing prefabricated buildings (State Office No. 71, 2016) emphasizes that China must build national prefabricated production bases to promote the rapid development of prefabricated buildings. Provinces such as Zhejiang, Shanghai, and Hunan have strongly supported enterprises in the research and development of new assembly technologies and encouraged the export of new technologies in complete sets.Prefabricated buildings have being boomingly developed in Jiangxi province in the past five years. Following that Fuzhou and Ganzhou won the national assembly building demonstration cities, the assembled building industry base are under construction, the counties (cities, districts) issue the implementation of assembly building views, and the development of the plan has been made. However, the province so far does not have its own original assembly technology system. The local assembly building enterprises are dominated by well-known domestic enterprises by technology radiation, and they cannot occupy the high ground of market competition, becoming the buyer of technology. Consequently, it is imperative to facilitate the independent research and development of local assembly technology system and standards.Currently, there are still a series of key problems restricting the development of assembled buildings, including the "three boards" problem of residential assembled steel buildings, the quality control of vertical connection of prefabricated PC shear walls and other technical problems, as well as the shortcomings of the industry including the fragmentation of the construction industry chain, high construction costs and low degree of intelligent construction. To further promote the quality, cost reduction, and efficiency of assembled buildings, a complete set of intelligent construction technology is proposed for waveform steel-bone composite shear wall houses, combining the advantages of assembled steel/concrete structure buildings and the development direction of intelligent construction. This technology combines the advantages of easy connections, efficient installation, and mature standardized supply chain of steel structure with the comfortable living quality, good sound insulation and durability of concrete structure, and significantly improves the level of intelligent construction.In summary, our province's original assembly technology system should be independently developed to achieve the goal of quality, cost reduction, efficiency and intelligent construction of assembled housing, and to promote the development of new construction industrialization in our province is of great significance. |
| 技术难题概述 | 装配式高层住宅结构主要有：①钢结构：自动化程度高，但为解决室内凸梁显柱的问题，大多采用异形柱框架或短肢剪力墙形式。存在：外墙开裂、隔音、防火、防腐等问题；②PC剪力墙结构：套筒灌浆质量难以控制；大量临时支撑影响施工作业面；标准化和自动化程度低，建安成本高等；装配式低层住宅结构有：①轻钢龙骨结构：施工便捷，但墙体空鼓，市场接受度低；②预制剪力墙结构：品质好，但造价高，运输、安装要求高；③轻钢轻混灌浆结构：造价低，但湿作业多，质量难以控制；④钢框架结构：标准化和工业化程度较高，但零部件太碎，现场组装作业过多，质量难控制。成本质量问题一直是制约装配式建筑发展的“卡脖子”问题。拟研发波形钢骨组合剪力墙结构体系涵盖高层和低层技术体系。适应用于高层住宅和美丽乡村绿色农房、应急保障、海外等低层房屋领域。重点创新突破：①构件标准化，解决成本的问题；②采用组合墙体构造，结合了钢结构与PC剪力墙的优点；③便捷的竖向连接节点和免支撑安装工艺，节约安装成本；④保温承重一体化墙板立式成型工艺，节能环保；⑤智能建造和自动化设备，解决效率和质量控制问题。通过攻关，有效解决诸多痛点，并最终实现提质降本增效和节能减排。The assembled high-rise residential structure mainly has: ① steel structure: high automation followed by solving the problem of interior convex beams and columns using shaped column frames or short limb shear wall forms. There are the existing issues comprising external wall cracking, sound insulation, fire prevention, corrosion and other problems; ② PC shear wall structure: sleeve grouting quality is difficult to control; a large number of temporary support affects the construction work surface; low standardization and automation, high construction and safety costs.The assembled low-rise residential structure has: ① light steel keel structure: convenient construction, but the hollow wall, low market acceptance; ② prefabricated shear wall structure: good quality, but high cost, high transport and installation requirements; ③ light steel and light mixed grout structure: low cost, but more wet work, difficult to control the quality;④steel frame structure: high standardization and industrialization, but the parts are too fragmented, too much on-site assembly work, and difficult to control quality.The cost and quality problem has been the strangle hold problem that restricts the development of assembled buildings. The proposed waveform steel bone combined shear wall structure system covers both high-rise and low-rise technology systems. It is suitable for high-rise residential buildings and green farmhouses in beautiful countryside, emergency security, overseas and other low-rise housing fields. Key innovation breakthroughs: ① standardization of components to solve the problem of cost; ② adoption of combined wall structure, combining the advantages of steel structure and PC shear wall; ③ convenient vertical connection nodes and support-free installation process to save installation costs; ④ vertical forming process of insulation and load-bearing integrated wall panels, energy saving and environmental protection; ⑤ intelligent construction and automated equipment to solve the problem of efficiency and quality control. Through the efforts, we can effectively solve many crucial points and finally realize the improvement of quality, cost reduction and efficiency and energy saving. |
| 技术攻关后希望达到的预期技术目标 | 波形钢骨组合墙体住宅智能建造成套技术通过标准化设计、装配式结构技术、配套的立式成型生产工艺和免支撑安装工法、智能生产设备以及智能识别技术对精度和质量控制应用等方面的研发，形成了从设计、生产、安装全过程的标准化、智能化建造成套技术，解决行业技术痛点、实现建筑节能环保、提质降本增效。1、采用新型组合墙板构造，解决了钢结构住宅外墙开裂和隔音耐久问题，解决了预制剪力墙套筒灌质量难以控制的问题，实现综合成本节约10%以上。2、采用的新型立式成型工艺和现场免支撑安装工法，使墙板生产和安装效率提升20%以上。3、通过工厂化智能生产与便捷工艺，节约人工30%以上，节约工期20%，节能减排20%以上。Through the research and development of standardized design, assembled structure technology, supporting vertical forming production process and support-free installation method, intelligent production equipment and the application of intelligent identification technology for precision and quality control, the standardized and intelligent construction technology from design, production and installation will be formed, which solves the technical difficult points of the industry and realizes energy-saving and environment-friendly construction. 1、The new combination wall panel structure is adopted to solve the problems of cracking and sound insulation durability of the exterior wall of steel structure residential buildings, and to solve the problem of difficult quality control of prefabricated shear wall sleeve grouting, so as to achieve comprehensive cost savings of more than 10%.2、The new vertical forming process and on-site support-free installation work method adopted is wished to increase the efficiency of wall panel production and installation by more than 20%.3、Saving more than 30% of labor, 20% of construction period and more than 20% of energy saving and emission reduction are realized through factorized intelligent production and convenient process. |
| 时限要求 | 要求2025年6月前完成项目研发内容。/It is required to complete the research and development of the project before June 2025. |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 3000万元。其中：愿意支付揭榜单位研发资金不少于 500万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 依托本项目产生的专利和软件著作权，其知识产权归中阳建设集团有限公司所有。依托本项目撰写的论文、专著、标准成果中阳建设集团有限公司和揭榜挂帅单位共同享有署名权。The intellectual property rights of the patents and software copyrights generated by this project belong to Zhongyang Construction Group Co. LTD. The papers, monographs and standard results written in accordance with this project are jointly owned by Zhongyang Construction Group Co. LTD and the unveiling unit. |
| 企业承接转化后预期的经济、社会效益 | 波形钢骨组合墙体住宅智能建造成套技术实现了标准化设计、工厂化生产、装配式安装全过程的一体化智能建造，具有：①标准化程度高，智能化程度高、施工速度更快等特点，实现了节约成本、提高质量、节能减排的目标；②可满足快速建造低多层与高层住宅，从城市建设到乡镇农村建设以及应急建筑的建设需求；③工厂化作业可实现拉动工人就业、改善工人工作生活条件、推动农民工转型为专业化的产业工人的目标；④从建造过程到建筑产品都具有较高的节能和低碳减排效益，对建筑业企业提高市场竞争力和高质量发展，推进新型建筑工业化的升级转型，实现建筑业的“双碳”目标具有重要意义。The complete set of intelligent construction technology for corrugated steel-bone combined wall housing realizes the integrated intelligent construction of the whole process of standardized design, factory production and assembled installation, followed by a series of merits:① High degree of standardization and intelligence, faster construction speed, etc., realizing the goals of cost saving, quality improvement, energy saving and emission reduction;② The complete set can meet the rapid construction of low multi-story and high-rise residential buildings, from urban construction to rural construction in towns and villages, as well as the construction needs of emergency buildings;③Factory operation can achieve the goal of pulling workers' employment, improving workers' working and living conditions, and promoting the transformation of migrant workers into specialized industrial workers;④High energy saving and low carbon emission reduction benefits from construction process to building products are of great significance for construction enterprises to improve market competitiveness and high quality development, promote the upgrading and transformation of new construction industrialization, and realize the "double carbon" goal of construction industry. |

**“揭榜挂帅”企业重大技术需求榜单（25）**

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| 所属产业领域或产业链 | 节能环保/Energy conservation and environmental protection | 细分方向 | 微生物工程/microbial engineering |
| 重大技术需求项目名称 | 天然纤维面料改性及前处理用多效复合酶的研究/Study on multi effect composite enzyme for modification and pretreatment of natural fiber fabrics |
| 技术需求提出企业 | 江西恩达麻世纪科技股份有限公司/Jiangxi Enda Ma Century Technology Co., Ltd |
| 技术需求牵头企业联系人 | 姓名 | 赵志慧/Zhao Zhihui | 职务 | 副总经理/Vice General Manager | 手机：13755581698 | 邮箱：1243179673@qq.com |
| 有共同技术需求的同行企业 | 序号 | 单位名称 | 单位性质 |
| 1 | 江西金旭麻纺织品有限公司/Jiangxi Jinxu Linen Textile Co., Ltd | ☑龙头企业□骨干企业□战略性新兴产业企业□高新技术企业□科技型中小企业 |
| 2 | 江西线元生物科技有限公司/Jiangxi Xianyuan Biotechnology Co., Ltd | □龙头企业□骨干企业□战略性新兴产业企业□高新技术企业☑科技型中小企业 |
| 项目需求的背景与意义 | 我国是纺织强国，纺织大国，纺织面料及服装的出口占全国总产量的10~30%，2021年我国纺织服装产业主营业务收入达50000多亿元，出口超3000亿美元。同时棉花的进口量越来越大。随着我国实现碳达峰、碳中和的战略方向，越来越多的植物纤维得到开发和利用。苎麻是具有鲜明中国特色的“中国草”，广泛应用于纺织面料生产，麻纤维纺织面料透气性好、凉爽，强力大还具用抗菌防霉的优点，深受消费者的喜爱，对棉花具有很强的替代作用。但苎麻纤维因其钢性大毛羽多产生刺痒感，而降低了人们对麻产品的服用舒适度体验。面料织物在织造过程中，纤维需要上浆以增加强力，形成坯布后进行染色、漂白、印花时则需要将织造过程中纤维上的浆料去掉，以增强着色度和色牢度，印花后则需要把印花的浆料去掉。退浆的好坏，直接影响成品的质量，如手感、白度、光洁度、给色量、白芯及强度等。目前大多采用淀粉浆料上浆，而退浆的方法很多，可以用烧碱、硫酸、双氧水等，但这些化工产品不仅有损织物，操作麻烦，而且会污染环境。这些退浆工艺通常需要大量的能耗，并产生大量有机性废水，其污染物浓度高，色度深，是难处理的工业废水之一。酶法退浆则从源头上减少和解决了纺织废水污染物的产生和排放，酶法退浆工艺减少了化学品和水资源的耗费，产生的废水危害性较小，减少对环境的污染。酶法退浆采用单一的淀粉酶，在催化作用下发生水解断裂，生成相对分子质量较小、粘度较低、溶解度较高的一些低分子化合物，然后经处理水解产物，从而达到退浆的目的。该酶只作用于淀粉浆料，酶活指标为2000~20000 u/ml(mg)；退浆率达到≧90%，作用时间≥30min，通常用于棉布、丝绸、维纶、[粘胶纤维](https://baike.so.com/doc/144097-152271.html%22%20%5Ct%20%22https%3A//baike.so.com/doc/_blank)、混纺织物、色织府绸和化纤混纺等织物，但天然纤维面料有植物纤维的独特性，如苎麻纤维面料退浆后，纤维毛羽突出，严重影响面料的柔软性、舒适性。目前苎麻纤维纺织面料退浆改性最好技术掌握在日本和韩国人手中，形成技术壁垒。节能减排绿色环保是国家发展不变的主题，在“十四五规划”中作为一个重要指标被提出来。根据研究资料显示，染整前处理工序的能耗在染整总耗能中占有较大的比例（在70%以上），目前国内染整企业的能耗、水耗较高，染整企业单位产品能源消耗量是发达国家的3倍左右，染整企业单位产品取水量是发达国家的2~3倍，同时前处理工序中产生的污水对环境污染有极大的影响。随着社会的不断进步，减少污染、保护人类生存环境的呼声日益高涨，各国制定的环保政策和法规也日趋完善和严格。退浆工艺今后的发展趋势是减少化学品和水资源的耗费，减少对环境的污染，实现清洁生产。China is a strong textile country, with exports of textile fabrics and garments accounting for 10-30% of the country's total output. In 2021, the main business income of China's textile and apparel industry reached more than 500 billion yuan and exports exceeded 300 billion U.S. dollars. At the same time, cotton imports are increasing. With the strategic direction of carbon peak and carbon neutralization in China, more and more plant fibers have been developed and utilized. Ramie is a "Chinese grass" with distinct Chinese characteristics. It is widely used in the production of textile fabrics. Ramie textile fabrics have the advantages of good air permeability, cool, strong but also antibacterial and mildew proof, which is loved by consumers and has a strong substitution effect on cotton. However, ramie fiber can reduce people's comfort experience of hemp products because of its big stiff hair.Fabric fabric in the weaving process, the fiber needs sizing to increase strength, after the formation of grey cloth dyeing, bleaching, printing is needed to remove the size of the fiber in the weaving process, in order to enhance the color and color fastness, printing is needed to remove the size of the printing. Desizing is good or bad, directly affect the quality of finished products, such as hand feeling, whiteness, finish, color, white core and strength. At present, starch sizing is mostly used, and many desizing methods can be used, caustic soda, sulfuric acid, hydrogen peroxide, etc., but these chemical products not only damage the fabric, troublesome operation, and will pollute the environment. These desizing processes usually require a large amount of energy consumption and produce a large amount of organic wastewater, which is one of the refractory industrial wastewater due to its high concentration of pollutants and deep color. Enzymatic desizing process can reduce and solve the production and discharge of textile wastewater pollutants from the source. Enzymatic desizing process can reduce the consumption of chemicals and water resources, resulting in less harmful wastewater, and reduce the pollution to the environment. Enzymatic desizing method uses a single amylase, under the catalytic action of hydrolysis fracture, the formation of relatively small molecular weight, low viscosity, high solubility of some low molecular compounds, and then through the treatment of hydrolysis products, so as to achieve the purpose of desizing. The enzyme only acted on starch slurry and its activity index was 2000-20000 U/mL (mg). Desizing rate reaches ≧90% and action time ≥30min. It is usually used for cotton, silk, vinamide, viscose fiber, blended fabric, yarn-dyed poplin and chemical fiber blended fabric, but natural fiber fabric has the uniqueness of plant fiber. For example, after desizing ramie fiber fabric, fiber hair is prominent, which seriously affects the softness and comfort of the fabric. At present, the best technology of ramie textile fabric desizing modification is in the hands of Japan and Korea, which forms technical barriers.Energy conservation, emission reduction and green environmental protection is a constant theme of national development, and was put forward as an important index in the 14th Five-Year Plan. According to the research data show that the energy consumption of the dyeing and finishing pretreatment process in dyeing and finishing occupies a large proportion in the total energy consumption (above 70%), the current domestic dyeing enterprise of high energy consumption, water consumption, dyeing and finishing enterprise energy consumption per unit product is about three times as many developed countries, dyeing and finishing enterprises product withdrawals 2 ~ 3 times that of developed countries, At the same time, the waste water produced in the pretreatment process has a great influence on the environmental pollution. With the continuous progress of the society, the voice of reducing pollution and protecting the living environment of human beings is increasingly rising, and the environmental protection policies and laws and regulations formulated by various countries are also increasingly perfect and strict. The development trend of desizing process in the future is to reduce the consumption of chemicals and water resources, reduce the pollution to the environment, and realize clean production. |
| 技术难题概述 |  为了克服苎麻纤维染整退浆后毛羽多，钢性大有刺氧，服用性能差的缺陷，企业常常在脱胶环节用强酸强碱对麻纤维进行改性处理，这样即增加成本，还对麻纤维有一定成度的损伤，同时还大大增加污水达标排放的压力。如何改进这些缺点，研发出如何在印染退浆环节采用天然环保的技术同时完成退浆和纤维改性，使面料即柔软舒适又不损伤纤维品质，打破现有中国低价出口麻纤维坯布，经日本、韩国做面料处理后高价往销到中国的局面，从而大幅提升麻纤维替代棉花的比例，减少进口依懒，使之可广泛应用于高档床上用品面料、家居品面料和时尚服装面料的制作当中，如何采取绿色环保技术，高速高效生产柔软舒适又不失麻纤维风格的面料已成为各大麻纺生产企业的重要研究课题。研究作用于苎麻纤维的复合纤维素酶要以降低能耗，且对环境友好，并同时提高苎麻纤维的服用性能，但是复合纤维素酶优异的高产菌种的选育与生产制备工艺较高。如果将作用苎麻纤维的复合纤维素酶改性方法推广到工业应用上，还需要解决诸多技术问题。In order to overcome the defects of ramie fiber after dyeing and desizing, such as hairiness, rigidity, and poor performance, enterprises often modify the ramie fiber with strong acid and alkali in the degumming process, which increases the cost, damages the ramie fiber to a certain degree, and greatly increases the pressure of sewage discharge to meet the standard.How to improve these disadvantages, how to develop in the dyeing and printing the desizing process USES the natural environmental protection technology and complete the desizing and fibre modification, make the fabric soft, comfortable and does not damage the fiber quality, break the existing Chinese export hemp fabric, after do fabrics with Japan, South Korea, and the price is to pin to the situation of China, thus considerably increase the proportion of hemp fibers to replace cotton, Reduce the import of lazy, so that it can be widely used in the production of high-grade bedding fabric, home goods fabric and fashion clothing fabric, how to adopt green environmental protection technology, high-speed and efficient production of soft and comfortable fabric without losing the style of hemp fiber has become an important research topic of hemp textile production enterprises.Research on compound cellulase for ramie fiber is necessary to reduce energy consumption, be environmentally friendly and improve the wearing performance of ramie fiber at the same time, but the breeding and production process of high yield strain with excellent compound cellulase is relatively high. Many technical problems need to be solved if the complex cellulase modification method of ramie fiber is extended to industrial application. |
| 技术攻关后希望达到的预期技术目标 | 本项目研制一种多效复合纤维素酶制剂，用于麻纤维面料印染退浆工艺过程中，实现退浆、改性和固色同浴处理，生产的面料柔软无刺痒感。其特点是:高效高速，适合高温退浆，时间短，退浆率可达95%以上;织物不受损伤，对植物纤维具有改性作用；退浆后织物手感柔软、丰满，光洁度强，染色鲜艳;退浆、改性和固色可以同浴处理，缩短工艺流程，提高劳动生产率;用于炼白，能提高毛细管效应，并能改善劳动生产条件、降低成本、减少能耗和污染，能用于连续化大生产，可充分满足人们对美好生活的需求。希望能与有研发实力的高等院校或单位合作，通过联合技术攻关，优化工艺及参数配比，攻克目前麻纤维面料硬挺、毛羽多刺痒及面料退浆时间长，环境污染大等缺陷，形成织物手感柔软、丰满，光洁度强，染色鲜艳;退浆、改性和固色可以同浴处理，缩短工艺流程，提高劳动生产率，有效降低成本，具备产业化技术工艺条件，实现成为国内外纺织行业领军企业供货商。项目预期主要技术目标：1、成功选育一种用于面料染整退浆环节的复合纤维素酶制剂，整合纤维改性和面料退浆过程，使纤维改性、退浆、固色在同等的环境下同步完成。作用温度30~50℃，作用时间15~30min，采用该技术建成年加工30万米麻面料染整生产线，年产值达5000万元，并形成可在行业内推广的工业化应用示范线。现有技术：无面料退浆和纤维改性处理在同等环境下同步完成工艺技术；只有单一作用于面料退浆的淀粉酶，作用温度40~90℃，作用时间40~60min；2. 突破单一酶酶活性差，配合使用化学助剂，退浆率低，作用时间长，污水排放成本高的关键技术，通过基因编辑技术对菌种进行改良，研发复合纤维素酶制剂，使退浆酶活指标大幅提升，提高退浆率，减少作用时间，有助于污水达标排放。（酶活8000~25000u/ml(mg)），作用时间15~30min，退浆率≧95%，提高生产效率。；现有技术：酶活指标为2000~11000u/ml(mg)，作用时间40~60min，退浆率80~90%；3. 突破苎麻织物毛羽多，穿着有刺痒感及麻织物的色牢度差的关键技术，改变麻纤维的结构，有效提高色牢度。（毛羽长度<1.0mm,耐皂洗色牢度≧5）现有技术：主要采用化学药剂和物理方法对麻纤维进行改性，无生物酶改性的实际应用；毛羽长度≥3mm,耐皂洗色牢度≦3。4. 采用生物酶系进行苎麻纤维染整前处理，降低前处理成本，提高生产效率和前处理织物品质，节约大量助剂，减少能耗、水耗。（前处理成本降低20%，前处理生产效率提高20%，单位国内生产总值能源消耗降低20%左右，单位工业增加值用水量降低30%，主要污染物排放总量减少10%）现有技术：苎麻纤维染整前处理工艺繁琐、生产效率较低、污水排放成本高。In this project, a multi-effect compound cellulase preparation is developed, which can be used in the process of dyeing and desizing of flax fabric to achieve desizing, modification and color fixing in the same bath. The fabric produced is soft and has no itching sensation. Its characteristics are: high efficiency and high speed, suitable for high temperature desizing, short time, desizing rate can reach more than 95%; The fabric is not damaged and has modification effect on plant fiber. Desizing fabric feel soft, plump, strong finish, bright dyeing; Desizing, modification and color fixing can be treated in the same bath to shorten the process flow and improve labor productivity; Used for refining white, can improve capillary effect, and can improve labor production conditions, reduce costs, can be used for continuous large-scale production, can fully meet people's needs for a better life.We hope to cooperate with institutions of higher learning or units with research and development strength. Through joint technical research, we can optimize the process and parameter ratio to overcome the defects such as stiff, itchy hair, long fabric desizing time and large environmental pollution, so as to form a soft, plump, strong finish and bright dyeing fabric. Desizing, modification and color fixing can be treated with the same bath, shorten the process flow, improve labor productivity, effectively reduce the cost, with industrialization technology conditions, to become a leading supplier of textile industry at home and abroad.Expected main technical objectives:1. Successfully select and develop a compound cellulase preparation for the dyeing and desizing process of fabric, integrate fiber modification and fabric desizing process, so that fiber modification, desizing and color fixing are completed synchronously in the same environment. The operating temperature is 30~50℃ and the operating time is 15~30min. The technology can be used to build an annual processing line of 300,000 meters of hemp fabric dyeing and finishing, with an annual output value of 50 million yuan, and form an industrial application demonstration line that can be promoted in the industry.Existing technology: no fabric desizing and fiber modification treatment in the same environment to complete the process technology synchronously; Only amylase acted only on desizing fabric, acting at 40~90℃ for 40~60min;2. The breakthrough single enzyme enzyme activity is poor, support the use of chemical agents desizing rate is low, effect time is long, sewage discharge the key technology of the high cost, modified strains of gene editing techniques, research and development of composite cellulose enzyme preparation, improved the index of desizing enzyme activity, improve desizing rate, reduce the action time, help wastewater discharging standard. (Enzyme activity 8000~ 25000U /ml(mg)), action time 15~30min, desizing rate ≧95%, improve production efficiency. ;Existing technology: enzyme activity index is 2000-11000U/mL (mg), action time is 40-60min, desizing rate is 80-90%;3. Break through the key technology that ramie fabric has many hairiness, itchy feeling and poor color fastness, change the structure of ramie fiber and effectively improve the color fastness. (Hair length <1.0mm, color fastness to soap ≧5)Existing technology: mainly using chemical agents and physical methods to modify the hemp fiber, without the actual application of biological enzyme modification; Hair length ≥3mm, color fastness to soap ≦3.4. The pretreatment of ramie fiber dyeing and finishing with biological enzyme system can reduce pretreatment cost, improve production efficiency and fabric quality, save a lot of additives, reduce energy consumption and water consumption. (Reduce pretreatment cost by 20%, increase pretreatment production efficiency by 20%, reduce energy consumption per unit of gdp by about 20%, reduce water consumption per unit of industrial added value by 30%, and reduce total discharge of major pollutants by 10%)Existing technology: the pretreatment process of ramie dyeing and finishing is complicated, the production efficiency is low and the wastewater discharge cost is high. |
| 时限要求 | 2024年3月前完成Completed before March 2024 |
| 需求企业出资承诺 | 1.本企业愿意为该技术难题攻关提供研发资金不少于 500 万元。其中：愿意支付揭榜单位研发资金不少于 100 万元。2.承诺研发资金和支付揭榜单位资金及时足额拨付。 |
| 产权归属 | 知识产权归属于本公司即技术需求方，并在需求方实现产业化成果转化；合作权益双方在合作协议中另予明确。The intellectual property belongs to the company, that is, the technology demander, and the transformation of industrialization achievements is realized on the demander; The cooperative rights and interests of both parties shall be specified separately in the cooperation agreement. |
| 企业承接转化后预期的经济、社会效益 | 成功研发出能使麻纤维织物手感柔软、丰满，光洁度强，染色鲜艳;退浆、改性和固色可以同浴处理，缩短工艺流程，提高劳动生产率，有效降低成本的多效复合酶制剂，将有效打破技术壁垒，扩大产品应用范围，实现成为国内纺织行业领军企业供货企业。对企业而言，将显著提升公司市场竞争力，有利于公司更好拓展与国内外纺织服装市场领军企业的合作空间，提升企业经济效益，进而增加我省就业机会，乃至带动国内及我省上、下游纺织生产企业的发展。预计项目可年实现产业化收入1.5亿元，提供就业岗位200余个，每年可实现利润2500万元，税收约1000万元。同时，产品及工艺技术可向全行业推广，符合高效节能和绿色环保的要求，促进行业可持续发展，转变行业经济增长方式，经济和社会效益显著。The successful research and development can make hemp fiber fabric feel soft, plump, strong finish, bright dyeing; Desizing, modification and color fixing can be treated with the same bath, shorten the process flow, improve labor productivity, effectively reduce the cost of multi-effect compound enzyme, will effectively break the technical barrier, expand the scope of product application, enhance the company's product market competitiveness, to achieve the domestic textile industry leading enterprises supplier. For the enterprise, it will significantly enhance the market competitiveness of the company, help the company to better expand the cooperation space with domestic and foreign textile and garment market leaders, improve the economic benefits of the enterprise, and then increase the employment opportunities in our province, and even drive the development of domestic and upstream textile and garment manufacturers in our province. The project is expected to achieve an annual industrial income of 150 million yuan, provide more than 200 jobs, annual profit of 25 million yuan, tax revenue of about 10 million yuan. At the same time, the products and process technology can be promoted to the whole industry, in line with the requirements of high efficiency, energy saving and green environmental protection, promote the sustainable development of the industry, change the mode of economic growth of the industry, the economic and social benefits are significant.  |