

Research Group of Fundamental Research and Applications of Novel Rare Earth Functional Materials Changchun Institute of Applied Chemistry, Chinese Academy of Sciences



The research group devotes their efforts to solving the key problems of science and technology and combined the basic research, application research and strategic high technology research together. The as-prepared rare earth functional materials have been successfully applied in lighting, space flight, aviation and motorcar field, etc.. They successfully developed the AC-LED lighting device by adding the rare earth afterglow materials into the luminescent powder to handle the flash problem caused by AC power sources and made a great progress in the field of LED lighting industry. Without the electronic components to convert AC into DC, the AC lighting products have some advantages such as high efficiency, small radiating heat, small size, long-life, low-cost and so on. In cooperation with the Sichuan sunfor light, the sales of AC-LED products have exceeded 6 billion Yuan. They invented the temperature-sensitive rare earth phosphors which break the international blockade of the phosphorescent thermographic technology using in the wind tunnel for measuring the surface heat flux of aircraft. The research group has successfully developed a series of Mg-RE master alloys through the electro-winning method with subsidence cathode in the molten salt system. The low-cost Mg-RE alloy with superior mechanical properties has been successfully used in automotive parts, high speed train, "Shenzhou VI" spacecraft and Mars probe. Furthermore, the research group has been authorized with 75 invention patents in China and abroad forming a complete system of independent intellectual property rights and developed a number of national and industry standards. The achievements meet the important strategic needs of China.

Outstanding contributors of this research group

Zhang Hongjie

As the academic leader of the research team, he guide the development of the research work comprehensively based on the responsibility of serving the national economic construction and solving the national major strategic needs.

Li Chengyu

He is responsible for the research of rare earth alternating current LED lighting devices and temperature-sensitive luminescent materials. He developed several series of indoor and outdoor lighting products, which have been sold to many countries.

Meng Jian

He is responsible for the development of high performance rare earth magnesium alloy. He broke the key technology of developing rare earth magnesium alloy with high strength and toughness, heat and creep resistance, and high-strength corrosion resistance characteristics.



神舟6号电源整流器(稀土合金封装), 神舟6号减重13公斤
稀土合金在飞行器上得到应用

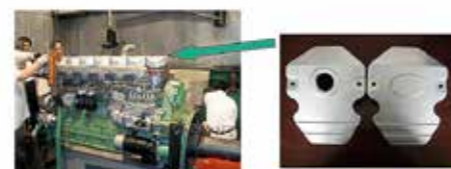
稀土镁合金在神舟飞船和无人机平台应用
Mg-RE alloy applied in "Shenzhou VI" spacecraft and unmanned aerial vehicle platform

Other members

- Tang Jinkui
- Wang Cheng
- Liao Wuping
- You Hongpeng
- Song Shuyan
- Feng Jing
- Zhou Liang
- Liu Dapeng
- Pang Ran
- Deng Ruiping
- Wang Yinghui
- Wang Xiao

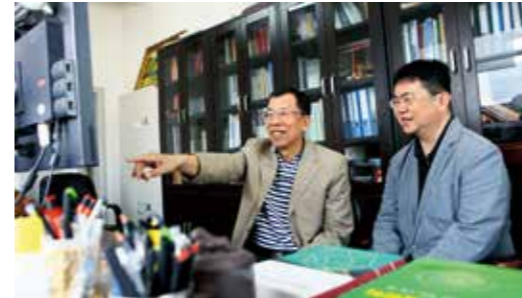


稀土镁合金在高铁上应用
Mg-RE alloy applied in high speed train



与一汽集团合作用稀土合金开发的460马力发动机缸罩盖, 进行自架试验, 形成4万件/年生产能力

稀土镁合金用于汽车零部件
Mg-RE alloy applied in automotive parts



张洪杰研究员(左一)与李成宇研究员探讨交流LED应用的关键科学与技术问题
Prof. Hongjie Zhang (left) discusses with Prof. Chengyu Li about the key science and technology problems of alternating current LED

新型稀土功能材料基础研究和应用研究集体

研究集体推荐单位: 中国科学院长春应用化学研究所

研究集体主要科技贡献:

致力于解决影响学科发展的关键科学与技术问题, 将基础、应用和战略高技术研究有机结合, 研制出的稀土功能材料已成功应用于照明、汽车、航天航空和国防军工等领域。提出了稀土交流LED原创思想, 解决了交流驱动产生频闪的世界性难题, 与四川新力光源合作, 实现了交流LED

产品的产业化, 销售额已超6亿元; 解决了温敏涂层全表面精确测量的关键问题, 突破了国外的技术封锁, 成功应用于全表面荧光风洞测温; 研制出高强、高韧和轻质的稀土镁合金, 为“神舟6号”飞船减重13公斤, 为国家某“重点工程”制备多用途轻型导弹壳体, 该导弹已批量装备部队。该集体获授权发明专利75项, 形成了完整的自主知识产权体系, 制定了多项国家和行业标准, 满足了国家重大需求。

研究集体突出贡献者



张洪杰 Zhang Hongjie

张洪杰 中国科学院长春应用化学研究所

主要科技贡献: 作为研究集体的学术负责人, 以服务国民经济建设和解决国家重大战略需求为己任, 全面指导科研工作的开展。



李成宇 Li Chengyu

李成宇 中国科学院长春应用化学研究所

主要科技贡献: 负责稀土交流LED照明器件和稀土风洞测温发光材料的研究, 开发了多种系列室内、外照明产品, 销往多个国家。



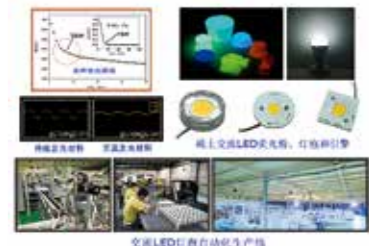
孟健 Meng Jian

孟健 中国科学院长春应用化学研究所

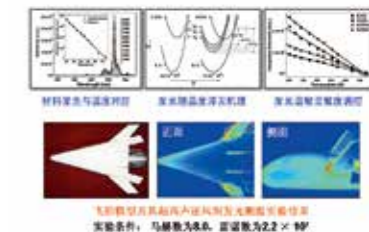
主要科技贡献: 负责高性能稀土镁合金的研制, 突破了高强高韧、耐热、抗蠕变及大尺寸半连续铸棒稀土镁合金研发的关键技术。

研究集体主要完成者

唐金魁 王成 廖伍平 尤洪鹏 宋术岩 冯婧 周亮 刘大鹏
庞然 邓瑞平 王樱蕙 汪啸



稀土交流LED发光技术
Alternating current LED lighting technology based on rare earth phosphors



超高声速风洞发光测温技术
Phosphorescent thermographic technology for hypersonic wind tunnel