

Research Group of Vanadium Flow Battery Energy Storage Technology, Dalian Institute of Chemical Physics, Chinese Academy of Sciences



离子传导膜离子筛分传导机理
Ions sieve-conducting mechanism

Large scale energy storage is the key technique to solve the critical issues of discontinuity, instability in renewable energies and becomes pivotal for national energy security and sustainable development. Vanadium flow battery (VFB) is one of the most suitable candidates for large scale energy storage due to its attractive features like long cycle life, high safety, high storage capacity and environmental friendly. The research group of vanadium flow battery at Dalian Institute of Chemical Physics systematically grasped technologies of key materials, high power stacks, high efficiency flow battery unit module and stationary energy storage station according to more than 10 years' innovative research. More than 20 demonstration projects including the world largest 5MW/10MWh VFB system and the first 250MW/1MWh VFB system in Europe have been successfully implemented by the research group. The achievements created strategic emerging industry of flow battery in China and the group is leading the research development, industrialization and standardization of flow battery in the world.

Outstanding contributors of this research group

Zhang Huamin

Dalian Institute of Chemical Physics, Chinese Academy of Sciences.
The leader and organizer of the research group, who is responsible for proposing overall research directions, designing research strategies, supervising the project implementation. He leads the fundamental research, industrialization and standardization of flow battery.

Li Xianfeng

Dalian Institute of Chemical Physics, Chinese Academy of Sciences.
He is responsible for the research and development of ion conducting membranes. He firstly introduced porous ion conducting membranes in flow battery.

Liu Zonghao

Dalian Rongke Power Co. Ltd.
He is responsible for the industrialization and generalization of flow battery system and the implementation flow battery demonstration projects.



250kW 集装箱式单元储能系统模块
250kW containerized VFB energy storage unit module

Other members

- Ma Xiangkun
- Gao Sujun
- Zhang Hongzhang
- Liu Tao
- Xing Feng
- Lai Qinzi
- Wang Xiaoli
- Zhong Hexiang
- Chen Jian
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- Wang Meiri
- Liu Jingkai
- Sun Jiawei
- Li Jie
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- Liu Huiying



全球最大规模 5MW10MWh 全钒液流电池系统
The world largest 5MW10MWh VFB system

风电场外景 Overview of wind farm	电池系统区 Battery system region
电解质溶液区 Electrolytes region	电力电子控制区 Electronic control system



电解质溶液生产线
Produce line of electrolytes

全钒液流电池储能技术研究集体

研究集体推荐单位：中国科学院大连化学物理研究所

研究集体主要科技贡献：

大规模储能技术是解决可再生能源发电不连续、不稳定特征的关键瓶颈技术，是国家能源战略和能源安全的重大需求。全钒液流电池储能技术因其使用寿命长、储能规模大、安全可靠、环境友好等特点，成为规模储能的首选技术之一。全钒液流电池储能技术研究集体通过对关键材料、核心部件及系统集成和控制管理技术的创新研究，成为国际上全面掌握高性能全钒液流电池关键材料、大功率电堆、单元储能模块及储能电站产业化技术的团队；实施了包括全球最大规模 5MW/10MWh 和欧洲首套 250kW/1MWh 商业应用在内的 20 多项应用示范工程，率先实现了液流电池的商业化应用。开创了我国液流电池战略新兴产业。在国内外液流电池技术研究开发、产业化及标准化领域发挥了重要的引领作用。



非氟离子传导膜生产线
Produce line of Non-fluoride ion conducting membrane



批量生产的 32kW 液流电池电堆
32kW VFB stacks



大功率液流电池电堆生产装置
Stacks assembly equipment

研究集体突出贡献者

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