

Development and prospect of flow battery energy storage technology

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Abstract: Energy shortage and environmental pollution expedite the wider utilization of renewable energies. In order to overcome the instability and intermittence of renewable energies, electrochemical energy storage technologies are attracting more and more attention. Among various electrochemical energy storage technologies, flow batteries have attracting characteristics such as independently tunable power and energy, high efficiency, high safety and environmental benignity, which are very promising for large-scale energy storage applications. Up to now, several flow battery systems have been at the demonstration stage and achieved the initial commercialization, like vanadium flow battery (VFB) and zinc-bromine flow battery (ZBFB). However, in order to accelerate the further industrialization and commercialization of flow batteries, the optimization of current flow battery systems, the exploration of novel high-performance and low-cost systems, and the research on flow battery stacks are significant. As a result, this presentation will focus on the research and development of current and novel flow battery systems, and the design and optimization of flow battery stacks. Especially, an innovative machine learning methodology to optimize and predict the efficiencies and costs of flow batteries with extreme accuracy based on our works will be illustrated. On the basis of the research and development of flow batteries, the prospects of flow battery energy storage technologies will also be clarified.

Biography: Dr. Xianfeng Li received his PhD in Polymer Chemistry and Physics from Jilin University. He was appointed as a full professor in Dalian Institute of Chemical Physics (DICP), Chinese Academy of Science (CAS), in 2012. He currently serves as the head of energy storage division at DICP. His research interests focus on electrochemical energy storage. He currently serves as the editorial board of “Sustainable Energy & Fuels” (RSC), “Scientific Reports” (Nature publishing Group), “Sustainability” and "Journal of Energy Chemistry" (Elsevier). Up to now, he is the Co-author of more than 250 peer-reviewed papers with more than 10000 citations and filled more than 150 patents

