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Development and application of vanadium flow battery for energy storage

Renewable energies from sources like solar and wind are among the central topics of our times with the issues of energy shortage and environment pollution. However, the random nature of these intermittent renewable sources (change with synoptic conditions, day and night alternation, etc.) makes it quite challenging for its use and dispatch through the grid. One effective solution is to connect the power station and the grid with electrical energy storage devices. Vanadium redox flow battery (VFB) as one kind of energy storage techniques is rather suitable for this application due to its features like long life time, active thermal management as well as the independence of energy and power ratings. Dalian Institute of Chemical and Physics (DICP) has devoted to VFB research for more than 10 years from materials to system integration, where the VFB stacks with power rating from 5 W to 32 kW were successfully developed. To further accelerate its commercialization, a spin-off company (Rongke power Co. Ltd.) was established in 2008, where different demonstrations of VFB in different application field were carried out. In 2012, a world largest 5MW/10MWh VFB system was successfully implemented by Ronke Power. In this presentation, the detailed research and development of VFB including key materials, stacks and application will be introduced. The challenge and prospect will be summarized as well.

Biography

Huamin Zhang currently serves as a tenure-track full Professor and Director of Energy Storage Division at Dalian Institute of Chemical Physics (DICP), Chinese Academy of Science. He is also CTO of Dalian Rongke Power Co., Ltd., Director of the state key lab of flow battery for energy storage and National Technical Committee on flow battery standardization. He got PhD degree from Kyushu University in 1988. After several years' of work in SUD-CHEMIE Japan, Osaka Gas Inc., Japan, he joined in DICP as a full Professor in 2000. His research interests include the topic of energy and energy storage, e.g. fuel cells, flow batteries and batteries with high specific energy density. He has co-authored more than 260 research papers published in refereed journals and more than 200 patents. He has received various awards such as National Technology Invention Award, CAS Outstanding Achievement Award etc.

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