

Aqueous redox flow batteries using organic and metalorganic active materials as redox couple

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Aqueous organic redox flow batteries (AORFBs) have been developed as one of promising redox flow battery (RFB) system instead of vanadium-based redox flow batteries due to its excellent benefits in cost, performance and stability. As the parameters affecting the cost, performance and stability of RFBs, there are four ones, such as energy density, power density, cycle life, and efficiency. To improve these parameters, high solubility of organic active materials, high cell voltage of redox couple, good chemical stability, fast kinetics, and development of low-cost organic materials and membrane are needed. In this presentation, the development method would be presented in four different prospect: 1) tuning the organic materials by synthesis or mixing process, 2) electrolyte with additive or deep eutectic solvent, 3) electrode modification by catalyst, 4) cost-effective membrane instead of expensive Nafion membrane. Furthermore, the future development of aqueous metalorganic redox flow batteries would be discussed.