High-performance and long-cycle life zinc-bromine flow battery

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Considerable research and development efforts in redox flow batteries aim to nonflammable, low cost, long-cycle life under high current densities for practical electric energy storage (EES) system. Among various types of RFBs, zinc-bromine redox flow batteries (ZBBs) has much attention because its high open circuit voltage (1.82 V), theoretical energy (>400 W h kg^{-1}) and power densities (>100 mW cm^{-2}). However, no single ZBBs has met the cost, lifetime and rate performance targets required for successful EES implementation. Here, we report defected carbon layer coated graphite felt (DGF) electrode that was prepared by the carbonization of a Celtic imidazole framework at 1000 ℃ under an argon atmosphere. The ZBBs assembled with the prepared DGF shows energy efficiency of 78% at the current density of 100 mA cm^{-2} and 5,000 cycles are achieved, which represents the best performance for ZBBs so far.