

Enhancing the Performance of Vanadium Redox Flow Battery using Mesocellular Carbon

정주영, 이진우[†], 권용재¹
포항공과대학교; ¹서울과학기술대학교
(jinwoo03@postech.ac.kr[†])

Redox flow batteries (RFBs), which require two redox couples dissolved in electrolytes, are one of the batteries which already been commercialized. Also, RFBs are one of the candidates for batteries in energy storage systems. Among various RFBs, vanadium redox flow battery (VRFB) with low cross contamination and long lifetime is considered as the best RFBs. However, sluggish $\text{VO}_2^+/\text{VO}^{2+}$ cathode reaction lowers the efficiencies. Here, we used mesocellular carbon foam (MSU-F-C) with large, opened pores to enhance the slow cathode reaction. Synthesized mesocellular carbon foam with and without catalysts loading were compared with commercial carbon. As a result, MSU-F-C based catalysts have increased the reactivity. High surface area have increased the reaction sites and large, opened pores have enhanced the diffusion of active materials through the reaction sites. These effects have lowered cathode overpotential, and internal resistance. Also, synthesized MSU-F-C have contained larger portion of oxygen containing functional group, which are also active sites for $\text{VO}_2^+/\text{VO}^{2+}$ redox reaction