

Application of Mesoporous Tungsten Oxide to Anode Material for Aqueous Zinc Ion Batteries

강우석, 홍정수, 조창신[†]

중앙대학교

(changshin@cau.ac.kr[†])

As the attention to renewable energy sources grows to replace the fuel sources, grid-scale energy storage system (ESS) has become more important. Li-ion batteries have mostly been investigated to be applied to ESS. However, the use of flammable and expensive organic electrolytes lowers the practicality. Since grid-scale ESS is stationary, it depends more on cost, safety, and stability than weight. Therefore, aqueous system has been considered as a better option due to the non-flammability, low cost, and high-rate capability.

Zn-ion batteries (ZIBs) have emerged to be used for ESS. Zn ion has many advantages such as low redox potential (-0.76 V vs SHE), low cost, and non-toxicity. Currently, Zn metal is mostly used for anode material of ZIBs. However, it is suffering from corrosion of surface and formation of dendrites. To replace Zn metal, we have prepared mesoporous structured WO_3 (m- WO_3) as anode. Owing to its mesoporous structure, it takes advantages of i) larger reaction sites, ii) fast electrolyte penetration, iii) short solid-diffusion length and iv) buffer of volume change. Herein, the electrochemical behavior and characterization of structure of m- WO_3 have been discussed.