Molecular Mediator Assisted Synthesis of Porous Molybdenum Carbide-Carbon Nanocomposites: Superior Electrocatalysts for Hydrogen Evolution Reaction

김성빈, 박진규, 육 솔, 이진우†
포항공과대학교
(jinwoo03@postech.ac.kr†)

Molybdenum carbide grabs attentions as a high-performance electrocatalysts for HER, due to its high activity, stability and low price. To improve the catalytic performance, the introduction of nanostructure into molybdenum carbide has been required. However, nanostructuring of molybdenum carbide has significant difficulty, since the high temperature is required during the carburization process. In our works, we synthesize the porous molybdenum carbide-carbon nanocomposite using molecular mediator assisted evaporation induced self-assembly (EISA) methods. To incorporate the Mo precursor in the PEO moieties, N-containing molecules are used (molecular mediator). By adjusting the amount of molecular mediator, we can improve the porosity of materials, and the distribution and size of molybdenum carbide nanoparticles. In addition, by adjusting the thermal treatment condition, the phase of molybdenum carbide can be controlled. Through controlling the phase of molybdenum carbide, the HER performance can be maximized. This materials show high performance for hydrogen evolution reaction in both acidic and basic condition.