

Highly efficient electrocatalytic performance of NiRh nano-flower catalysts for hydrogen evolution reaction

Nguyen Ngoc Anh, 신상호, Nguyen Van Toan, 최호석[†]
충남대학교
(hchoi@cnu.ac.kr[†])

Hydrogen is an energy carrier for future fuel cell applications. It can store and transmit available energy. Since hydrogen is not present in nature in its own molecular form, however, it needs to generate hydrogen from compounds containing it. At present, the efficient generation of hydrogen through water separation is of great interest. In the case of hydrogen evolution reactions (HER), Pt nanoparticles and Pt-based nanoalloys are the most efficient catalysts for HER in acidic media. However, due to the high price and scarcity of Pt, widespread utilization is severely limited. In this study, as an alternative to Pt electrode catalysts, NiRh alloy nano-flowers are synthesized using Ni, Rh precursor salt and NaBH₄ as a reducing agent. The morphology and structure of the synthetic NiRh materials are thoroughly inspected using SEM, TEM, XRD and XPS. We also carefully measure the electrochemical properties. As a result, the overvoltage at the current density of 10 mA.cm⁻² is only 94 mV. Therefore, NiRh alloy nanoparticles can be regarded as promising electrode catalysts for HER.