

NiFe based alloy nanoparticles as advanced catalysts for electrocatalysts for the oxygen evolution reaction

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Herein, binary NiFe alloy nanoparticles were successfully synthesized by a hydrothermal method and subsequent hydrogen treatment. The catalysts were applied to electrocatalysts for the oxygen evolution reaction (OER). The binary NiFe alloy electrocatalyst displayed a much lower overpotential at a current density of 10 mA cm^{-2} than that of the unary Ni or Fe. The binary NiFe alloy showed electrocatalytic performance comparable to state-of-the-art RuO_2 and IrO_2 noble metal catalysts. The alloy catalyst also indicated significant long-term stability even after 1000 cyclic voltammetry (CV) tests. These outstanding electrochemical activity and durability toward OER were attributed to change of redox properties and creation of the structural disorder derived from incorporation of Fe into Ni, thus leading to improving electrocatalytic performance.