

Electrochemical behavior of CoMn_2O_4 spinel structures coated on NiOOH/NF electrodes for effective HER through water decomposition

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This study focuses on its electrochemical properties depending on the specific structure of Co-Mn bimetallic electrocatalyst and on the amount of active species. The catalysts of four types are prepared by following a solvothermal process and coated on a NiOOH/NF support electrode (NNF). Compared to the CoO and Mn_2O_3 single particle-assembled electrodes, the CoMn_2O_4 /NNF electrode coated with the flower shaped CoMn_2O_4 bimetallic particle displays the higher stability in HER. The double-layer capacitance of the CoMn_2O_4 /NNF electrode (25.6 mF cm^{-2}) is approximately three or four times higher than those of the CoO/NNF and Mn_2O_3 /NNF electrodes, meaning that the CoMn_2O_4 /NNF electrode has a larger electrochemical active surface area. The CoMn_2O_4 /NNF electrode additionally has a low overpotential (132 mV). It is demonstrated that the structural characteristic of CoMn_2O_4 contributes to the excellent stability in a long-term HER test. Thus, the experimental and theoretical findings in this study prove the excellent HER performance of CoMn_2O_4 particles.