Plasma-assisted Synthesis of 3-D Hierarchical Ni₂P on Ni Foam as Highly Active Hydrogen Evolution Reaction Electrocatalysts

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To prepare low-cost, high-performance electrocatalytic hydrogen evolution material, we prepared Ni₂P nanosheets on nickel foam (NF) substrate combining the hydrothermal method and plasma-enhanced chemical vapor deposition (PECVD). We characterized the microstructure and composition of the material with X-ray diffraction (XRD), Field Emission Scanning Electron Microscopy (SEM), and Energy Dispersive Spectroscopy (EDS). Meanwhile, the electrochemical properties of the material under acidic and alkaline conditions were tested. In 0.5 M H₂SO₄ solution, the current density was 10 mA/cm², and the potential was 106 mV; in 1 M KOH solution, the current density was 10 mA/cm², and the potential was 97 mV. The results demonstrate that the nanoflake Ni₂P/NF as-prepared has good electrocatalytic activity under either acidic or alkaline conditions.

Keywords: Ni₂P; electrocatalysis; plasma synthesis; HER

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