

## Nanostructured NiCoVP as an efficient hydrogen evolution reaction catalyst

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Hydrogen production through electrochemical water splitting has advantages such as eco-friendliness and reduced energy consumption compared to the existing natural gas reforming method or use of plant by-product hydrogen, and many studies have been conducted. However, since the catalysts used in these electrochemical reactions are mainly precious metals, it is difficult to enter the commercialization stage because it is disadvantageous compared to the existing method in terms of economic efficiency. Among the materials to replace this, transition metal-based phosphides such as Ni and Co are advantageous in optimizing the surface adsorption energy with hydrogen, so many studies have been conducted as HER catalysts. In order to maximize the properties of these phosphide catalysts, in this study, the number of surface active sites was maximized through nanostructure and the intrinsic conductivity of the catalyst was improved through vanadium doping to synthesize a catalyst with high efficiency and stability.