

Development of  $\text{Ni}_2\text{W}_3\text{N}$  as a non-noble electrocatalyst for hydrogen evolution

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Hydrogen energy is receiving much attention due to high energy density and sustainability. Electrochemical water splitting is an eco-friendly method to produce hydrogen. However, platinum is a typical catalyst for hydrogen evolution reaction (HER), a half reaction of water splitting. Due to high cost and scarcity of Pt, development of noble metal free electrocatalysts for HER is highly required. Transition metal nitrides are attracting attention as non-noble HER catalysts because of their similar electronic structure to Pt, excellent electrical conductivity and chemical stability. Herein, we synthesized  $\text{Ni}_2\text{W}_3\text{N}$  catalyst on Ni foam support using a modified urea glass route, where urea acted as a nitrogen source and Ni foam acted as Ni source. Compared to previous bimetallic nitride synthesis involved with 2 step annealing (hydrothermal and nitridation), our method is simple and economical due to 1 step annealing without toxic  $\text{NH}_3$  gas. The resultant  $\text{Ni}_2\text{W}_3\text{N}$  recorded high HER activity and stability.

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