

Plasma-Treated NiAu Nanosponge with Enhanced Electrocatalytic Performance for Hydrogen Evolution Reaction

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Plasma-treated NiAu nanosponge is simply synthesized as an electrocatalyst for hydrogen evolution reaction (HER) in water electrolysis. First, an as-prepared NiAu nanosponge sample was synthesized by using NaBH₄ as a reducing agent without using any surfactant. Second, the as-prepared NiAu nanosponge sample was treated by using argon plasma under atmospheric pressure with a treatment time of 15 min to obtain the final plasma-treated NiAu nanosponge sample. The plasma-treated NiAu nanosponge sample was performed as an electrocatalyst for HER. As a result, plasma-treated NiAu nanosponge sample exhibited an enhanced-performance in HER activity as well as stability because of the exposure of more active sites. In more details, the overpotential at a current density of 10 mA.cm⁻² of the plasma-treated NiAu nanosponge sample (88 mV) is lower than that of the as-prepared NiAu nanosponge (134 mV) due to the plasma treatment process. In addition, plasma-treated NiAu nanosponge sample also showed an excellent durable ability of HER activity for 80,000 seconds.