Effect of dealloying parameters on HER electrocatalytic performance of nanoporous silver

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Ag₁₅Cu₈₅ binary alloy ribbon, as the precursor, was executed high-temperature oxidation at 650 °C and dealloying with different durations to fabricate nanoporous silver at different stages. The HER electrocatalytic performance of nanoporous silver at different stage was tested using open circuit potential (OCP), linear sweep voltammetry (LSV), and potential polarization curve. The results show that the nanoporous silver electrode in the B1 stage has the best anti-toxic performance, E_{corr} is -0.088V, and the i_{corr} is 1.2×10⁻⁷ A/cm²; the nanoporous silver electrode in the A2 stage shows the lowest Tafel slope (45.8 mV dec⁻¹); at a current density of 10 mA/cm², the hydrogen evolution overpotential of the nanoporous silver electrode in the B3 stage is 37.6 mV. From all those electrochemical tests, the nanoporous silver electrode in the B1 stage exhibited the best comprehensive HER performance.

Keywords: nanoporous silver; hydrogen evolution performance; high-temperature oxidation; dealloying

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