

Synthesis of Pd@Ni Foam as Multifunctional Catalyst Fabricated via Mussel-Inspired Surface Modification for H₂O₂ Sensor and 4-Nitrophenol reduction

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In this study, nickel (Ni) foam is used as supporting material for palladium (Pd) to make recyclable multifunctional catalyst with large surface area. Pd@Ni foam catalyst was fabricated via electroless plating of surface modified Ni foam. By using adhesive polydopamine (PDA) as surface modifying agent, a simple and novel method to fabricate Pd@Ni foam composite was developed. PDA-Ni foam and Pd@Ni foam composite with a PDA intermediate layer were characterized by X-ray photoelectron spectroscopy (XPS), field-emission scanning electron microscopy (FE-SEM), and X-ray diffraction (XRD). Fabricated catalyst was employed in 4-nitrophenol (4-NPh) reduction reaction which is essential for chemical synthesis and removal of toxic aromatic pollutant. It was also applied to the electrode for H₂O₂ sensor which is widely investigated in biology, environmental monitoring, and food production.