Electrochemical Synthesis of PtNiCo/3DGN Composite Catalyst and Its Performance for Methanol Electrooxidation

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A novel PtNiCo/three-dimensional graphene (PtNiCo/3DGN) catalyst was synthesized by sequential electrodeposition of three-dimensional graphene and PtNiCo nanoparticles. The catalysts were characterized by scanning electron microscopy (SEM), transmission electron microscopy (TEM), Raman and electrochemical measurements. Electrochemical experiments revealed that PtNiCo/3DGN catalyst shows high activity for methanol oxidation with improved electrocatalytic capacity (the forward anodic peak current density of 790.4 mA mg_{Pt}⁻¹), which is about 2.02 and 2.06 folds of that for PtNi/3DGN (390.2 mA·mg_{Pt}⁻¹) and PtCo/3DGN (383.9 mA·mg_{Pt}⁻¹), and much higher than Pt (144.0 mA·mg_{Pt}⁻¹) and Pt/3DGN (277.2 mA·mg_{Pt}⁻¹) catalysts.

Keywords: Methanol oxidation; Three-dimensional graphene (3DGN); PtNiCo nanoparticles; Electrodeposition

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