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Au nanoparticle-decorated $NiCo_2O_4$ nanoflower with enhanced electrocatalytic activity toward methanol oxidation

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Abstract

The performance of direct methanol fuel cells hinges on the activity of the catalyst. To enhance the electro-catalytic activity, a flower-like nanostructure assembled from thin Au/$NiCo_2O_4$ nanosheet is synthesized via a microwave process combined with deposition-reduction method, where the Au nanoparticles are well dispersed on the surface of the $NiCo_2O_4$ nanosheet. The Au/$NiCo_2O_4$ composite nanoflower is successfully applied in the electro-catalytic oxidation of methanol and its electro-catalytic performance is investigated by cyclic voltammetry, chronoamperometry and electrochemical impedance spectroscopy, which exhibits excellent electro-catalytic qualities towards methanol electro-oxidation in alkaline medium, including low onset potential (0.31 V), high current densities (135.9 mA cm^{-2}) at 0.60 V (vs. SCE), and desirable electro-oxidation stability (94%) after 500

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