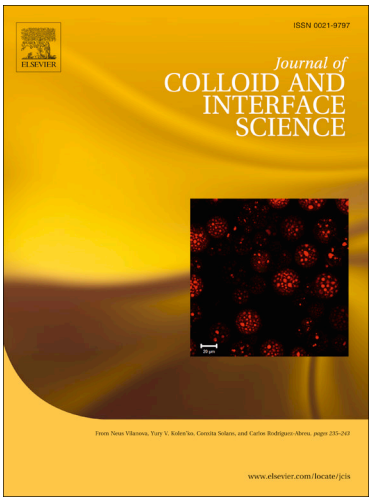

Regular Article

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Superior catalytic activity of Pt/carbon nanohorns nanocomposites toward methanol and formic acid oxidation reactions

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Abstract

Pt nanoparticle-loaded carbon nanohorns (Pt/CNHs) nanocomposites were synthesized by using formic acid as reducing agent at room temperature. Taking the advantage of the high surface area and excellent electronic conductivity, CNHs were used as support without any pretreatments for the enhancement of catalytic performance. By adjusting the feeding amount of H_2PtCl_6, the mass, size and distribution of Pt nanoparticles could be effectively controlled on CNHs. Compared with commercial Pt/C, the synthesized Pt/CNHs exhibit higher catalytic activity and improved long-term stability toward both methanol and formic acid oxidations. Among the Pt/CNHs, 13% wt. Pt/CNHs exhibit the best catalytic performances for the small size (2.4 nm) and uniform distribution of Pt NPs on CNHs. Our work reveals the superior catalytic performance of Pt/CNHs which may be a promising substitute for commercial Pt/C.

Keywords: Pt nanoparticles, carbon nanohorns, methanol oxidation, formic acid oxidation