

Facile Synthesis of Intermetallic PtPb Nanocatalysts in Ordered Mesoporous Carbon/Silica Composites for Formic Acid Oxidation

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Here, we report on the one-pot synthesis and single-cell characterization of ordered, large pore (> 30 nm) mesoporous carbon/silica (OMCS) composites with well-dispersed intermetallic PtPb nanoparticles on pore wall surfaces as anode catalysts for direct formic acid fuel cells (DFAFCs). This novel material shows a mass activity that is more than 10 times higher and an onset potential for formic acid oxidation that is much lower than that of commercial Pt/C. In single cells, the maximum power density was higher than that of commercial Pt/C, and the stability highly improved, compared with commercial Pd/C. The results suggest that PtPb-based catalysts on large-pore OMCSs may be practically applied as real fuel cell catalysts for DFAFC.