

Synthesis of Palladium–Antimony Alloy Nanoparticles on Porous Carbon Materials for the Ethanol Oxidation Reaction

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Direct ethanol fuel cells (DEFCs) have been receiving much attention with substantial potential in green energy technology due to their high efficiencies, low environmental pollution and low operating temperature. In this study, we present a series of PdSb alloy nanoparticles supported on porous carbon prepared through a modified polyol method as anode electrocatalysts for ethanol oxidation in alkaline medium. The crystallographical information and morphology of catalysts are investigated by X-ray diffraction (XRD), scanning electron microscopy (SEM) and transmission electron microscopy (TEM) respectively. The resulting PdSb/PC catalysts showed much enhanced current densities in cyclic voltammetric measurements, compared to commercial Pd/C. The mass activity of PdSb_{0.1}/PC for ethanol oxidation is 1.8 times higher than that of Pd/C. Our electrochemical measurements highlight the promotional effect of porous carbon as a support materials and Sb as an additive by forming a PdSb alloy nanoparticles on porous carbon supports.