Bimetallic Palladium-Antimony Nanoparticles supported on Porous Carbon for Direct Ethanol Fuel Cells

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Direct ethanol fuel cells (DEFCs) have attracted considerable interest with their significant potential in green energy technology. Ethanol has high energy density, low environmental pollutant emission and can be gained from agricultural biomass. In this study, we present a series of bimetallic PdSb nanoalloys supported on porous carbon as anode electrocatalysts for ethanol oxidation in alkaline medium. According to scanning electron microscopy (SEM) and transmission electron microscopy (TEM), the morphology of catalysts is observed, and the crystallographical information is chacterized by X-ray diffraction (XRD). The prepared Pd_xSb_y/PC catalysts showed enhanced current density for ethanol oxidation reaction in cyclic voltammetry, and had a similar level of stability in chronoamperometry compared to commercial Pd/C. The mass activity of $Pd_{0.90}Sb_{0.10}$/PC for ethanol oxidation is 2.6 times higher than that of the commercial Pd/C. Our electrochemical measurements highlight the promotional structural effect of 3D porous carbon structure as a support materials and the electronic effect by forming a Pd-Sb alloy.