Short Communication

Investigation of Pt/C and Pt-Ru/C Mixed Catalyst for DME Oxidation in Direct Dimethyl Ether Fuel Cells

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The performance of Pt/C and Pt-Ru/C mixed catalyst has been studied for dimethyl ether (DME) oxidation in direct dimethyl ether fuel cells (DDFCs). Transmission Electron Microscopy (TEM) characterizations show that Pt and Pt-Ru particles (about 3.0 nm) are highly dispersed on their supports. The electrochemical activity of mixed catalyst was evaluated by polarization curve, amperometric current density – time technique, and electrochemical impedance spectroscopy (EIS). The results show that the activity of mixed catalyst is better than Pt/C toward DME oxidation. Pt-Ru/C in the mixed catalyst is helpful for reducing the catalyst poisoning effect, and simultaneously, Pt/C in the mixed catalyst can provide continuous Pt active sites for DME dehydrogenation. Too much Pt-Ru can reduce the catalytic activity. The optimal Pt-Ru content is 3.5 mg cm⁻² Pt and 0.5 mg cm⁻² Pt-Ru (metal loading) in anode catalyst layer.

Keywords: Direct dimethyl ether fuel cell; Dimethyl ether; Anode catalyst; Pt-Ru/C; Pt/C

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