

Pt and PtRu nanoparticles supported on N-doped carbons as electrocatalysts for methanol electro-oxidation

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Methanol is a liquid transportation fuel that can be produced from fossil or renewable resources. Fuel cells employing methanol directly as fuel (Direct Methanol Fuel Cell - DMFC) are very attractive as power source for portable, mobile and stationary applications [1]. PtRu/C electrocatalyst has been considered the best electrocatalyst for methanol electro-oxidation, however, its performance is strongly dependent on the method of preparation and on the characteristics of the carbon support. N-doped carbons with different N contents (1, 2 and 5 wt%) were prepared by thermal treatment of carbon with urea at 800°C. Pt and PtRu nanoparticles were supported on N-doped carbons by co-reduction of Pt(IV) and Ru(III) ions using an alcohol-reduction process [2]. The obtained materials were characterized by Energy Dispersive X-ray spectroscopy, X-ray diffraction, Transmission electron microscopy and Cyclic Voltammetry. Pt and PtRu nanoparticles supported on N-doped carbons showed superior performance for methanol electro-oxidation when compared to the materials supported on non-modified carbon and to Pt/C and PtRu/C commercial electrocatalysts. Pt/C and PtRu/C prepared with the carbon modified with 2.5 wt% of N content showed the best activities.

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