Effect of Sn Loading on the Characteristics of Pt Electrocatalysts Supported on Reduced Graphene Oxide for Application as Direct Ethanol Fuel Cell Anode

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The effect of Sn loading (5–30 mol %) on Pt catalysts supported on reduced graphene oxide was investigated for ethanol electro-oxidation in acidic medium. Reduced graphene oxide was synthesized via graphite oxidation–exfoliation process in liquid phase and chemical reduction. Pt and Pt_xSn_y catalysts were deposited on reduced graphene oxide by a NaBH₄ impregnation–reduction method. The adopted procedures allowed the synthesis of graphene-like nanosheets where single Sn-doped Pt nanoparticles were impregnated. Pt lattice parameter and micro-strain increased with Sn addition, confirming the formation of a solid solution. Concerning ethanol electro-oxidation, Pt was more active when supported on reduced graphene oxide whereas the introduction of Sn enhanced the catalyst activity, leading to lower ethanol oxidation potentials and higher current densities.

Keywords: reduced graphene oxide, platinum, tin, ethanol electro-oxidation

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