

Microwave Activation of Palladium Nanoparticles for Enhanced Ethanol Electrocatalytic Oxidation Reaction in Alkaline Medium

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Dedicated to Professor R. G. Compton on the Occasion of his 60th Birthday

Abstract

The impact of microwave irradiation on the structure and electrochemistry of monodispersed palladium nanoparticles is reported for the first time. When compared to the Pd that was not subjected to microwave treatment, the microwaved Pd nanocatalyst gave higher electrochemical active surface area (EASA. $67 \text{ m}^2 \text{ g}^{-1}$), aggregation/uniformity of dispersion, showed higher amount of the palladium oxides, and showed remarkable electrocatalytic behaviour towards ethanol oxidation reaction in alkaline medium (in terms of high mass activity, stability and fast reaction kinetics). The remarkable microwave- induced properties on the Pd catalyst promise to revolutionize the use of microwave for catalyst activation for enhanced heterogeneous catalysis and fuel cell chemistry.