

Electrooxidation of oxalic acid at a carbon-paste electrode with deposited palladium nanoparticles

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Abstract

Palladium nanoparticles deposited on the surface of a carbon-paste electrode exhibit electrocatalytic activity in the oxidation of oxalic acid. The surface topography of modified carbon-paste electrodes (CPEs) and the shapes of the metal crystallite particles were studied with atomic-force microscopy. These data were correlated with the voltammetric parameters of the electrooxidation of palladium and oxalic acid. As the dispersity of palladium nanoparticles electrodeposited on the CPE surface increased and their size diminished, the peak current of the catalytic oxidation of oxalic acid decreased, whereas the increment of this current increased as compared to the limiting current of metal oxidation. Evidently, this was due to an increase in the catalytic activity of the metal. The use of CPE modified with palladium nanoparticles instead of CPE containing palladium macrocrystals lowered the detection limit for the analyte by one order of magnitude (down to 2×10^{-5} M). © Pleiades Publishing, Inc., 2006.

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