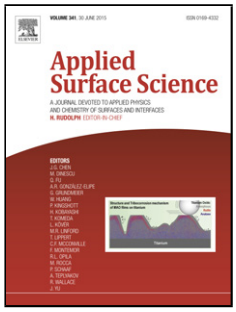

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Platinum electrodeposition from a dinitrosulfatoplatinate(II) electrolyte

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Highlights

- Deposition of Pt-nanoparticles from a halogenic free electrolyte by pulse plating
- The size of smallest Pt-particles is approximately 5nm
- The diffusion coefficient of the [Pt(NO2)2SO4]2--complex amounts to 5.4*10-6 cm2s-1.
- High catalytic sensitivity

Abstract

In this work a halogenic-free electrolyte to deposit platinum nanoparticle is studied. The investigated $[Pt(NO_2)_2SO_4]^{2-}$-complex is suitable for electrochemical deposition on halogenic sensitive substrates. The mechanism and kinetic of particle deposition is investigated using a glassy carbon rotating disk electrode. Nano sized platinum particles are deposited by using pulse plating technique. The size of the smallest platinum nanoparticle is 5 nm. The shape of the particle distribution strictly depends on the plating time. The platinum deposition is usually superimposed with hydrogen evolution. A diffusion coefficient of the $[Pt(NO_2)_2SO_4]^{2-}$-complex is determined to $5.4*10^{-6}$ cm^2s^{-1}. The current efficiency depends on the deposition parameters and amounts to 37% under the chosen pulse plating conditions.

Keywords: platinum, electrodeposition, nanoparticles, pulse plating