BOOK of ABSTRACTS

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Сојуз на хемичарите и технолозите на Македонија

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26th Congress of SCTM

with International Participation

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Synergistic Effects of the Supporting Material and Annealing Temperature on the Performance of Pt Thin Film Catalysts

D. V. Tripković,* S. I. Stevanović and D. L. Milošević

University of Belgrade – Institute of Chemistry, Technology and Metallurgy, Njegoševa 12, 11000 Belgrade, Republic of Serbia

* dusan@ihtm.bg.ac.rs

The electrocatalytic oxidation of small organic molecules, such as methanol, ethanol and formic acid has been extensively studied due to their properties that make them suitable for use in fuel cells. Particularly, the electrochemical oxidation of formic acid has been comprehensively examined as the anodic reaction in direct formic acid fuel cell. The main goal in the development of the catalysts for formic acid oxidation (FAO) is to find the optimal balance between catalytic performance (activity/stability) and the catalyst cost, i.e. quantity of the noble metal used.

In the work presented herein, we explored the synergistic effects of the supporting material and annealing temperature on the performance of Pt thin film catalysts for FAO in acidic media. Our results show that compared to the as-prepared Pt films, the annealed (500 ^{o}C) films show exceptional activity for FAO reaction on both Pt/Ni and Pt/Cr catalysts, with 5-fold and 15-fold improvement, respectively.

The 500 ^{o}C annealed Pt/Cr catalyst was found to be the most active, the most selective and the most stable catalyst in our study. A catalyst with the best marks for all three characteristics is a very rare find in electrocatalysis in general.

Keywords: platinum thin film catalysts; formic acid oxidation; chromium; nickel

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