

Carbon Supported PtSn *versus* PtSnO₂ Catalysts in Methanol Oxidation

Sanja Stevanović^{1,*}, Dušan Tripković¹, Aleksandra Gavrilović-Wohlmuther², Jelena Rogan³,
Uroš Lačnjevac⁴, Vladislava Jovanović¹

¹ University of Belgrade - Institute of Chemistry, Technology and Metallurgy, Department of electrochemistry, Njegoševa 12, 11000 Belgrade, Republic of Serbia,

² Schoeller-Bleckmann Nitec GmbH, Hauptstrasse 2, 2630 Ternitz, Austria,

³ Faculty of Technology and Metallurgy, University of Belgrade, Karnrgijeva 4, 11000 Belgrade, Serbia,

⁴ Department of Material Science, Institute for Multidisciplinary Research, University of Belgrade, Kneza Višeslava 1, 11030 Belgrade, Serbia

*E-mail: sanjas@ihm.bg.ac.rs

doi: 10.20964/2021.02.55

Received: 6 November 2020 / Accepted: 21 December 2020 / Published: 31 December 2020

Pt, PtSn and PtSnO₂ catalysts supported on high surface area carbon synthesized by microwave assisted polyol procedure were tested for methanol oxidation. Based on TGA, EDX and XRD analysis, PtSn/C is composed of Pt and Pt₃Sn phase while the rest of Sn is present in a form of very small tin oxide particles. This paper focuses on structure-activity relationships for CO tolerance and methanol oxidation reactions after addition of Sn to Pt catalysts. Alloying of Sn with Pt improves the rate of CO oxidation despite the fact that the pure Sn does not react with CO and therefore activity for methanol oxidation increases ~ 2 times in comparison to Pt/C catalyst. PtSn/C catalyst shows small advantage in comparison with PtSnO₂/C catalyst due to the alloyed Sn and its electronic effect. Long term stability tests also confirmed that PtSn/C catalyst is somewhat better in comparison to PtSnO₂/C.

Keywords: platinum catalysts; microwave polyol synthesis; methanol oxidation; stability tests.

[FULL TEXT](#)

© 2021 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).