

Novel nanostructured materials for environmental friendly alternative power sources

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Abstract:

Statement of the Problem: The main contemporary industrial processes are based on fossil fuels usage. Intensive fossil fuel application leads to the growing environment pollution, causing the "greenhouse effect". During the 20th century the CO₂ concentration increased about 20%, being the main reason for average temperature increase on Earth. This fact has already caused undesirable climate changes, connected to animal and plants biodiversity disorder. United Nations has recognized environment pollution effects and global actions to prevent it have already been taken. From Stockholm conference held in 1972 and Kyoto in 1997, United Nations announced several declarations to stabilize gas emission and decrease greenhouse effect. European Union has established main targets until 2020, in the frame of Climate and Energy Package, to increase alternative power sources usage and save environment. Thus, the further development of water electrolysis and fuel cells catalysts (the subject of this work), as environmental friendly, green technologies are extremely desirable, to contribute to the environment protection and sustainable development. Hydrogen – high efficiency and environmental friendly fuel, produced by water electrolysis is used in low temperature fuel cells, while oxidative agent is oxygen from air. In this work novel nanostructured materials with noble metal nanoparticles deposited onto ceramics based supports have been investigated as the catalysts for fuel cells, promising alternative power sources. Several ceramic supports were prepared - Ti, Sn and W based oxides, doped by Ru or Nb to improve conductivity. Physical chemical and electrochemical characterization of these novel materials confirmed higher efficiency and long term stability to decrease the costs and increase life time of fuel cells acceptable for commercial application.

Biography:

Nevenka R. Elezovic completed her PhD in 2005, from University of Belgrade. She is currently research professor at the Institute for Multidisciplinary Research. Since 2013 she is served as representative of Serbia and member of the European board in European Academy of Surface Technology- <http://www.east-site.net>. She has published more than 40 papers in reputed journals and has been serving as an reviewer for: Energy and Environmental Science, Applied Materials and Interfaces, Journal of Materials Chemistry A, Electrochimica Acta, Applied Catalysis B: Environmental, RSC Advances, PCCP, Chemical Communications, Journal of the Electrochemical Society, International Journal of Hydrogen Energy.