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Noble metal based nanostructures for zero emission energy production-carbon based vs. carbon free catalysts supports, advantages and disadvantages

Platinum based nanoparticles on high surface area carbon (commercially named Vulcan XC 72 or Ketjen Black) are state of the art materials for low temperature fuel cells application – high efficiency environmental friendly power sources. These catalysts have acceptable high activity for commercial use; however the stability is still big challenge to overcome, to achieve proper durability and long-life costs acceptable for practical purpose. The other big challenge is high oxygen reduction overpotential and its slow kinetics causing unacceptable power loss. Namely, we have synthesized Pt based nano catalysts on different metal oxide based supports (Ti, Sn, W based oxides) and characterized its activity and stability for oxygen reduction reaction. The supports were doped by several percent of Nb and Ru (5-10%) to achieve sufficient conductivity. The synthesized nanocatalysts were characterized by X-ray Diffraction (XRD), High Resolution Transmission Electron Microscopy (HRTEM), Electron Energy Loss Spectroscopy (EELS), X-Ray Photoelectron Spectroscopy (XPS), as well as by electrochemical techniques and Accelerated Stability Testing. The results confirmed very high activity and stability, if compared to commercial Vulcan XC 72 supported catalysts with the same Pt loading.

Biography

Nevenka R Elezovic has completed her PhD in 2005, from University of Belgrade. She is currently working as a Research Professor at the Institute for Multidisciplinary Research. Since 2013, she is serving 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 30 papers in reputed journals and has been serving as a reviewer for: *Energy and Environmental Science*, *Applied Materials and Interfaces*, *Journal of Materials Chemistry A*, *Electrochimica Acta*, *Applied Catalysis B: Environmental*, *RSC Advances*, *PCCP* and *Chemical Communications*.

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