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Design of a cost-effective catalyst for the removal of organic pollutants from wastewater by WHPCO nanotechnology

Natasa Novak Tusar
National Institute of Chemistry, University of Nova Gorica, Slovenia

Wet Hydrogen Peroxide Catalytic Oxidation (WHPCO) is one of the most promising advanced oxidation processes (AOPs) of industrial applicability for the decomposition of organic pollutants in water. We have recently demonstrated [1] for the first time that manganese functionalized silicate nanoparticles act as a superior catalyst for WHPCO, since they completely decompose 80% of a test organic compound in 30 minutes at neutral pH and room temperature and convert it to carbon dioxide. Structural characterization of the material by X-ray absorption spectroscopic techniques along with catalytic tests revealed that the superior activity of this catalyst can be attributed uniquely to manganese incorporated in the silicate framework of the nanoparticles, and not to manganese in the form of manganese oxides (Mn_3O_4, Mn_2O_3). The work to be described herein introduces a new family of catalysts with extraordinary efficiency for the decomposition of organic pollutants dissolved in water.

[1] N. Novak Tušar, D. Maučec, M. Rangus, I. Arčon, M. Mazaj, M. Cotman, A. Pintar, V. Kaučič, Manganese Functionalized Silicate Nanoparticles as a Fenton-Type Catalyst for Water Purification by Advanced Oxidation Processes (AOP), *Advanced Funcional Materiales*, 22 (2012) 820-826.

Biography

Nataša Novak Tušar received her PhD in Chemistry from the University of Ljubljana, Slovenia in 2000. She was a post PhD researcher in 2003-2004 as an Individual Marie Curie Fellow at synchrotron ELETTRA and University of Trieste, Italy. Beginning in 2004 she has been working at the Laboratory for Inorganic Chemistry and Technology at the National Institute of Chemistry in Ljubljana, Slovenia on the design of porous catalysts as advanced materials for energy and environmental technologies. Since 2006 she has been lecturing in Chemical Engineering at the School of Engineering and Management of the University of Nova Gorica, Slovenia, and was promoted to associated professor in 2012.

natasa.novak@ki.si