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„International Conference of Experimental and Numerical Investigations and New Technologies“

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Programme

and

The Book of Abstracts

29 June – 02 July 2021

Zlatibor, Serbia

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INFLUENCE OF ANODIZATION VOLTAGE ON PHOTOCATALYTIC ACTIVITY OF TIO_2 NANOTUBES

Jelena Vujancevic[1*], Jovana Cirkovic[2], Endre Horváth[3], László Forró[4], Vladimir Pavlovic[1], Dorde Janackovic[5]

[1] Institute of Technical Sciences of SASA, 11000 Belgrade, Serbia

[2]Institute for Multidisciplinary Research, University of Belgrade, 11000 Belgrade, Serbia

[3]Haute école du paysage, d'ingénierie et d'architecture de Genève – HEPIA, Genève, Switzerland

[4]Ecole Polytechnique Fédérale de Lausanne, Laboratory of Physics of Complex Matter (LPMC), CH-1015 Lausanne, Switzerland

[5]University of Belgrade, Faculty of Technology and Metallurgy, 11000 Belgrade, Serbia

*Corresponding author e-mail: jelena.vujancevic@itn.sanu.ac.rs

Abstract

TiO_2 under UV light generates charge carriers (electrons and holes) that take part in the process of decomposition of pollutants, which is a well-known fact for the past few decades. For this reason, TiO_2 is used for photocatalytic purification water and air. Photoactivity of TiO_2 depends on the amount of generated charge carriers, and one part of those carriers are lost through the process of recombination. In order to improve photoactivity, it is necessary to speed up transport of electrons and holes. For better and faster charge carrier transport a unidirectional path is desired, which can be obtained by synthesizing 1D morphology. Anodization of titanium foil is a good way to obtain perpendicular nanotubular morphology onto a substrate. Nanotubular morphology can be optimized via operative conditions of anodization: applied voltage, anodization time and type of electrolyte. In this work, TiO_2 nanotube arrays were synthesized by anodization of titanium foil at different voltages: 10 V, 15 V, 20 V and 25 V. Based on FESEM (Field Emission Scanning Electron Microscopy) micrographs, the microstructure of nanotubes was analysed and data concerning wall thickness, outer diameter of nanotubes and active surface were considered. Also, the influence of nanotube morphology on optical properties was determined. Results of our research show that the increasement in anodization voltage influenced on the appearance of redshift in the absorption spectrum. The sample synthesized at 20 V showed the highest photocatalytic activity due to the optimal nanotube length and nanotube diameter.

Keywords:

TiO_2, photocatalysis, anodization voltage, nanotube morphology

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