Tenth Young Researchers' Conference
Materials Science and Engineering

December 21-23, 2011, Belgrade, Serbia
Serbian Academy of Sciences and Arts, Knez Mihailova 35 & 36

Program and the Book of Abstracts

Materials Research Society of Serbia
Institute of Technical Sciences of SASA

December 2011, Belgrade, Serbia

Book title:
Tenth Young Researchers' Conference - Materials Science and Engineering:
Program and the Book of Abstracts

Publisher:
Institute of Technical Sciences of SASA
Knez Mihailova 35/IV, 11000 Belgrade, Serbia
Tel: +381-11-2636994, fax: 2185263
http://www.itn.sanu.ac.rs

Editor:
Prof. Dr. Nenad Ignjatović

Technical Editor:
Aleksandra Stojičić

Printer:
Copy Planet
Brankova 12, 11000 Belgrade, Serbia
Tel: +381-11-3036545, fax: 3036546
http://www.copyplanet.rs

Edition:
130 copies

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

66.017/.018(048)

YOUNG Researchers' Conference Materials Science and Engineering (10 ; 2011 ; Beograd)

Program ; and the Book of Abstracts / Tenth Young Researchers' Conference Materials Science and Engineering, December 21-23, 2011, Belgrade, Serbia ; [organized by] Materials Research Society of Serbia and Institute of Technical Sciences of the Serbian Academy of Sciences and Arts ; [editor Nenad Ignjatović]. - Belgrade : Institute of Technical Sciences of SASA, 2011 (Belgrade : Copy Planet). - XV, 62 str. ; 30 cm
Tiraž 130. - Registar.

ISBN 978-86-80321-27-1
1. Materials Research Society of Serbia (Beograd) 2. Institute of Technical Sciences of SASA (Beograd)

a) Наука о материјалима - Апстракти b) Технички материјали - Апстракти
COBISS.SR-ID 188165900

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Characterisation of bronze surface coatings on titanium formed by plasma electrolytic oxidation in 12-tungstosilicic acid

Marija Petković[1], S. Stojadinović[1], R. Vasilić[2], I. Belća[1], B. Kasalica[1], Lj. Zeković[1]

[1]Faculty of Physics, University of Belgrade, Belgrade, Serbia, [2]Faculty of Environmental Governance and Corporate Responsibility, Educons University, Sremska Kamenica, Serbia

The growth of silicate tungsten bronzes on titanium by plasma electrolytic oxidation (PEO) in 12-tungstosilicic acid was experimentally investigated. Oxide coatings were characterized by AFM, SEM-EDS and XRD. It was confirmed that oxide coating morphology is strongly dependent on PEO time, density of discharge channels decreases while their diameter increases resulting in increased roughness of oxide coatings. The elemental components of PEO coatings are Ti, W and O. Oxide coatings are partly crystallized and mainly composed of WO_3 and TiO_2. Raman spectroscopy showed that the outer layer of oxide coatings is silicate tungsten bronzes.

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Influence of thermal treatment on structural, morphological and optical characteristics of upconvertors

Vesna Lojpur[1], Lidija Mančić[1], Maria Eugenia Rabanal[2], Miroslav Dramićanin[3], Olivera Milošević[1]

[1]Institute of Technical Sciences of SASA, Belgrade, Serbia, [2]University Carlos III of Madrid, Dept. of Material Science and Engineering and Chemical Engineering, Leganes, Madrid, Spain, [3]Institute of Nuclear Science "Vinča", University of Belgrade, Belgrade, Serbia

The upconverting phosphors are materials of great interest for optoelectronics operating in the near infrared region. The preparation of highly spherical Y_2O_3:Yb,Er particles are synthesized *via* spray pyrolysis from common nitrate solution with fixed dopants ratio of Yb/Er=10. The processing conditions are as follows: precursor concentration 0.1M, atomization frequency 1.3 MHz, temperature regime 200-900-900°C and air flow rate 1,6 dm^3/min. The as-prepared particles collected in the electrostatic precipitator are additionally thermally treated at 1100 °C for 12, 24 and 48 hours. Detailed structural analyses are performed by X-ray powder diffraction (XRPD) based on which the structural refinement is done using Topas Academic Software. The results imply that with the increase of calcination time crystallite size increasing along with microstrain diminishing. The particle morphological characteristics are studied by scanning electron microscopy (SEM) and are further correlated with specific surface area (BET), size distribution (LPS) and optical properties followed through photoluminescence measurements (PL).