ELEVENTH ANNUAL CONFERENCE

YUCOMAT 2009

Hotel “Plaža”, Herceg Novi, Montenegro, August 31 - September 4, 2009
http://www.mrs-serbia.org.rs

Programme
and
The Book of Abstracts

Organised by:
Materials Research Society of Serbia,
and
Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Belgrade

under the auspices of
Federation of European Material Societies
and
Materials Research Society

Title: THE ELEVENTH ANNUAL CONFERENCE
"YUCOMAT 2009"
Programme and The Book of Abstracts

Publisher: Institute of Technical Sciences of the Serbian Academy of Sciences & Arts
Knez Mihailova 35/IV; P.O. Box 377, 11000 Belgrade, Serbia
Phone: +381 11 2185-437; Fax: + 381 11 2185-263
http://www.itn.sanu.ac.rs

Editor: Prof. Dr. Dragan P. Uskoković

Technical editor: Aleksandra Stojičić

Cover page: Aleksandra Stojičić and Milica Ševkušić

Acknowledgment:

FEMS MRS Materials Research Society

endorsed by biomat.net

nanopaprika.eu

Printed in: Printing office "Čigoja"
Studentski trg 15, 11000 Belgrade
Phones: + 381 11 2186-725; + 381 11 625-954
Circulation: 300 copies. The end of printing: July 2009.

ISBN 978-86-80321-18-9

9 788680 321189

CIP – Каталогизација у публикацији
Народна библиотека Србије, Београд

66.017/.018(048)

MATERIALS Research Society (Beograd). Conference (11 ; 2009 ; Herceg Novi)
Programme ; and The Book of Abstracts / Eleventh Annual Conference YUCOMAT 2009, organized by Materials Research Society of Serbia and Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Belgrade ; [editor Dragan P. Uskoković]. – Belgrade : Institute of Technical Sciences of SASA, 2009 (Belgrade : Čigoja).– L, 219 str. ; 24 cm

Tiraž 300. – Registar.

ISBN 978–86–80321–18–9
1. Materials Research Society (Beograd) 2. Institute of Technical Sciences of SASA (Beograd)

a) Наука о материјалима – Апстракти b) Технички материјали – Апстракти
COBISS.SR–ID 168339724

P.S.C.16.

STEEL SURFACE CHARACTERIZATION WITH DIFFERENT COMPOSITION AND VARYING TOOL GEOMETRY BY SCANNING PROBE MICROSCOPY

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In this paper we analyzed a possible application of scanning probe microscopy techniques in characterization of lathe steel processing. We investigated the influence that variation of tip curvature has onto topographic and magnetic properties of two common steel samples (AiSi302 and AiSi316). The tip curvatures used were 0.8 mm, 1 mm, and 1.2 mm while other parameters were fixed. We used all three tip curvatures on each of two samples, and obtained the total of six different settings. It can be seen that, aside from expected change in topography and processed surface granulation size due to change in tool geometry, also different magnetic properties arise as a consequence of variation of knife tip curvature. We conducted a standard surface characterization in order to provide a new possible guideline for quality assessment and or determine future surface structure integrity of processed materials. We present the resulting images showing the topography, magnetic force, conductivity and phase image surface examination of chosen samples.

P.S.C.17.

MECHANOCHEMICAL SYNTHESIS OF ZnO NANOSTRUCTURED POWDER USING A DIFFERENT ORGANIC SURFACTANTS AND ITS INFLUENCE ON THE PARTICLES SIZE AND MORFOLOGY

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Pure zinc oxide (ZnO) nanostructured powder was prepared by mechanochemical method followed by heat-treatment in a planetary ball-mill using agate jars and alumina balls. The frequency of the rotation of jars around the common axis was 180 per minute, activation times were from 30 min to 4 h. Mechanochemical processing involves the mechanical activation of reactant mixture in a liquid phase (wet milling). We studied influence of organic surfactants on reduction of ZnO particles size, their shape and size distribution. As a process controlling agent (PCA), we used different organic compounds such as oxalic acid, oleic acid and isopropanol. After milling procedure, intermediate compounds were calcinated in air to form ZnO powder. Powders characterization was preformed using X-ray diffraction method (XRD) and scanning electron microscopy (SEM).