

THIRTEENTH ANNUAL CONFERENCE

YUCOMAT 2011

Hunguest Hotel Sun Resort Herceg Novi, Montenegro,
September 5-9, 2011
<http://www.mrs-serbia.org.rs>

Programme and The Book of Abstracts

Organised by:
Materials Research Society of Serbia

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

Title: THE THIRTEENTH ANNUAL CONFERENCE
YUCOMAT 2011
Programme and The Book of Abstracts

Publisher: Materials Research Society of Serbia
Knez Mihailova 35/IV, 11000 Belgrade, Serbia
Phone: +381 11 2185-437; Fax: + 381 11 2185-263
<http://www.mrs-serbia.org.rs>

Editor: Prof. Dr. Dragan P. Uskoković

Technical editor: Aleksandra Stojičić

Cover page: Aleksandra Stojičić and Milica Ševkušić

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Acknowledgment:



Printed in: Biro Konto
Sutorina bb, Igalo – Herceg Novi, Montenegro
Phones: +382-31-670123, 670025, E-mail: bkonto@t-com.me
Circulation: 250 copies. The end of printing: August 2011

P.S.E.10.

HYDROTHERMAL SYNTHESIS OF ZnO NANOSTRUCTURES WITH DIFFERENT MORPHOLOGIES AND THEIR ANTIMICROBIAL ACTIVITY AGAINST *Escherichia coli* AND *Staphylococcus aureus* BACTERIAL CULTURES

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Considering that many very important properties that determine the use of material for a range of purposes depend on size and morphology of the particles of which the material is made up of exceptional importance is the synthesis of particles of controlled morphology and dimensions. Nanoparticle metal oxides represent a new class of important materials that are increasingly being developed for use in research and health-related applications. Zinc oxide is currently being investigated as an antimicrobial agent in both microscale and nanoscale formulations. Results have indicated that ZnO nanoparticles show antibacterial activity apparently greater than for microparticles. In this study, we generally attempt to examine influence of size and particularly shape of ZnO nanoparticles synthesized through a controlled hydrothermal method, on the antibacterial activity toward *Escherichia coli* (Gram-negative bacteria) and *Staphylococcus aureus* (Gram-positive bacteria).

Characterization of the prepared ZnO nanopowders was performed using experimental technique such as XRD analysis, FE SEM, HR TEM, UV VIS and Malvern's Master Sizer instrument for particle size distribution. The antibacterial properties of synthesized ZnO nanostructures were done using a colony count method.

Apart from different forms of prepared ZnO nanoparticles, antimicrobial tests showed impressive antibacterial properties, above 99% microbial cells reduction, toward gram positive bacteria *S. Aureus* and gram negative bacteria *E. Colli*.

P.S.E.11.

CHITOSAN-POLYETHYLENE OXIDE FILMS FOR CONTROLLED DRUG RELEASE

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This report presents the fabrication of polymer films based on chitosan and polyethylene oxide (PEO) and the ability of films to tune drug release. Film thickness varied between 353 and 409 μm depending on the PEO content. Crystallinity of the polymer mostly depend of the increase of PEO as shown by DSC, XRD and optical microscopy Water contact angle decreased from pure chitosan to 50/50 wt% chitosan/PEO and then increased with increasing the PEO content, which is attributed to the formation of partially ordered crystalline structure. The addition of PEO induced the increase of swelling degree, which is in agreement with results of water contact angle measurements. Release rate of paracetamol drug decreased with the addition of PEO due to increased crystallinity and coherent structure of the film. A faster release of paracetamol from the pure chitosan film was observed due to the presence of meso- and macropores in examined films after swelling.