THE SEVENTH YUGOSLAV MATERIALS RESEARCH SOCIETY CONFERENCE

YUCOMAT 2005

Programme
and
The Book of Abstracts

HERCEG NOVI,
September 12-16, 2005

Organized by:
YUGOSLAV MATERIALS RESEARCH SOCIETY
and
INSTITUTE OF TECHNICAL SCIENCES OF SASA

http://www.yu-mrs.org.yu

YU - CO MAT

THE SEVENTH YUGOSLAV MATERIALS RESEARCH SOCIETY CONFERENCE

YUCOMAT 2005

Programme
and
The Book of Abstracts

HERCEG NOVI,
September 12-16, 2005

Organized by:

YUGOSLAV MATERIALS RESEARCH SOCIETY
and
INSTITUTE OF TECHNICAL SCIENCES OF SASA

http://www.yu-mrs.org.yu

YU - CO MAT

Title: THE SEVENTH YUGOSLAV MATERIALS RESEARCH SOCIETY CONFERENCE

"YUCOMAT 2005"

Programme

and

The Book of Abstracts

Publisher: Institute of Technical Sciences of SASA
Knez Mihailova 35/IV; P.O. Box 315, 11000 Belgrade
Phone: +381 11 185-437; Fax: + 381 11 185-263

Editor: Prof. Dr. Dragan P. Uskoković

Technical editor: Aleksandra Stojičić

Cover page: Aleksandra Stojičić

Acknowledgment: The editor of the book of abstracts is grateful to the Ministry of Sciences and Environmental Protection of Republic of Serbia for its financial support of this book and The Seventh Yugoslav Materials Research Society Conference "YUCOMAT 2005" held in Herceg Novi.

Printed in: Printing office "Čigoja"
Studentski trg 15, 11000 Belgrade
Phones: + 381 11 186-725; + 381 11 625-954
Circulation: 300 copies. The end of printing: July 2005.

Yu-MRS

President: Dragan Uskoković
Vice-presidents: Slobodan Milonjić, Velimir Radmilović, Branislav Radonjić, Dejan Raković
General Secretary: Jovan Nedeljković
Members: Snežana Bošković, Milorad Davidović, Vera Dondur, Slobodan Jovanović, Djuro Koruga, Zoran Petrović, Milenko Plavšić, Zoran Popović, Momčilo Stevanović, Jovan Šetrajčić, Ana Terlecki-Baričević, Mira Vukčević, Miodrag Zlatanović

International Advisory Board

Fritz Aldinger (Germany), Rostislav A. Andrievski (Russia), Aline Auroux (France), Djamila Bahloul-Hourlier (France), Xavier Batlle (Spain), Giovanni A. Battiston (Italy), Ivan Božović (USA), Philippe Colomban (France), Miha Drofenik (Slovenia), Michel Fedoroff (France), Lev A. Gribov (Russia), Stuart Hameroff (USA), Paul Harrison (UK), Felix T. Hong (USA), Thomas Jung (Switzerland), Vladimir Krstić (Canada), Hans Theo Langhammer (Germany), Toshiaki Makabe (Japan), Egon Matijević (USA), Olga Mićić (USA), Amelia Montone (Italy), Eiji Osawa (Japan), Zoran S. Petrović (USA), Robert Sinclair (USA), Valeriy V. Skorohod (Ukraine), Danilo Suvorov (Slovenia)

Conference Organising Committee

Chairman: Jovan Nedeljković
Members: Ljiljana Čerović, Nikola Cvjetićanin, Kemal Delijić, Miroslav Dramićanin, Nenad Ignjatović, Djordje Janaćković, Jovan Mirković, Nebojša Mitrović, Nebojša Romčević, Vladimir Srdić, Edin Suljovrujić
Conference Secretary: Aleksandra Stojičić

INTRODUCTION:

Materials science and engineering incorporate acquiring of knowledge on synthesis and processing of materials, their composition and structure, properties and behaviour, functions and potentialities as well as application of that knowledge to various final products. Economic prosperity, life quality, and healthy environment are tightly connected with the improvements in the existing and the development of new materials and processing technologies. These improvements and development can contribute greatly to the national priorities: energy saving, environment and health protection, information and communication, infrastructure, transportation, etc.

The Yugoslav Materials Research Society (Yu-MRS), a non-government and non-profit scientific association, was founded in 1997 to promote multidisciplinary goal-oriented research in materials science and engineering. Main task and objective of the Society is to encourage creativity in materials research and engineering to reach a harmonic coordination between achievements in this field in our country and analogous activities in the world with an aim to include our country into the global international projects.

The First Conference on materials science and engineering, including physics, physical chemistry, condensed matter chemistry, and technology in general, was held in September 1995, in Herceg Novi. An initiative to establish Yugoslav Materials Research Society was born at the conference. Similar to other MR societies in the world, the programme was made and objectives determined. Until 2003 Conferences were held every second year and then they grew into Annual Conference that will be traditionally held in Herceg Novi in September of every year.

P.S.B.51. **CHARACTERISATION OF BIMETALLIC ZEOLITES: Cu,FeZSM-5, Cu,MnZSM-5 and Fe,MnZSM-5. ADSORPTION BEHAVIOUR**
V. Rakić[1,3], V. Rac[1], Lj. Damjanović[2], V.T. Dondur[2], A. Auroux[3]
[1]*Faculty of Agriculture, Beograd-Zemun, Serbia and Montenegro,* [2]*Faculty of Physical Chemistry, University of Belgrade, Belgrade,* [3]*Institut de Recherches sur la Catalyse, 2, Av. Einstein, 69626 Villeurbanne Cedex, France*

P.S.B.52. **PHOTOACOUSTIC PROPERTIES OF THICK NiO FILMS**
O. S. Aleksić[1], N. Begenišić[2], M. V. Nikolić[1], D. Urošević[3]
[1]*Center for Multidisciplinary Studies of the University of Belgrade, Belgrade, Serbia and Montenegro,* [2]*Ericson d.o.o., New Belgrade,* [3]*Mathematical Institute, Serbian Academy of Sciences and Arts, Belgrade*

P.S.B.53. **HIGH PRESSURE AND OPTICAL PROPERTIES OF LMA:Mn^{2+}**
B.R. Jovanić[1], B. Viana[2]
[1]*Institute of Physics, Centre of Experimental Physics, Laboratory for Multidiscplinary Research, Zemun, Serbia & Montenegro,* [2]*Laboratoire de Chimie Appliquée de l'Etat Solide CNRS UMR 7574, ENSCP, Paris cedex 05, France*

P.S.B.54. **ELECTRONIC STRUCTURE OF TIN OXIDE FILMS**
I.D. Shcherba[1,*], J. Chmura[1], D.P. Uskoković[2], J. Szuber[3], V.N. Uvarov[4], B. Jatcyk[5]
[1]*Institute of Techniques, University of Pedagogy, Krakow, Poland, *Permanent address: Lviv National University by Ivan Franko, Lviv, Ukraine,* [2]*Institute of Technical Sciences of SASA, Belgrade, Serbia & Montenegro,* [3]*Department of Semiconductor Surface Physics, Silesian University of Technology,* [4]*Institute of Metals, NAN Ukraine, Kyiv, Ukraine,* [5]*Lviv Forest & Technology University, Lviv*

P.S.B.55. **UTILLIZATION OF FLY ASH IN DENCE CERAMIC COMPOSITES: ECOTECHNOLOGICAL AND ECONOMICAL BENEFITS**
Z. Baščarević[1], Lj. Petrašinović-Stojkanović[1], M. Komljenović[1], J. Bossert[2]
[1]*Department of Materials Science & Energy Conversion, Center for Multidisciplinary Studies Belgrade University, Belgrade, Serbia and Montenegro*
[2]*Institute of Materials Science & Technology (IMT), Friedrich-Schiller-University Jena, Jena, Germany*

P.S.B.56. **EQUILIBRIUM AND KINETIC STUDIES OF HEAVY METAL IMMOBILISATION BY HYDROXYAPATITE**
I.D. Smičiklas[1], A.E. Onjia[1], S. Raičević[1], Dj. Janaćković[2]
[1]*The "Vinča" Institute of Nuclear Sciences, Belgrade, Serbia and Montenegro*
[2]*Faculty of Technology and Metallurgy, Belgrade*

P.S.B.56.

EQUILIBRIUM AND KINETIC STUDIES OF HEAVY METAL IMMOBILISATION BY HYDROXYAPATITE

I.D. Smičiklas[1], A.E. Onjia[1], S. Raičević[1], Dj. Janaćković[2]
[1]The "Vinča" Institute of Nuclear Sciences, Belgrade, Serbia and Montenegro
[2]Faculty of Technology and Metallurgy, Belgrade

Sorption capacities and kinetics of toxic heavy metals sorption by synthetic, well-characterized, hydroxyapatite (HAP) was studied using the batch technique. Initial concentration of Pb^{2+}, Zn^{2+}, Cd^{2+} and Sr^{2+} solutions, obtained from their nitrate salts, was $2 \cdot 10^{-3}$ mol/dm^3 for kinetic experiments. The effect of initial metal concentration (10^{-4}-10^{-2} mol/dm^3 for Zn^{2+}, Cd^{2+} and Sr^{2+} and 10^{-4}-$5 \cdot 10^{-2}$ mol/dm^3 for Pb^{2+}) on the amounts of retained heavy metals was examined in order to calculate sorption capacities. Initial pH values, in all batches were adjusted to 5.0 ±0.1. Suspensions of HAP and individual metal solutions were equilibrated on a horizontal shaker, at the solid to solution ratio of 1:200, at room temperature (20±1^{o}C). The suspensions were filtrated and analyzed for residual heavy metal concentration, final pH and the amount of Ca^{2+} released into the solution at different time intervals (from 5 minutes up to 2 days) for kinetic and at 24 h for equilibrium studies. Sorption of all examined metals was followed by Ca^{2+} release from crystal lattice of HAP, indicating ion-exchange or dissolution-precipitation mechanisms. The isotherm data were found to be well fitted by linear Langmuir equation. The sorption of Pb^{2+} was found to be the most rapid in respect to other cations (for equilibrium, a contact time of approximately 30 minutes was required for Pb^{2+} and 24 hours for Cd^{2+}, Zn^{2+}, and Sr^{2+}). In order to determine the sorption mechanisms and rate constants, two most widely used kinetics models in sorption processes (pseudo-first and pseudo-second order equations) have been applied to experimental data. According to correlation coefficients and calculated values of equilibrium concentrations, the pseudo-second order model was found to be more appropriate, suggesting that the rate limiting step in heavy metal sorption on HAP involves valence forces through sharing or exchange of electrons between the sorbent and sorbates.