

YUCOMAT 2010

Selected Papers presented at the Twelfth Annual Conference of the
Materials Research Society of Serbia Herceg Novi, Montenegro,
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WARSAW

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MRS-Serbia and YUCOMAT Conferences

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 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 and, similar to other MR societies in the world, the programme was made and objectives determined. 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. Until 2003, Conferences were held every second year and then they grew into Annual Conferences that were traditionally held in Herceg Novi in September of every year. Following the political separation between Serbia and Montenegro, in 2007 Yu-MRS formed two new MRS: MRS-Serbia (official successor of Yu-MRS) and MRS-Montenegro (in founding). In 2008 MRS-Serbia became a member of FEMS (Federation of European Materials Societies).

Preface

The Twelfth Annual YUCOMAT 2010 Conference was held in Herceg Novi, Montenegro between September 6 and September 10, 2010. The Conference was attended by more than 220 participants, representing authors from 36 countries; they presented 228 papers, 23 out of which were invited lectures, 56 oral presentations and 149 posters, within four Plenary Sessions and five one-day Symposia (including five oral and three poster sessions) dedicated to advanced methods in the synthesis and processing of materials, advanced materials for high-technology applications, nanostructured materials, composites and biomaterials.

The invited speakers were:

First Plenary Session

Prof. Richard W. Siegel, *Rensselaer Nanotechnology Center & NSF Nanoscale Science and Engineering Center, Rensselaer Polytechnic Institute, Troy, New York, USA*, “A LOOK AT NANOTECHNOLOGY: PAST, PRESENT, FUTURE”

Prof. Alexander H. King, *AMES Lab, Ames, IA, USA*, “THE IMPACT OF TRIPLE LINES ON MATERIALS SCIENCE AND ENGINEERING”

Prof. Robert Ritchie, *UC Berkeley & LBNL, Department of Materials Science, Berkeley, CA, USA*, “BIO-INSPIRED STRUCTURAL MATERIALS”

Prof. Robert Sinclair, *Materials Science and Engineering, Stanford University, Stanford Nanocharacterization Laboratory, Stanford, CA, USA*, “RECENT ELECTRON MICROSCOPE STUDIES OF GOLD-BASED NANOPARTICLES FOR MEDICAL APPLICATIONS”

Prof. Velimir Radmilović, *National Center for Electron Microscopy, Materials Science Division, Lawrence Berkeley National Laboratory, University of California at Berkeley, Berkeley, CA, USA*, “CONVERGING THEORY AND EXPERIMENT: NUCLEATION OF Li_2 COMPLEX NANOSTRUCTURES”

Second Plenary Session

Prof. Horst Hahn, *Forschungszentrum Karlsruhe, Institut für Nanotechnologie, Karlsruhe, Germany*, “ELECTRONICALLY TUNABLE NANOSTRUCTURES”

Prof. Wolfgang Jäger, *Microanalysis of Materials, Institute for Materials Science, Christian-Albrechts-University Kiel, Kiel, Germany*, “MULTILAYER COATINGS FOR X-RAY OPTICS”

Dr. Martina Luysberg, *Institute of Solid State Research and Ernst Ruska-Centre, Research Centre Jülich, Germany*, “POLAR OXIDE INTERFACES: STRUCTURE AND COMPOSITION ON THE ATOMIC SCALE”

Prof. Andrew Minor, *Department of Materials Science, UC Berkeley & LBNL, Berkeley, CA, USA*, “QUANTITATIVE NANOMECHANICAL TESTING IN A TEM”

Prof. Roger Webb, *Surrey Ion Beam Centre, Faculty of Engineering & Physical Sciences, University of Surrey, UK*, “THE USE OF MeV IONS FOR SECONDARY ION MASS SPECTROMETRY WITH SIMULTANEOUS PIXE AND RBS”

Prof. Leonidas Tsetseris, *National Technical University of Athens, School of Applied Mathematical and Physical Sciences, Greece*, “FIRST-PRINCIPLES STUDIES OF TRADITIONAL AND EMERGING MATERIALS”

Third Plenary Session

Prof. Mamoru Senna, *Faculty of Science and Technology, Keio University, Yokohama, Japan*, “CROSS-LINKING BEHAVIOR IN GELATIN – HYDROXYAPATITE NANOCOMPOSITE”

Dr. Vuk Uskokovic, *Division of Biomaterials and Bioengineering, University of California, San Francisco, CA, USA*, “MIMICKING THE GENESIS OF TOOTH ENAMEL”

Dr. Ai Leen Koh, *Centre for Plasmonics & Metamaterials, Imperial College, London, UK*, “ELECTRON ENERGY-LOSS SPECTROSCOPY (EELS) FOR NANOPLASMONIC APPLICATIONS IN MATERIALS SCIENCE”

Prof. Carolin Körner, *University of Erlangen, Erlangen, Germany*, “TAILORED IMPLANTS BY SELECTIVE ELECTRON BEAM MELTING”

Dr. Uroš Cvelbar, *Plasma Lab F4, Jožef Stefan Institute, Ljubljana, Slovenia*, “PLASMA TAILORED NANOSTRUCTURES AND THEIR ADVANCED APPLICATIONS”

Dr. Thomas Kelly, *CEO of IMAGO, Madison, WI, USA*, “PRESENT STATUS AND IMPORTANT NEW TRENDS IN ATOM PROBE TOMOGRAPHY”

Forth Plenary Session

Prof. Danilo Suvorov, *Advanced Materials Department, Jožef Stefan Institute, Ljubljana, Slovenia*, “FROM HIGH TO LOW PERMITTIVITY GLASS-FREE MATERIALS FOR LTCC TECHNOLOGY”

Prof. Amílcar Labarta, *Departament Física Fonamental, U. Barcelona, Barcelona, Catalonia, Spain*, “RECENT ADVANCES IN MAGNETIC NANOSTRUCTURES”

Prof. Mihály Pósfai, *Department of Earth and Environmental Sciences University of Pannonia, Veszprém, Hungary*, “CHARACTERIZATION OF MAGNETIC NANOCRYSTALS FORMED BY MAGNETOTACTIC BACTERIA”

Prof. Spomenka Kobe, *Institute Jožef Stefan, Department of Nanostructured Materials, Ljubljana, Slovenia*, “BONDED INTERMETALLIC POWDERS FOR THE APPLICATION IN MAGNETIC REFRIGERATION”

Dr. Rick Ubic, *Department of Materials Science & Engineering, Boise State University, Boise, Idaho, USA*, “CRYSTAL STRUCTURE OF APATITE TYPE RARE-EARTH SILICATE $\text{SrLn}_4\text{Si}_3\text{O}_{13}$ ”

Dr. Jae-Ho Jeon, *Korea Institute of Materials Science, Changwon, Korea*, “HYDROTHERMAL SYNTHESIS AND POST HEAT-TREATMENT OF $(\text{K},\text{Na})\text{NbO}_3$ PARTICLES”



Some of the participants of the Twelfth Annual YUCOMAT 2010 Conference,
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Conference participants had the opportunity to enjoy excellent and inspiring presentations giving insight into research activities in leading academic and industrial laboratories world-wide. Many participants openly expressed their satisfaction with the quality and breadth of the presented works. YUCOMAT 2010 also featured an exhibition of innovative scientific equipment.

All of the submitted papers were reviewed by the members of the MRS – Serbia Scientific Committee and the corresponding review team. The 29 papers accepted (out of 65 submitted) for the special issue of *Acta Physica Polonica A* were esteemed sufficiently original and representative to find their place in the record of the Conference. All of them deal with topics within the scope of this journal.

The Editors are grateful to all MRS officers and members of the International Advisory Board for their efforts made in organizing the Conference successfully and selection of the most representative articles. Foreign and domestic reviewers are particularly acknowledged in providing their expertise for the purpose of obtaining an excellent and highly relevant selection of papers presented in this issue.

Unfailing help and enthusiasm of Ms. Aleksandra Stojičić, Secretary of the Conference, is also gratefully appreciated. The Editors would like to acknowledge her technical editing of the conference material before, during and after the Conference.

Dragan P. Uskoković
Slobodan K. Milonjić
Dejan I. Raković
Belgrade, February 2011