

YUCOMAT 2009  
Selected Papers presented  
at the Eleventh Annual Conference  
of the Materials Research Society of Serbia  
Herceg Novi, Montenegro, August 31 — September 4, 2009

*Editors of the Proceedings*

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WARSAW

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## **MRS-Serbia and YUCOMAT Conferences**

Materials science and engineering encompasses acquiring knowledge about the synthesis and processing of materials, their composition and structure, properties and behaviour, functions and potentials, and its application to obtain various final products. Economic prosperity, life quality, and healthy environment are closely related to the improvement of the existing and the development of new materials and processing technologies. These improvements and development can contribute greatly to national priorities: energy saving, environment and health protection, information and communication, infrastructure, transportation, etc.

The First Conference on materials science and engineering, encompassing physics, physical chemistry, condensed matter chemistry, and technology in general, was held in September 1995, in Herceg Novi, Montenegro. An initiative to establish the Yugoslav Materials Research Society was born at the Conference and, after the model of international materials research societies, a 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. The main task and objective of the Society is to encourage creativity in materials research and engineering to reach a harmonious coordination between achievements in this field in our country and analogous activities in the world, with the aim to include national research centres into global international projects. Until 2003, the Conferences were held biannually to grow into an annual event traditionally held in Herceg Novi in September. Following the political separation between Serbia and Montenegro, in 2007, Yu-MRS split into two new materials research societies: 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 Eleventh Annual YUCOMAT 2009 Conference, held in Herceg Novi, Montenegro, between August 31 and September 4, 2009, was attended by about 200 participants, representing authors from 37 countries; they presented 213 papers, out of which 18 were presented as invited lectures, 59 as oral presentations and 136 as posters, within three Plenary Sessions and five one-day Symposia (including six oral and three poster sessions) dedicated to advanced methods in materials synthesis and processing, advanced materials for high-technology applications, nanostructured materials, composites and biomaterials.

The invited speakers were:

### First Plenary Session

- Masahiro Yoshimura (Materials and Structures Laboratory, Tokyo Institute of Technology, Yokohama, Japan) *Soft Processing for Ceramics: Single-Step Fabrication of Nano-Structured Oxide Ceramics (Particles, Films, Integrated Layers and Patterns) from Solution without Firing*
- Alexandra Porter (Imperial College, Department of Materials, London Centre for Nanotechnology, London, UK) *Functionalization Changes Targeting Site and the Stability of Carbon Nanotubes inside Lung Epithelial Cells*
- Robert Hull (Department of Materials Science and Engineering, School of Engineering, Materials Research Center, Rensselaer Polytechnic Institute, Troy, NY, USA) *New Methods in Materials Research Using Focused Ion Beams*
- Davor Pavuna (École Polytech. Fed. de Lausanne, Dept. of Physics, PH (Ecublens), Lausanne, Switzerland) *On Physics and Nanoengineering of High- $T_c$  and Related Oxide Films*
- Danilo Suvorov (Advanced Materials Department, Jožef Stefan Institute, Ljubljana, Slovenia) *Tunable Ceramics Based on the  $Na_{0.5}Bi_{0.5}TiO_3$  System*

### Second Plenary Session

- Jovan Mijovic (New York University, Polytechnic Institute of New York University, Othmer-Jacobs Department of Chemical and Biological Engineering, Brooklyn, NY, USA) *Dynamics of Liquid Crystalline Physical Gels*
- Josè M. Kenny (European Center of Nanostructured Polymers (ECNP) and University of Perugia — UdR INSTM, Loc. Pentima Bassa, Terni, Italy) *Processing and Properties of Advanced Composite Materials with Nacomposite Polymer Matrices*
- Bruno Viana (LCMCP-ENSCP-UMR7574, ENSCP, Paris France) *Materials with Time Control Luminescence in Medical Imaging*
- Maxim Kuznetsov (Head of Laboratory for Synthesis of Functionalized Oxide Materials, Institute of Structural Macrokinetics and Materials Science, Russian Academy of Sciences (ISMAN), Chernogolovka, Moscow region, Russia) *Combustion Synthesis of Complex Oxide Materials: Present State and Perspectives of Development*
- Glenn Hibbard (Department of Materials Science & Engineering, Faculty of Applied Science & Engineering, University of Toronto, Toronto, Ontario, Canada) *Failure Mechanisms in Hybrid Nanocrystalline Cellular Materials*
- Emmanuelle A. Marquis (Royal Society Dorothy Hodgkin Fellow, Department of Materials, University of Oxford, Oxford, U.K.) *Alloy Structures at the Nanoscale by Atom-Probe Tomography*

### Third Plenary Session

- Robert Sinclair (Materials Science and Engineering, Stanford University, Director, Stanford Nanocharacterization Laboratory, Stanford, CA, USA) *Electron Microscopy of Nanoparticles for Cancer Detection*
- Velimir Radmilovic (National Center for Electron Microscopy, Materials Science Division, Lawrence Berkeley National Laboratory, University of California at Berkeley, Berkeley, CA, USA) *Synthesis and Characterization of High-Quality Graphene*

- Nobuhiko Nakano (Department of Electronics and Electrical Engineering, Keio University, Yokohama, Japan) *Multisite Stimulation and Sensing by Custom LSI Chip by CMOS Technology and Microelectrode Array*
- Valeriy Sukharev (Mentor Graphics Corporation, Calibre R&D, San Jose, CA, USA) *Microstructure Effect on EM-Induced Degradations in Dual-Inlaid Copper Interconnects*
- Miroslavna Kovylyna (Departament Física Fonamental, U. Barcelona, Barcelona, Catalonia, Spain) *Magnetoresistance in Positive and Negative Exchange Bias Ni/FeF<sub>2</sub> Bilayered Antidots*
- Rostislav A. Andrievskiy (Institute of Problems of Chemical Physics, Russian Academy of Sciences, Chernogolovka, Moscow Region, Russia) *Superhard and Superplastic Brittle Nanomaterials*
- Antonio Ravaglioli (Director of research at National Council of Research-Institute for Science and Technology for Ceramic Materials ISTECCNR, Faenza (RA), Italy) *Glass-Ceramic Scaffolds for Tissue Engineering*

We are proud to note that we had excellent representation from the leading governmental and academic laboratories all over the world at this conference (see Conference Report: <http://www.mrs-serbia.org.rs/images/MRS-Bulletin-1-2010.pdf>). Owing to breadth of topics covered, the invited, oral and poster presentations were met with interest among Conference participants. The Conference also featured an exhibition of innovative scientific equipment.

All of the submitted papers were reviewed by the members of the Scientific Committee and the corresponding accessory review team. The 33 papers accepted for the special issue of Acta Physica Polonica A journal were esteemed sufficiently original and representative to find their place in the record of the Conference; they are all discussing topics within the scope of this journal. Besides these, another 21 papers presented at the YUCOMAT 2009 Conference were published in the *International Journal of Modern Physics B* (Volume 24, issues 6-7, 2010).

The guest Editors would like to express their warmest Acknowledgments to all MRS-Serbia officers and members of the International Advisory Board for their efforts to organize the Conference successfully, and to perform their duties as Session Chairmen and reviewers. We also acknowledge our profound gratitude to international and domestic reviewers whose expert comments helped Editors select the most original and up-to-date papers.

Unfailing help and enthusiasm of Ms. Aleksandra Stojičić, secretary of the Conference, are also highly appreciated. The Editors would like to thank Aleksandra for the technical editing of the materials before, during and after the Conference.

Dragan P. Uskoković  
Nebojša Romčević  
*Guest Editors*



Participants of the Eleventh Annual YUCOMAT 2009 Conference,  
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