

ARCHIVES of

ISSN 1689-9210

Computational Materials Science and Surface Engineering

2009 • Volume 1 • Issue 3

QUARTERLY



Editor-in-Chief – Prof. Leszek A. Dobrzański

International Scientific Journal published quarterly
by the Association of Computational Materials Science
and Surface Engineering

SCOPE

Computer-aided methods of modelling, simulation and prediction for designing new engineering materials and the technological processes of the manufacturing, processing and forming of their structure and properties in the whole volume and their surface and also the description of phenomena and phase transformations appearing in those materials and also the description of the research results in the field of the materials science and engineering and surface engineering, as well as solutions of real-life problems, in which it is necessary to apply computational materials science and computational surface engineering methodologies for achieving effective results and for solving tasks in materials and surface engineering, industrial management and administration, and technical education in any particular fields from macroscopic to nanoscopic scales (e.g. nanoscience and nanotechnology), including the following subjects:

Engineering materials:

Metallic alloys; Tool materials; Superplastic materials; Ceramics and glasses; Carbon-based materials; Composites; Amorphous materials; Nanostructured materials; Nanocomposite materials and structures; Materials in micromanufacturing and nanomanufacturing; Electronic materials; Multifunctional and smart materials; Bioengineering and biomimetic materials; Materials for artificial organs and tissues; Engineering polymers; Novel applications of materials.

Manufacturing and processing of engineering materials:

Casting; Powder metallurgy; Sintering; Plastic deformation; Heat treatment; Thermo-mechanical treatment; Thermo-chemical treatment; Thin and thick coatings and other methods of surface treatment; Welding; Advanced manufacturing technology; Machining; Laser treatment; Electron beam treatment; Processes for nanomaterials synthesis; Nanomanufacturing and nanotechnology; Micromanufacturing; Electronic packaging technology; Tissue engineering; Quality assessment; Biological and environmental aspects and cleaner production; Industrial management and organisation in the field of materials engineering and surface engineering; Societal and educational implications.

Engineering materials properties:

Ductility and crack-resistance; Fatigue-resistance; Creep-resistance; Fracture mechanics; Mechanical, electrical and magnetic properties; Corrosion-, erosion- and wear-resistance; Non-destructive testing; Reliability assessment; Toxicity; Working properties of materials and products; Methods of research of structure and chemical composition of engineering materials; Electron microscopy; X-ray phase analysis; Materialography and quantitative materialography; Image analysis; Spectroscopic methods; Surface characterisation and metrology.

Methods of analysis and modelling:

Statistical methods; Artificial intelligence methods; Expert systems; Genetic algorithms; Neural networks; Numerical techniques; Process system design; Mould flow analysis; Engineering design; Technological design; Materials design; Modelling of behaviour of materials; Materials and engineering databases; Computer aided materials selection; Computer aided materials design; Computer aided manufacturing; Computer-integrated material processing; Computer-aided learning and teaching.

Only papers positively pre-reviewed by at least two reviewers are published in the Journal.

ARCHIVES of

Computational Materials Science and Surface Engineering

2009 • Volume 1 • Issue 3

QUARTERLY



Editor-in-Chief – Prof. Leszek A. Dobrzański

International Scientific Journal published quarterly
by the Association of Computational Materials Science
and Surface Engineering



Editor-in-Chief

Prof. Leszek A. Dobrzański M. Dr H.C., Silesian University of Technology, Gliwice, POLAND

Deputies Editor-in-Chief

Prof. Mark J. Jackson, Purdue University, West Lafayette, USA

Prof. Yong-Taek Im, Korea Advanced Institute of Science and Technology, Daejeon, REPUBLIC OF KOREA

Prof. Ivars Knets, Riga Technical University, Riga, LATVIA

Prof. Maria H. Robert, University of Campinas, Campinas, BRAZIL

Prof. Ming-Yen Tan, Nanyang Technological University, Singapore, SINGAPORE

Prof. Božo Smoljan, University of Rijeka, Rijeka, CROATIA

Associate Editors

Dr Miroslaw Bonek, Silesian University of Technology, Gliwice, POLAND

Dr Małgorzata Drak, Silesian University of Technology, Gliwice, POLAND

Dr Klaudiusz Golombek, Silesian University of Technology, Gliwice, POLAND

Ms Marzena Kraszewska, MA, Silesian University of Technology, Gliwice, POLAND

Dr Daniel Pakuła, Silesian University of Technology, Gliwice, POLAND

Dr Wojciech Sitek, Silesian University of Technology, Gliwice, POLAND

Editorial Assistance

Ms Justyna Hajduczek, MSc, Silesian University of Technology, Gliwice, POLAND

Ms Marta Górniak, MSc, Silesian University of Technology, Gliwice, POLAND

Mr Paweł Jarka, MSc, Silesian University of Technology, Gliwice, POLAND

Reading Direct

Dr Adam Polok, Silesian University of Technology, Gliwice, POLAND

Dr Marek Sroka, Silesian University of Technology, Gliwice, POLAND

Mr Piotr Zarychta, MSc, Silesian University of Technology, Gliwice, POLAND

Editorial Board Members

Prof. Joze Balic, University of Maribor, Maribor, SLOVENIA

Prof. Dorel Banabic, Technical University of Cluj Napoca, Cluj Napoca, ROMANIA

Prof. Joan Vivancos Calvet, Universitat Politècnica de Catalunya, Barcelona, SPAIN

Prof. Tara Chandra, University of Wollongong, Wollongong, AUSTRALIA

Prof. Antonio Cunha, University of Minho, PORTUGAL

Prof. J. Paulo Davim, University of Aveiro, Aveiro, PORTUGAL

Prof. Edward Dermot Doyle, Swinburne University of Technology, Hawthorn, AUSTRALIA

Prof. Georgy Drapak, Khmelnytsky State University, Khmelnytsky, UKRAINE

Prof. Nikolaos Gouskos, University of Athens, Athens, GREECE

Prof. Janez Grum, University of Ljubljana, Ljubljana, SLOVENIA

Prof. Toshio Haga, Osaka Institute of Technology, Osaka, JAPAN

Prof. Abdel Magid Hamouda, Qatar University, Doha, QATAR

Prof. Stuart Hampshire, University of Limerick, Limerick, IRELAND

Prof. Marek Hetmańczyk, Silesian University of Technology, Katowice, POLAND

Prof. Werner Huffenbach, Technische Universität Dresden, Dresden, GERMANY

Prof. David Hui, University of New Orleans, New Orleans, USA

Prof. Ill-Soo Kim, Mokpo National University, Muan-gun Chonnam, REPUBLIC OF KOREA

Prof. Albert Kneisel, University of Leoben, Leoben, AUSTRIA

Prof. Petr Louda, Technical University of Liberec, Liberec, CZECH REPUBLIC

Prof. Jerzy Nowacki, Szczecin University of Technology, Szczecin, POLAND

Prof. Abraham Atta Ogwu, University of Paisley, Paisley, Scotland, UK

Prof. Zbigniew Rdzawski, Silesian University of Technology, Gliwice, POLAND

Prof. Mario Rosso, Politecnico di Torino, Torino, ITALY

Prof. Jan Sieniawski, Rzeszów University of Technology, Rzeszów, POLAND

Prof. Jorge Antonio Sikora, National University of Mar del Plata, Mar del Plata, ARGENTINA

Prof. Mirko Sokovic, University of Ljubljana, Ljubljana, SLOVENIA

Prof. Antonio Sousa, University of New Brunswick, Fredericton, CANADA

Prof. Józef Suchy, AGH University of Science and Technology, Cracow, POLAND

Prof. Vasco Teixeira, University of Minho, Braga, PORTUGAL

Prof. Miklós Tisza, University of Miskolc, Miskolc-Egyetemváros, HUNGARY

Prof. Boris Tomov Dr H.C., University of Rousse, Rousse, BULGARIA

Prof. Jose M. Torralba Dr H.C., Universidad Carlos III de Madrid, Leganes (Madrid), SPAIN

Prof. Steffen Valder, Universidade Federal de Uberlandia, Uberlandia, BRAZIL

Prof. Algirdas Vaclovas Valiulis, Vilnius Gediminas Technical University, Vilnius, LITHUANIA

Prof. Abdalla Wifi, Cairo University, Giza Cairo, EGYPT

Prof. Leszek Wojnar, Cracow University of Technology, Cracow, POLAND

Prof. Gwomei Wu, Chang Gung University, Taoyuan, ROC TAIWAN

Prof. Kanaka Durga Vara Prasad Yarlagadda, Queensland University of Technology, Brisbane, AUSTRALIA

Prof. Andrzej Zieliński, Gdansk University of Technology, Gdansk, POLAND

Prof. Jozef Zrník, University of West Bohemia, Plzen, CZECH REPUBLIC