

CHEMICAL ENGINEERING JOURNAL

An International Journal of Research and Development

Co- Editors:

Environmental Chemical Engineering:

Professor Laurence Weatherley, University of Kansas, Dept. of Chemical and Petroleum Engineering, 4132 Learned Hall, 1530 W. 15th Street, Lawrence, KS 66045-7609, USA

Professor Marc Deshusses, Dept. of Civil and Environmental Engineering, Duke University, 127 Hudson Hall, Box 90287, Durham, NC 27708-0287, USA

Chemical Reaction Engineering:

Professor Guy B. Marin, Universiteit Gent, Chemical Engineering Department, Laboratory for Chemical Technology, Krijgslaan 281 S5, B-9000 Gent, Belgium

Professor King L. Yeung, Hong Kong University of Science and Technology, Department of Chemical and Biomolecular Engineering, Clear Water Bay, Kowloon, Hong Kong

Materials Synthesis and Processing:

Professor Jesus Santamaria, University of Zaragoza, Dept. of Chemical and Environmental Engineering, 50009 Zaragoza, Spain

Editorial Board:

Prof. B. Andersson, Department of Chemical Reaction Engineering, Göteborg, Sweden

Prof. J.M. Asua, Universidad del Pais Vasco, San Sebastian, Spain

Prof. M.A. Baltanas, Titular DE(UNL), Santa Fe, Argentina

Prof. C. de Bellefon, Director of the Laboratory for Catalytic Process Engineering, Villeurbanne, France

Dr. R. Bredeesen, SINTEF Materials Technology, Oslo, Norway

Prof. L.J. Broadbelt, Northwestern University, Evanston, IL, USA

Prof. D.P.Y. Chang, University of California Davis, Davis, CA, USA

Prof. N.T.S. Chung, National University of Singapore, Singapore

Dr. M. Fan, Georgia Institute of Technology, Atlanta, GA, USA

Prof. P. Forzatti, Politecnico di Milano, Milano, Italy

Prof. V. Hessel, IMM Institut für Mikrotechnik Mainz GmbH, Mainz, Germany

Prof. S. Jenekhe, Seattle, WA, USA

Prof. T. Randall Lee, University of Houston, Houston, TX, USA

Dr. G. Luo, Tsinghua University, Beijing, China

Prof. G. McKay, Hong Kong University of Science and Technology, Hong Kong, China

Prof. M. Menéndez, University of Zaragoza, Zaragoza, Spain

Prof. A. Monzón, University of Zaragoza, Zaragoza, Spain

Prof. I.S. Nam, Pohang University of Science & Technology, Kyungbuk, Korea

Prof. E.B. Nauman, Rensselaer Polytechnic Institute, Troy, NY, USA

Prof. B.C. Pan, Nanjing University, Nanjing, China

Prof. J. Petera, Technical University of Lodz, Lodz, Poland

Prof. A.E. Rodrigues, Univ. of Porto, Porto, Portugal

Prof. A. Seidel-Morgenstern, Max-Planck-Institut fuer Dynamik

Komplexer Technischer Systeme, Magdeburg, Germany

Prof. G. Stevens, Univ. of Melbourne, Melbourne, Australia

Prof. C. Tsouris, Oak Ridge National Laboratory, Oak Ridge, TN, USA

Dr. G. Walker, The Queens University of Belfast, Northern Ireland, UK

Prof. R.A. Williams, University of Leeds, UK

Prof. G. de With, Eindhoven University of Technology, Eindhoven, Netherlands

Prof. C.S. Wu, National Taiwan University, Taipei, Taiwan

Prof. X. Zhang, Dalian University of Technology, Dalian, China

Aims and Scope

The *Chemical Engineering Journal* provides an international forum for the presentation of original research, interpretative reviews and discussion of new development in chemical engineering. Papers which describe novel theory and its application to practice are welcome, as are those which illustrate the transfer of techniques from other disciplines. Reports of carefully executed experimental work, which is soundly interpreted are also welcome.

Within the Chemical Engineering Journal, the *Environmental Chemical Engineering* section presents papers dealing with topics in environmental chemical and process engineering. Treatment processes, environmental process control and measurement and clean process technology are covered, and papers in which knowledge from other disciplines is integrated with chemical engineering are especially welcome.

Within the Chemical Engineering Journal, the *Chemical Reaction Engineering* section presents papers on a wide range of topics including reaction kinetics, applied catalysis, simulation and optimization of different types of reactors, unsteady-state reactors, multiphase reactors, and fundamental investigations of the processes of heat, mass and momentum transfer that take place along with chemical reaction. Research works addressing critical areas of reactor engineering (e.g. reactor materials, control strategies, reactor safety and environmental issues), and emerging reactor technologies (e.g. membrane reactors, chromatographic reactors, unconventional fluidized beds, electrochemical reactors, micro-reactors, etc.) are particularly welcome.

Within the Chemical Engineering Journal, the *Materials Synthesis and Processing* section presents papers dealing with different aspects of the preparation and characterization of advanced materials. Novel physical and chemical methods of synthesis will be covered, as well as the processes used to obtain materials of different morphologies (particles, films, fibers), and to modify their surface and structural properties, always from a chemical engineering point of view. Manuscripts dealing with micro- and nano-structured materials, and those describing the preparation of composite and hybrid materials with advanced properties are especially welcome.

Publication information: *Chemical Engineering Journal* (ISSN 1385-8947). For 2009, volume(s) 145–154 are scheduled for publication. Subscription prices are available upon request from the Publisher or from the Regional Sales office nearest you or from this journal's website (<http://www.elsevier.com/locate/cej>). Further information is available on this journal and other Elsevier products through Elsevier's website: (<http://www.elsevier.com>). Subscriptions are accepted on a prepaid basis only and are entered on a calendar year basis. Issues are sent by standard mail (surface within Europe, air delivery outside Europe). Priority rates are available upon request. Claims for missing issues should be made within six months of the date of dispatch.

USA mailing notice: – *Chemical Engineering Journal* (ISSN 1385–8947) is published semi-monthly with the exception of March June and September by Elsevier B.V. (P.O. Box 211, 1000 AE Amsterdam, The Netherlands.) Periodical postage paid at Rahway NJ and additional mailing offices.

USA POSTMASTER: Send change of address: *Chemical Engineering Journal*, Elsevier, Customer Service Department, 11830 Westline Industrial Drive, St. Louis, MO 63146, USA.

AIRFREIGHT AND MAILING in USA by Mercury International Limited, 365, Blair Road, Avenel, NJ 07001.

Orders, claims, and journal enquiries: please contact the Regional Sales Office nearest you:

St. Louis: Elsevier, Customer Service Department, 11830 Westline Industrial Drive, St. Louis, MO 63146, USA; phone: (877) 8397126 [toll free within the USA]; (+1) (314) 4537076 [outside the USA]; fax: (+1) (314) 5235153; e-mail: JournalCustomerService-usa@elsevier.com

Amsterdam: Elsevier, Customer Service Department, PO Box 211, 1000 AE Amsterdam, The Netherlands; phone: (+31) (20) 4853757; fax: (+31) (20) 4853432; e-mail: JournalsCustomerServiceEMEA@elsevier.com

Tokyo: Elsevier, Customer Service Department, 4F Higashi-Azabu, 1-Chome Bldg, 1-9-15 Higashi-Azabu, Minato-ku, Tokyo 106-0044, Japan; phone: (+81) (3) 5561 5037; fax: (+81) (3) 5561 5047; e-mail: JournalsCustomerServiceJapan@elsevier.com

Singapore: Elsevier, Customer Service Department, 3 Killiney Road, #08-01 Winsland House I, Singapore 239519; phone: (+65) 63490222; fax: (+65) 67331510; e-mail: JournalsCustomerServiceAPAC@elsevier.com

Advertising Information

Advertising orders and enquiries can be sent to: James Kenney, Elsevier Ltd., 32 Jamestown Road, London NW1 7BY, UK; phone: (+44) 207 424 4216; fax: (+44) 1865 853 136; e-mail: j.kenney@elsevier.com. Customers in the US and Canada can also contact: Mr Tino DeCarlo, Advertising Department, Elsevier Inc., 360 Park Avenue South, New York, NY 10010-1710, USA; phone: (+1) (212) 633 3815; fax: (+1) (212) 633 3820; e-mail: t.decarlo@elsevier.com

Funding body agreements and policies

Elsevier has established agreements and developed policies to allow authors whose articles appear in journals published by Elsevier, to comply with potential manuscript archiving requirements as specified as conditions of their grant awards. To learn more about existing agreements and policies please visit <http://www.elsevier.com/fundingbodies>

⊗ The paper used in this publications meets the requirements of ANSI/ NISOZ39.48-1992 (Permanence of Paper) .

Printed by GPN International bv, Meppel, The Netherlands