

PURE AND APPLIED CHEMISTRY

IUPAC PRESIDENT *Natalia Tarasova* (Russia)

VICE PRESIDENT *Qi-Feng Zhou* (China/Beijing)

PAST PRESIDENT *Mark Cesa* (USA)

SECRETARY GENERAL *Richard Hartshorn* (New Zealand)

TREASURER *Colin Humphris* (UK)

COMMITTEE ON PUBLICATIONS AND CHEMINFORMATICS DATA STANDARDS (CPCDS)

Bonnie Lawlor (USA, chair); *James Liu* (USA, secretary); *Hugh Burrows* (Portugal; ex officio); *Jeremy Frey* (UK); *Kazuhiro Hayashi* (Japan); *Lene Hviid* (Netherlands); *Wolfram Koch* (Germany); *Bono Lučić* (Croatia); *Lea McEwen* (USA); *Carmen Nitsche* (USA)

EDITORIAL ADVISORY BOARD (2014)

Colin Humphris (UK, IUPAC Acting Secretary General, Acting Chair)

David StC Black (Australia)

Bryan R. Henry (Canada)

Jung-Il Jin (Korea)

Nicole Moreau (France)

Leiv Sydnes (Norway)

Kazuyuki Tatsumi (Japan)

Mitsuo Sawamoto (Japan), Polymer

Nelson Torto (South Africa), Analytical Chemistry

Laura L. McConnell (USA), Chemistry and the Environment

Thomas J. Perun (USA), Chemistry and Human Health

Alan T. Hutton (South Africa), Chemical Nomenclature and Structure Representation

EX OFFICIO MEMBERS

Bonnie Lawlor (USA), Committee on Publications and Cheminformatics Data Standards, chair

Ron D. Weir (Canada), Interdivisional Committee on Terminology, Nomenclature and Symbols, chair

Hugh D. Burrows (Portugal), PAC Scientific Editor

IUPAC DIVISION REPRESENTATIVES

Roberto Marquardt (France), Physical and Biophysical Chemistry

Jan Reedijk (Netherlands), Inorganic Chemistry

Krishna N. Ganesh (India), Organic and Biomolecular Chemistry

ABSTRACTED/INDEXED IN CABI: CAB Abstracts; Global Health • Chemical Abstracts Service (CAS): SciFinder • Celdes • CNPIEC • EBSCO Discovery Service • EBSCOhost (relevant databases) • Gale/Cengage • Google Scholar • J-Gate • Naviga (Softweco) • Primo Central (ExLibris) • ProQuest (relevant databases) • Summon (Serials Solutions/ProQuest) • Swets • TDOne (TDNet) • Thomson Reuters: Current Contents/Physical, Chemical and Earth Sciences; Journal Citation Reports/Science Edition; Science Citation Index; Science Citation Index Expanded • WorldCat (OCLC)

ISSN 0033-4545 · e-ISSN 1365-3075

All information regarding notes for contributors, subscriptions, Open access, back volumes and orders is available online at www.degruyter.com/pac

SCIENTIFIC EDITOR, CONFERENCE AND SPECIAL TOPIC PAPERS Prof. Hugh D. Burrows, Department of Chemistry, University of Coimbra, Coimbra, Portugal, Email: burrows@ci.uc.pt

EDITORS, IUPAC RECOMMENDATIONS AND TECHNICAL REPORTS Prof. Dr. Ron D. Weir, Department of Chemistry and Chemical Engineering, Royal Military College of Canada, Kingston, Ontario, Canada, Email: weir-r@rmc.ca

Prof. Dr. Jürgen Stohner, Department of Life Sciences and Facility Management, Institute of Chemistry and Biological Chemistry, Zurich University of Applied Sciences, Wädenswil, Switzerland, Email: juergen.stohner@zhaw.ch

IUPAC SECRETARIAT PO Box 13757, Research Triangle Park, NC 27709-3757, USA; Tel.: +1 919-485-8700; Fax: +1 919-485-8706, Email: secretariat@iupac.org; Web site: www.iupac.org

JOURNAL MANAGER Joshua Gannon, De Gruyter, 125 Pearl St Boston, MA 02110, USA, Tel.: +1 857-284-7073-103, Fax: +1 857-284-7358, Email: joshua.gannon@degruyter.com

RESPONSIBLE FOR ADVERTISEMENTS Claudia Neumann, De Gruyter, Genthiner Straße 13, 10785 Berlin, Germany, Tel.: +49 (0)30 260 05 – 226, Fax: +49 (0)30 260 05 – 264, E-Mail: anzeigen@degruyter.com

© 2016 Walter de Gruyter GmbH, Berlin/Boston

TYPESETTING Compuscript Ltd., Shannon, Ireland

PRINTING Franz X. Stücker Druck und Verlag e.K., Ettenheim



Printed in Germany

Offenlegung der Inhaber und Beteiligungsverhältnisse gem. § 7a Abs. 1 Ziff. 1, Abs. 2 Ziff. 3 des Berliner Pressegesetzes: Die Gesellschafter der Walter de Gruyter GmbH sind: Clara Cram Stiftung, Berlin; Cram, Gisela, Rentnerin, Berlin; Cram, Dr. Georg-Martin, Unternehmens-Systemberater, Stadtbergen; Cram, Maike, Berlin; Cram, Jens, Mannheim; Cram-Heydrich, Ingrid, Betriebsleiterin, Tuxpan / Michoacan (Mexiko); Cram-Heydrich, Sabina, Mexico, DF (Mexiko); Cram, Silke, Wissenschaftlerin, Mexico DF (Mexiko); Cram, Björn, Aachen; Cram, Ella Anita, Rentnerin, Berlin; Cram, Berit, Greifswald; Cram-Gomez, Susanne, Mexico DF (Mexiko); Cram-Heydrich, Walter, Mexico DF (Mexiko); Cram-Heydrich, Kurt, Angestellter, Mexico DF (Mexiko); Duvenbeck, Brigitta, Oberstudienrätin i.R., Bad Homburg; Gädeke, Gudula, M.A., Atemtherapeutin/Lehrerin, Tübingen; Gädeke, Martin, Einzelunternehmer, Würzburg; Lubasch, Dr. Annette, Ärztin, Berlin; Schütz, Dr. Christa, Ärztin, Mannheim; Schütz, Sonja, Berlin; Schütz, Julianne, Berlin; Schütz, Antje, Berlin; Schütz, Valentin, Berlin; Seils, Dorothee, Apothekerin, Stuttgart; Seils, Gabriele, Journalistin, Berlin; Seils, Dr. Clara-Eugenie, Oberstudienrätin i.R., Reppenstedt; Seils, Christoph, Journalist, Berlin; Siebert, John-Walter, Pfarrer, Oberstenfeld; Walter de Gruyter Stiftung, Berlin.

Contents

Conference Editorial

Liliana Mammino

5th International IUPAC Conference on Green Chemistry (5th ICGC) — 1

Conference papers

Fabio Aricò and Pietro Tundo

Mustard carbonate analogues — 3

Egid B. Mubofu

From cashew nut shell wastes to high value chemicals — 17

Vânia G. Zuin

Green sample preparation of complex matrices: towards sustainable separations of organic compounds based on the biorefinery concept — 29

Natalia P. Tarasova, Anna S. Makarova and Faina I. Ingel

Systemic approach to the development of green chemistry — 37

Khang Wei Tan, Siah Ying Tang, Renjan Thomas, Neela Vasanthakumari and Sivakumar Manickam

Curcumin-loaded sterically stabilized nanodispersion based on non-ionic colloidal system induced by ultrasound and solvent diffusion-evaporation — 43

Precious Nokwethemba Sibiyi, Thokozani Xaba and Makwena Justice Moloto

Green synthetic approach for starch capped silver nanoparticles and their antibacterial activity — 61

Sneha Mohan, Oluwatobi S. Oluwafemi, Sandile P. Songca, Didier Rouxel, Patrice Miska, Francis B. Lewu, Nandakumar Kalarikkal and Sabu Thomas

Completely green synthesis of silver nanoparticle decorated MWCNT and its antibacterial and catalytic properties — 71

Robert L. Mnisi, Peter P. Ndibewu and Ntebogeng S. Mokgalaka

Green Chemistry in action: towards sustainable production of Gold nanoparticles — 83

Invited papers

Frédéric A. Perras

Quantitative structure parameters from the NMR spectroscopy of quadrupolar nuclei — 95

Zhibin Yang

High performance fiber-shaped solar cells — 113

Keary M. Engle

The mechanism of palladium(II)-mediated C–H cleavage with mono-*N*-protected amino acid (MPAA) ligands: origins of rate acceleration — 119

IUPAC Technical Reports

Paul J. Karol, Robert C. Barber, Bradley M. Sherrill, Emanuele Vardaci and Toshimitsu Yamazaki

Discovery of the elements with atomic numbers $Z = 113, 115$ and 117 (IUPAC Technical Report) — 139

Paul J. Karol, Robert C. Barber, Bradley M. Sherrill, Emanuele Vardaci and Toshimitsu Yamazaki

Discovery of the element with atomic number $Z = 118$ completing the 7th row of the periodic table (IUPAC Technical Report) — 155