Chem Soc Rev

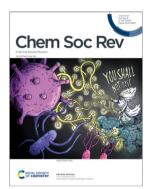
Chemical Society Reviews

rsc.li/chem-soc-rev

The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

IN THIS ISSUE

ISSN 0306-0012 CODEN CSRVBR 52(8) 2547-2868 (2023)



Cover

See Laura Hartmann et al., pp. 2617–2642. Image reproduced by permission of Laura Hartmann from Chem. Soc. Rev., 2023, 52, 2617. Illustration: Marvin Dörrie. Art Direction: Stefan Lüdemann.



Inside cover

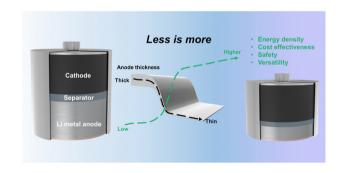
See Wei Luo, Yunhui Huang et al., pp. 2553–2572. Image reproduced by permission of Michael Tompsett, Wangyan Wu, Wei Luo and Yunhui Huang from Chem. Soc. Rev., 2023, 52, 2553. Image credit: Yiming Dai/Tongji University. Periodic Table by Michael Tompsett.

TUTORIAL REVIEWS

2553

Less is more: a perspective on thinning lithium metal towards high-energy-density rechargeable lithium batteries

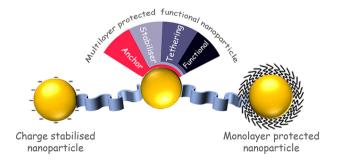
Wangyan Wu, Wei Luo* and Yunhui Huang*



2573

Surface functionalization of inorganic nanoparticles with ligands: a necessary step for their utility

Kaustav Bhattacharjee and Bhagavatula L. V. Prasad*



Editorial Staff

Executive Editor

Richard Kelly

Deputy Editor

Harriet Riley

Editorial Production Manager Helen Saxton

Development Editor

Danny Andrews, Ershad Abubacker

Senior Publishing Editor

Kirstine Anderson, Matthew Bown, Laura Cooper, Hannah Fielding, Clare Fitzgerald, Anoushka Handa, Claire Harding, Alan Holder, Charlie Palmer, Rosie Rothwell, Donna Smith, Laura Smith

Editorial Assistant

Iade Holliday

Publishing Assistant

Natalie Ford

For queries about submitted papers, please contact Helen Saxton, Editorial Production Manager, in the first instance, E-mail: chemsocrev@rsc.org

For pre-submission queries, please contact Richard Kelly, Executive Editor. E-mail: chemsocrev-rsc@rsc.org

Chemical Society Reviews (print: ISSN 0306-0012; electronic: ISSN 1460-4744) is published 24 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to the Royal Society of Chemistry Order Department, Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK Tel +44 (0)1223 432398; E-mail orders@rsc.org

2023 Annual (electronic) subscription price: £1,259; US\$1997. Customers in Canada will be subject to a surcharge to cover GST. Customers in the EU subscribing to the electronic version only will be charged VAT.

If you take an institutional subscription to any Royal Society of Chemistry journal you are entitled to free, site-wide web access to that journal. You can arrange access via Internet Protocol (IP) address at www.rsc.org/ip

Customers should make payments by cheque in sterling payable on a UK clearing bank or in US dollars payable on a US clearing bank.

Whilst this material has been produced with all due care, the Royal Society of Chemistry cannot be held responsible or liable for its accuracy and completeness, nor for any consequences arising from any errors or the use of the information contained in this publication. The publication of advertisements does not constitute any endorsement by the Royal Society of Chemistry or Authors of any products advertised. The views and opinions advanced by contributors do not necessarily reflect those of the Royal Society of Chemistry which shall not be liable for any resulting loss or damage arising as a result of reliance upon this material. The Royal Society of Chemistry is a charity, registered in England and Wales, Number 207890, and a company incorporated in England by Royal Charter (Registered No. RC000524), registered office: Burlington House, Piccadilly, London W1J 0BA, UK, Telephone: +44 (0) 207 4378 6556.

Advertisement sales:

Tel +44 (0) 1223 432246; Fax +44 (0) 1223 426017; E-mail advertising@rsc.org

For marketing opportunities relating to this journal, contact marketing@rsc.org

Chem Soc Rev

Chemical Society Reviews

rsc.li/chem-soc-rev

Chemical Society Reviews publishes accessible, succinct and reader-friendly articles on topics of current interest in the chemical sciences. The promotion of international and multidisciplinary awareness and cooperation is particularly encouraged. Chemical Society Reviews publishes three article types: tutorial reviews, which present an accessible introduction to the topic; review articles, which provide a deeper evaluation of the current literature; and Viewpoints, which are short, opinion-based articles

Editorial Board

Jennifer Love, University of Calgary

Associate Editors

Xian-He Bu Nankai University of China Louise Berben, University of California Davis Rebecca Goss, University of St Andrews Giulia Grancini, University of Pavia Zhong-Qun Tian, Xiamen University

Members

Osamu Ishitani. Tokyo Institute of Technology Raghaven Sunoi, IIT Bombay Tatiana Parac-Vogt, KU Leuven

Advisory Board

Ryu Abe, Kyoto University Dave Adams, University of Glasgow David Amabilino, Institute of Materials Science Jinghong Li, Tsinghua University of Barcelona Ruchi Anand, IIT Bombay

Ivan Aprahamian, Dartmouth College Parisa A. Ariya, McGill University Tom Baker, University of Ottawa Thomas Bennett, University of Cambridge Gonçalo Bernardes, Cambridge University Barry Blight, New Brunswick

Anne-Marie Caminade, University of Toulouse Araceli Campaña, University of Granada Rui Cao, Shaanxi Normal University Hong Chen, Soochow University Yong Cui, Shanghai Jiao Tong University Abhishek Dey, IACS

Huw Davies, Emory University Wim Dehaen, Catholic University of Leuven William Dichtel, Northwestern University Yves Dufrêne, Université catholique de Louvain Brenno Neto, Brasilia Antonio Echavarren, Institute of Chemical Research of Catalonia

Elena Fernández, Universitat Rovira i Virgili Miriam Freedman, Pennsylvania State University

Philip A. Gale, The University of Sydney Debashree Ghosh TACS Duncan Graham, University of Strathclyde Stefan Grimme, Universität Bonn Frances Houle, Joint Centre for Artificial

Ashlee Howarth, Concordia University Feihe Huang, Zhejiang University Masako Kato, Kwansei Gakuin University Jong Seung Kim, Korea University Rafal Klain, Weizmann Institute of Science Daniele Leonori, RWTH Aachen University Chao-Jun Li McGill University Yan Li. Peking University Zhuang Liu, Peking University Norberto Peporine Lopes, CEMMO Bettina Lotsch, Max Planck Institute for Solid State Research

Connie Lu, University of Minnesota Cara Lubner, NREL Rafael Luque, Cordoba University Uday Maitra, Indian Institute of Science Nazario Martín, Complutense University of

Feliu Maseras, Institute of Chemical Research

of Catalonia Fiona Meldrum, University of Leeds Jonannes Messinger, Uppsala University

Gugu Mhlongo, CSIR Simona Mura, Institut Galien Paris-Saclay

Tebello Nyokong, Rhodes University Martin Oestreich, Technische Universität

Elisa Orth, Federal University of Paraná Mario Pagliaro, National Research Council

Atul Parikh, University of California Davis Kanyi Pu, Nanyang Technological University Eric Rivard, University of Alberta Gregory Robinson, University of Georgia Peter Roesky, Karlsruhe Institute of Technology

Ashley Ross, University of Cincinnati Vincent Rotello, University of Massachusetts

Paolo Samori, University of Strasbourg

D D Sarma HSc

Clément Sanchez Pierre and Marie Curie University Hélder A. Santos, University of Helsinki Jennifer Schaefer, Notre Dame

. Wendy Shaw, PNNL Injae Shin, Yonsei University David Spring, University of Cambridge Andrew Steckl, University of Cincinnati

Samuel Stupp, Northwestern University Iin Suntivich, Cornell Kana Sureshan, IISER Thiruvananthapuram Micheal Tam, University of Waterloo Andrea Trabocchi, University of Florence

James Tucker, University of Birmingham Leyong Wang, Nanjing University Peng Wang, Changchun Institute of Applied Chemistry Bert Weckhuysen, Utrecht University

Helma Wennemers, ETH Zurich Stephen Withers, University of British Columbia

Yujie Xiong, University of Science and Technology of China Makoto Yamashita, Nagoya University Juyoung Yoon, Ewha Womans University

Shuli You, Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences

Guihua Yu, University of Texas at Austin Claudio Zannoni, University of Bologna Haoli Zhang, Lanzhou University Qiang Zhang, Tshinghua University Yong Zhang, NUS Yiping Zhao, University of Georgia Hongli Zhu, Northeastern University

Information for Authors

Full details on how to submit material for publication in Chem Soc Rev are given in the Instructions for Authors (available from http://www.rsc.org/authors). Submissions should be made via the journal's homepage: rsc.li/chem-soc-rev

The Editorial board typically commission articles that encourage international, interdisciplinary progress in chemical research. The board welcomes proposals for new tutorial reviews or review articles. Please contact the Editorial office for further details (chemsocrev-rsc@rsc.org). Additional details are available from the Editorial office or http://www.rsc.org/authors

Authors may reproduce/republish portions of their published contribution without seeking permission from the Royal Society of Chemistry, provided that any such republication is accompanied by an acknowledgement in the form; (Original Citation)-Reproduced by permission of the Royal Society of Chemistry.

This journal is @ The Royal Society of Chemistry 2023.

Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988 and the Copyright and Related Rights Regulation 2003, this publication may only be reproduced, stored or transmitted, in any form or by any means, with the prior permission in writing of the Publishers or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency in the UK. US copyright law is applicable to users in the USA.

@ The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

Registered charity number: 207890



TUTORIAL REVIEWS

2596

Pore confined time-of-flight secondary ion electrochemical mass spectrometry

Jun-Gang Wang, Ru-Jia Yu,* Xin Hua and Yi-Tao Long*

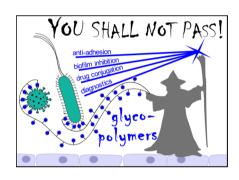


REVIEW ARTICLES

2617

Glycopolymers against pathogen infection

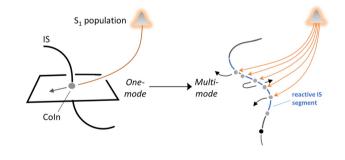
Ulla I. M. Gerling-Driessen, Miriam Hoffmann, Stephan Schmidt, Nicole L. Snyder and Laura Hartmann*



2643

From a one-mode to a multi-mode understanding of conical intersection mediated ultrafast organic photochemical reactions

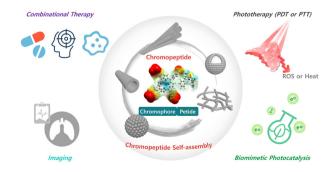
Yorrick Boeije* and Massimo Olivucci*



2688

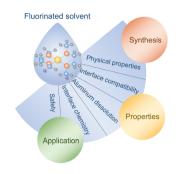
Functional chromopeptide nanoarchitectonics: molecular design, self-assembly and biological applications

Rui Chang, Luyang Zhao, Ruirui Xing,* Junbai Li* and Xuehai Yan*



REVIEW ARTICLES

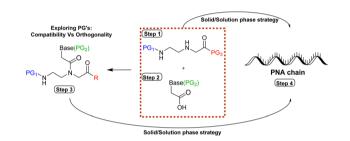
2713



Emerging electrolytes with fluorinated solvents for rechargeable lithium-based batteries

Yuankun Wang, Zhiming Li, Yunpeng Hou, Zhimeng Hao, Qiu Zhang, Youxuan Ni, Yong Lu, Zhenhua Yan, Kai Zhang, Qing Zhao, Fujun Li and Jun Chen*

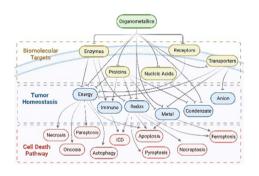
2764



The challenge of peptide nucleic acid synthesis

K. P. Nandhini, Danah Al Shaer, Fernando Albericio* and Beatriz G. de la Torre*

2790



Organometallic anti-tumor agents: targeting from biomolecules to dynamic bioprocesses

Kun Peng, Yue Zheng, Wei Xia* and Zong-Wan Mao*

2833



Emerging metallenes: synthesis strategies, biological effects and biomedical applications

Chenxin Lu, Ruoyao Li, Zhaohua Miao,* Fei Wang* and Zhengbao Zha*