Reaction Chemistry & Engineering

Bridging the gap between chemistry and chemical engineering rsc.li/reaction-engineering

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 2058-9883 CODEN RCEEBW 8(4) 737-944 (2023)



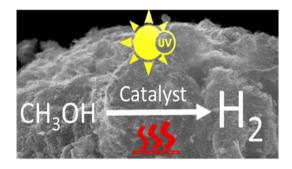
See Shujun Peng, Jian Xue et al., pp. 770-777. Image reproduced by permission of Shujun Peng & Jian Xue from React. Chem. Eng., 2023, 8, 770.

PERSPECTIVE

746

Case analysis and future aspects of photo/ thermocatalytic hydrogen production from methanol

Murat Efgan Kibar,* Lina Hilal and Brahim Ben Abdeljelil

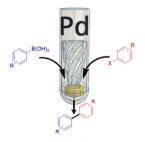


COMMUNICATIONS

752

3D printed tetrakis(triphenylphosphine)palladium (0) impregnated stirrer devices for Suzuki-Miyaura cross-coupling reactions

Matthew R. Penny, Zenobia X. Rao, Rumintha Thavarajah, Ahtsham Ishaq, Benjamin J. Bowles and Stephen T. Hilton*



Palladium Catalysis

Editorial Staff

Executive Editor

Maria Southall

Deputy Editor

Bianca Provost

Editorial Production Manager

Emily Skinner

Assistant Editors

Sean Browner, Molly Colgate, Paul Scott, Alison Winder

Editorial Assistant

Basita Javeed

Publishing Assistant Allison Holloway

Dublishor

Sam Keltie

For queries about submitted papers, please contact Emily Skinner, Editorial Production Manager in the first instance. E-mail: reactionchemeng@rsc.org

For pre-submission queries please contact Maria Southall, Executive Editor. E-mail: reactionchemeng-rsc@rsc.org

Reaction Chemistry & Engineering (electronic: ISSN 2058-9883) is published 12 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, CR4 OWF LIK

Tel +44 (0)1223 432398; E-mail: orders@rsc.org

2023 Annual (electronic) subscription price: £2584; \$4262. 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.rscorq/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,

Advertisement sales:

Tel +44 (0) 1223 432246; Fax +44 (0) 1223 426017;

E-mail: advertising@rsc.org

Telephone: +44 (0) 207 4378 6556.

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

Reaction Chemistry & Engineering

rsc.li/reaction-engineering

Bridging the gap between chemistry and chemical engineering

Editorial Board

Editor-in-Chief

Klavs F Jensen, Massachusetts Institute of Technology, USA

Associate Editors

Ian R Baxendale, Durham University, UK Richard Bourne, University of Leeds, UK Saif A Khan, National University of Singapore, Singapore

Francesca Paradisi, University of Bern, Switzerland Laura Torrente, University of Cambridge, UK Haihui Wang, Tsinghua University, China Memhers

Shane Grosser, Merck, USA Petra de Jongh, Utrecht University, Netherlands Heather Kulik, Massachusetts Institute of Technology. USA

Anita Maguire, University College Cork, Ireland Megan Smyth, Almac Sciences

Advisory Board

Malcolm Berry, MB Chemistry Consulting Ltd., UK Claude de Bellefon, University of Lyon, France Donna G Blackmond, Scripps Research Institute,

Wayne Blaylock, Dow Chemical Company, USA Cara Brocklehurst, Novartis AG, Switzerland Jian-Feng Chen, Beijing University of Chemical Technology, China

Ya-Huei Chin, University of Toronto, Canada Evelina Colacino, University of Montpellier, France Avelino Corma, Polytechnical University of Valencia, Spain

Anna Croft, University of Nottingham, UK Paul Dauenhauer, University of Minnesota, USA Stevan Djuric, Abbvie, USA

Raj Gounder, Purdue University, USA Raju Kumar Gupta, Indian Institute of Technology Kanpur, India

Dorota Gryko, Polish Academy of Sciences, Poland Ryan Hartman, New York University, USA Joel M Hawkins, Pfizer Worldwide R&D, USA Ive Hermans, University of Wisconsin- Madison,

Volker Hessel, University of Adelaide, Australia Lin Huang, Trunk & Petal Pte Ltd., Singapore Marty Johnson, Eli Lilly, USA Oliver Kappe, University of Graz, Austria Alexander Katz, University of California, Berkeley,

Francesca Kerton, Memorial University, Canada Beata Kilos-Réaume, Dow, USA Dong Pyo Kim, POSTECH, Republic of Korea Shu Kobayashi, University of Tokyo, Japan Amol Kulkarni, National Chemical Research Laboratory, India

Alexei Lapkin, University of Cambridge, UK Hélène Lebel, University of Montreal, Canada Angeliki Lemonidou, Aristotle University of Thessaloniki, Greece

Guangsheng Luo, Tsinghua University, China Haresh Manyar, Queen's University Belfast, UK Rebecca Meadows, AstraZeneca, UK Massimo Morbidelli, Milano Politecnico, Italy Timothy Noël, University of Amsterdam, Netherlands

Matthew O'Brian, Keele University, UK Tatsuya Okubo, University of Tokyo, Japan Polona Žnidaršič Plazl, University of Ljubljana, Slovenia

Anastasios Polyzos, University of Melbourne, Australia Jeffrey Rimer, University of Houston. USA Rebecca Ruck, Merck & Co. Inc., Kenilworth, NJ, USA

Andrew Rutter, GlaxoSmithKline, UK Basu Saha, Lancaster Univeristy, UK Susannah Scott, UC Santa Barbara, USA Doris Segets, University of Duisburg-Essen, Germany

Manish Sharma, BASF, USA Jay Siegel, Tianjin University, China Ning Sun, Lawrence Berkeley National Laboratory, USA

Annette Taylor, University of Sheffield, UK Enrico Tronconi, University of Milan, Italy Veronique Van Speybroeck, Ghent University, Relgium

Dionisios G Vlachos, University of Delaware, USA Siegfried Waldvogel, Johannes Gutenberg Universität Mainz, Germany Robin White, Luxembourg Institute for Science & Technology, Luxembourg Karen Wilson, RMIT University, Australia

Karen Wilson, RMIT University, Australia Sheryl L. Wiskur, University of South Carolina, USA Wen-De Xiao, Shanghai Jiao Tong University, China

Zhen Yao, Zhejiang University, China

Information for Authors

Full details on how to submit material for publication in Reaction Chemistry & Engineering 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/reaction-engineering, Submissions: The journal welcomes submissions of manuscripts for publication as Review Articles and Minireviews. Full Papers and Communications should describe original work of high quality and impact.

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.

Registered charity number: 207890

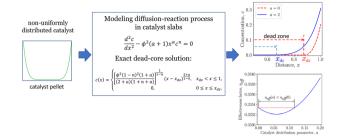


COMMUNICATIONS

758

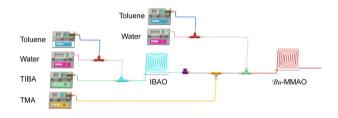
Dead-core solutions and critical Thiele modulus for slabs with a distributed catalyst and external mass transfer

Piotr Skrzypacz, Bek Kabduali, Boris Golman* and Vsevolod Andreev



A two-stage flow strategy for the synthesis of isobutyl-modified methylaluminoxane

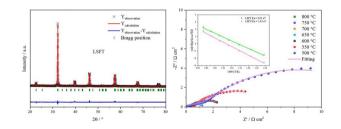
Mengbo Zhang, Linjin Lou, Yirong Feng, Yuting Zheng, Haomiao Zhang,* Jingdai Wang and Yongrong Yang



PAPERS

Tantalum doped $La_{0.6}Sr_{0.4}FeO_{3-\delta}$ electrodes for symmetrical proton conducting solid oxide fuel cells

Shujun Peng,* Zongjie Yin and Jian Xue*



Iridium-aluminium trichloride co-catalysed hydroformylation-acetalization of olefins with H₂O as the hydrogen source

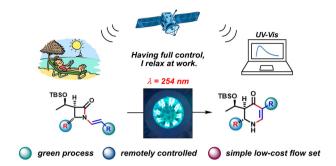
Huan Liu, Yi-Xuan Yao, Hong-Yan Shang, Da Yang* and Yuan-Yu Tian*

$$R \longrightarrow + R'OH \xrightarrow{[Ir]/PPh_3/AICI_3} Q'^{R'} + Q'^{R'} + Q'^{R'}$$

-water as hydrogen source -total yield of acetals 5% ~ 85%

-catalytic amount of Lewis acid -less than 3% of hydrogenation by-products

784



Remotely controlled flow photo-Fries-type rearrangement of N-vinylazetidinones: an efficient route to structurally diverse 2,3-dihydro-4pyridones

Magdalena Dolna, Jakub Narodowiec, Olga Staszewska-Krajewska, Piotr Szcześniak* and Bartłomiej Furman*

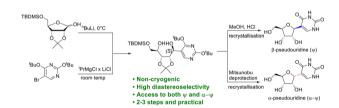
790



Diverse continuous photooxygenation reactions of (+) and (-)- α -pinenes to the corresponding pinocarvones or trans-pinocarveols

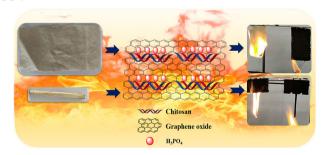
Gabriel H. S. Rosa, Thiago I. S. Santos, Timothy J. Brocksom and Kleber T. de Oliveira*

798



An improved stereodivergent and practical synthesis of α - and β -pseudouridines

Viktor Barát, Angi Chen and Yee Hwee Lim*



Phosphorus grafted chitosan functionalized graphene oxide-based nanocomposite as a novel flame-retardant material for textile and wood

Akhil V. Nakhate,* Dattatray A. Pethsangave, Ganapati D. Yadav,* Surajit Some* and Pradip V. Tekade

815

Phosphotungstic acid catalysed bioethylene synthesis under industrially relevant conditions

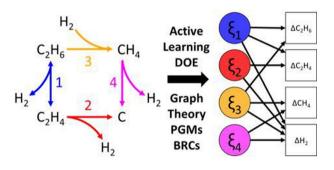
Cristina Peinado,* José M. Campos-Martin and Sergio Rojas



824

Active learning of chemical reaction networks via probabilistic graphical models and Boolean reaction circuits

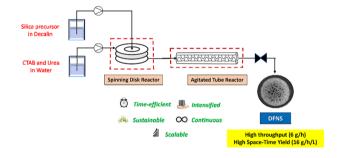
Maximilian Cohen, Tejas Goculdas and Dionisios G. Vlachos*



838

Process intensification of dendritic fibrous nanospheres of silica (DFNS) via continuous flow: a scalable and sustainable alternative to the conventional batch synthesis

Karuna Veeramani, Nagaraj Nayak, Neil R. Cameron and Anil Kumar*

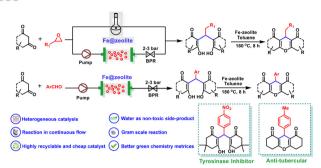


849

Photocatalytic aerobic oxidative deoximation reaction with degradable rhodamine B

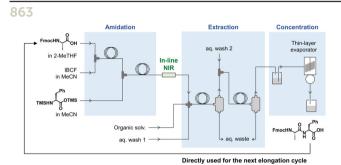
Feng Wang, Rongrong Qian and Lei Yu*

855



Continuous-flow Fe-zeolite-catalyzed temperaturedirected synthesis of bioactive tetraketones and xanthenes using epoxides and cyclic-1,3-diketones via a Meinwald rearrangement

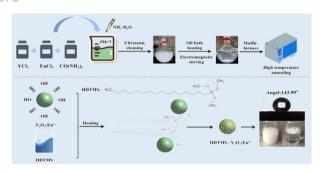
Shankhajit Mondal, Akanksha M. Pandey and Boopathy Gnanaprakasam*



A liquid-phase continuous-flow peptide synthesizer for preparing C-terminal free peptides

Yuma Otake,* Kyohei Adachi, Yoshiaki Yamashita, Natsumi Iwanaga, Hirokatsu Sunakawa, Taiki Shamoto, Jun-ichi Ogawa, Atsushi Ito, Yutaka Kobayashi, Keiichi Masuya, Shinichiro Fuse, Daisuke Kubo and Hidenosuke Itoh

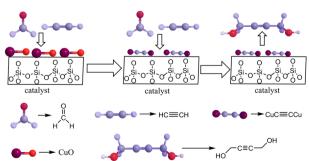
871



Fabrication and surface hydrophobic modification of Y₂O₃:Eu³⁺ phosphors

Cheng Wen, Runzi Zhou, Zenghui Qiu,* Junjiao Yang, Xin Zhang* and Haijun Xu*

881



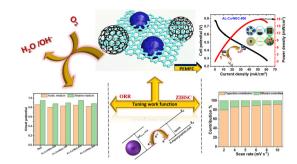
The importance of copper-phyllosilicate formed in CuO/SiO₂ catalysts in the ethynylation of formaldehyde for 1,4-butynediol synthesis

Guihua Yang,* Feng Gao and Linxue Yang

891

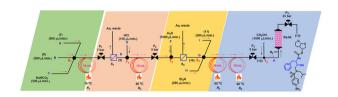
An electron "donor-acceptor-donor" strategy to activate ZIF-67 as a cathode material for fuel cells and zinc ion hybrid supercapacitor

Rupali S. Mane, Sayli Pradhan, Vaishnavi Somkuwar, Rama Bhattacharyya, Prakash C. Ghosh and Neetu Jha*



Micro-total process system machine (μ -TPSM) for rapid synthesis of antiretroviral darunavir

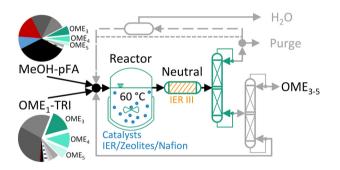
Ruchi Chauhan, Abhilash Rana, Subhash Ghosh, P. Srihari and Ajay K. Singh*



917

Suitable commercial catalysts for the synthesis of oxymethylene dimethyl ethers

Franz Mantei,* Sebastian Kopp, Anna Holfelder, Elisa Flad, Daniela Kloeters, Matthias Kraume and Ouda Salem*



Preparation and photocatalytic hydrogen evolution performance of square platform Cu₂MoS₄/lamellar ZnIn₂S₄

Meng-Yuan Zhu, Feng-Jun Zhang,* Ying-Rui Wang, Ze-da Meng and Chao-qun Mi

