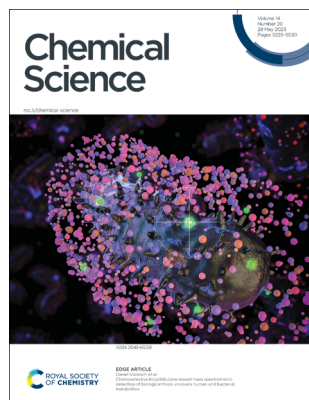
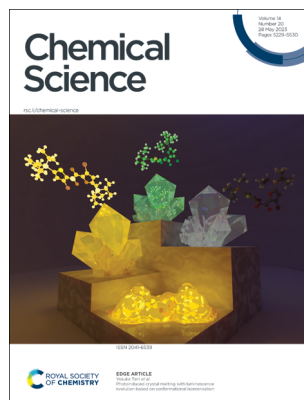


IN THIS ISSUE

ISSN 2041-6539 CODEN CSHCBM 14(20) 5229–5530 (2023)



Cover
See Daniel Globisch *et al.*,
pp. 5291–5301. Image
reproduced by permission of
Daniel Globisch from *Chem.*
Sci., 2023, 14, 5291.



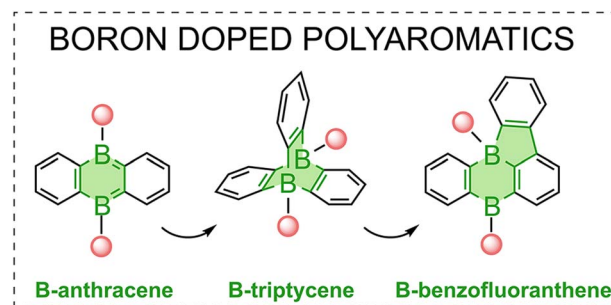
Inside cover
See Yosuke Tani *et al.*,
pp. 5302–5308. Image
reproduced by permission of
Mao Komura from *Chem. Sci.*,
2023, 14, 5302.

COMMENTARY

5241

A focus on anionic boron anthracenes and triptycenes as entry point toward B-doped polyaromatic materials and Lewis acids

Guillaume Berionni*

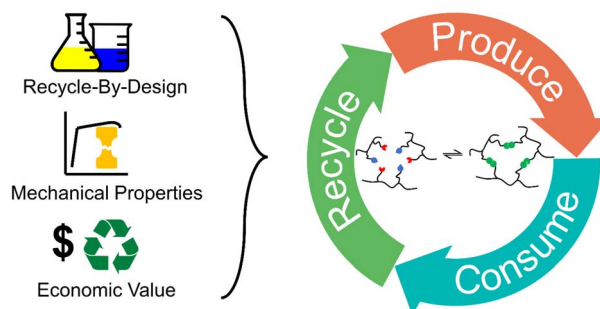


REVIEWS

5243

Circularity in polymers: addressing performance and sustainability challenges using dynamic covalent chemistries

Tianwei Yan, Alex H. Balzer, Katie M. Herbert,* Thomas H. Epps, III* and LaShanda T. J. Korley*



Editorial Staff

Executive Editor

May Copsey

Deputy Editor

Samantha Apps

Senior Editor

James Moore

Scientific Editors

Ellis Crawford, Jingtao Huang, Esther Johnston, Sophie Orchard, Richard Thompson and Amy Welch

Editorial Assistant

Karina Webster

Publishing Assistant

David Bishop

For queries about submitted articles please contact James Moore, Senior Editor, in the first instance. E-mail chemicalscience@rsc.org

For pre-submission queries please contact May Copsey, Executive Editor. E-mail chemicalscience-rsc@rsc.org

Chemical Science (electronic: ISSN 2041-6539) is published 48 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK.

Chemical Science is a Gold Open Access journal and all articles from 2015 onwards are free to read.

Please email orders@rsc.org to register your interest or contact 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

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

Chemical Science

rsc.li/chemical-science

Editorial Board

Editor-in-Chief

Andrew Cooper, University of Liverpool

Associate Editors

Vincent Artero, CEA-Grenoble
Luis M. Campos, Columbia University
Michelle Chang, University of California, Berkeley
Lin X. Chen, Northwestern University
Graeme Day, University of Southampton
Serena DeBeer, Max Planck Institute for Chemical Energy Conversion

Mircea Dincă, MIT

Vy Dong, University of California, Irvine
François Gabbai, Texas A&M University
Subi George, JNCASR
Jinlong Gong, Tianjin University
Stephen Goldup, University of Birmingham
Zaiping Guo, University of Adelaide
Christopher A. Hunter, University of Cambridge
Malika Jefferies-EL, Boston University
Ning Jiao, Peking University
Tanja Junkers, Monash University

Hemamala Karunadasa, Stanford University
Maja Köhn, University of Freiburg
Yi-Tao Long, Nanjing University
Gabriel Merino, CINVESTAV Merida
James K. McCusker, Michigan State University
Thomas Meade, Northwestern University
Paolo Melchiorre, University of Bologna
Carsten Schultz, Oregon Health & Science University
Dmitri Talapin, The University of Chicago
Toshiharu Teranishi, Kyoto University
Andrei Yudin, University of Toronto

Advisory Board

Dave Adams, University of Glasgow
Ayyappanpillai Ajayaghosh, NIIST
Ulf-Peter Apfel, Ruhr-University Bochum
Polly Arnold, University of California, Berkeley
Xinhe Bao, Dalian Institute of Chemical Physics
Zhenan Bao, Stanford University
Gonçalo Bernardes, University of Cambridge
Frank Biedermann, Karlsruhe Institute of Technology
Donna Blackmond, Scripps Research Institute
Jeffrey Bode, ETH Zurich
Jennifer S. Brodbelt, University of Texas at Austin, USA
Christopher Chang, University of California, Berkeley
Chi-Ming Che, University of Hong Kong
Jun Chen, Nankai University
R. Graham Cooks, Purdue University
Christophe Copéret, ETH Zurich
Eugenio Coronado, University of Valencia
Leroy Cronin, University of Glasgow
James Crowley, University of Otago
Christopher C. Cummins, Massachusetts Institute of Technology
Ben Davis, University of Oxford
Jillian Dempsey, University of North Carolina at Chapel Hill
Kazunari Domen, University of Tokyo
James Durrant, Imperial College London
Xinlang Feng, TU Dresden
Ben Feringa, University of Groningen
Makoto Fujita, University of Tokyo
Phillip Gale, University of Technology Sydney
Song Gao, Peking University
Jeremiah Gassensmith, University of Texas at Dallas
Elizabeth Gibson, Newcastle University
Ryan Gilmour, WWU Münster
Hubert Girault, EPFL
Frank Glorius, WWU Münster
Leticia González, University of Vienna
Duncan Graham, University of Strathclyde

Vicki Grassian, University of California, San Diego
Alexis Grimaud, Boston College
Christian Hackenberger, FMP Berlin
Buxing Han, Chinese Academy of Sciences
Christy Haynes, University of Minnesota
Patrick Holland, Yale University
Kim Jelfs, Imperial College London
Yousung Jung, KAIST
Stephanie Kath-Schorr, University of Cologne
Takashi Kato, University of Tokyo
Christopher Kelly, Janssen Research & Development
Jérôme Lacour, University of Geneva
Ai-Lan Lee, Heriot-Watt University
Daniele Leonori, RWTH Aachen University
Chao-Jun Li, McGill University
Yi Li, Jilin University
Mi Hee Lim, KAIST
Wenbin Lin, University of Chicago
Kopin Liu, Academia Sinica
Watson Loh, UNICAMP
Bettina Lotsch, Max Planck Institute
Xiong Wen (David) Lou, Nanyang Technological University
Kazuhiko Maeda, Tokyo Institute of Technology
Satoshi Maeda, Hokkaido University
Swadhin Mandal, IISER Kolkata
Ellen Matson, University of Rochester
Scott Miller, Yale University
Daniel Mindiola, University of Pennsylvania
Wonwoo Nam, Ewha Womans University
Jonathan Nitschke, University of Cambridge
Allie Obermeyer, Columbia University
Martin Oestreich, Technical University of Berlin
Takashi Ooi, Nagoya University
Rachel O'Reilly, University of Birmingham
Oleg Ozerov, Texas A&M University
Xiulian Pan, Dalian Institute of Chemical Physics
Nicolas Plummer, Technical University of

Munich
Rasmita Raval, University of Liverpool
Erwin Reisner, University of Cambridge
Andrea Rentmeister, WWU Münster
Jeffrey Rinehart, University of California, San Diego
Stuart Rowan, University of Chicago
Richmond Sarpong, University of California, Berkeley
Danielle Schultz, Merck
Dwight Seferos, University of Toronto
Oliver Seitz, Humboldt University of Berlin
Roberta Sessoli, University of Florence
Kay Severin, Federal Polytechnic School of Lausanne
Mikiko Sodeoka, RIKEN
Galo Soler-Illia, Universidad Nacional de San Martin
David Spring, University of Cambridge
Brian Stoltz, California Institute of Technology
Brent Sumerlin, University of Florida
Raghavan B. Sunoj, IIT Bombay
Yogesh Surendranath, MIT
Mizuki Tada, Nagoya University
Ben Zhong Tang, The Hong Kong University of Science and Technology
Zhiyong Tang, National Center for Nanoscience and Nanotechnology
Christine Thomas, Ohio State University
He Tian, East China University of Science & Technology
Zhong-Qun Tian, Xiamen University
F. Dean Toste, University of California, Berkeley
Takashi Uemura, University of Tokyo
Jan van Hest, Radboud University
Latha Venkataraman, Columbia University
Chu Wang, Peking University
Julia Weinstein, University of Sheffield
Tom Welton, Imperial College London
Charlotte Williams, University of Oxford
Vivian Yam, University of Hong Kong
Qi-Lin Zhou, Nankai University
Jenny Zhang, University of Cambridge

Information for Authors

Full details on how to submit material for publication in Chemical Science 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/chemical-science

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

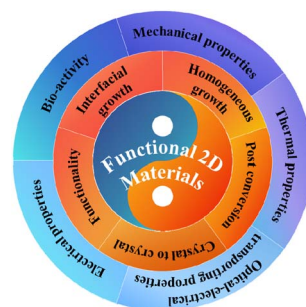


REVIEWS

5266

Design, synthesis, and application of some two-dimensional materials

Luwei Zhang, Ning Wang* and Yuliang Li*

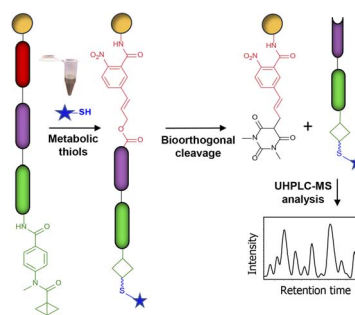


EDGE ARTICLES

5291

Chemoselective bicyclobutane-based mass spectrometric detection of biological thiols uncovers human and bacterial metabolites

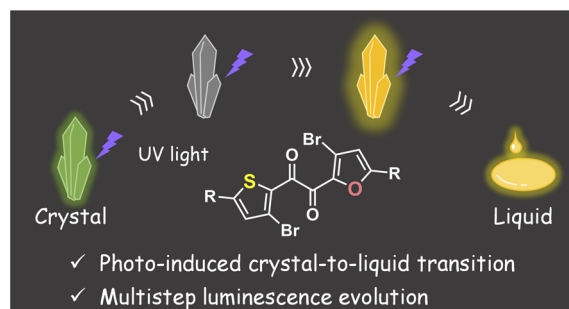
Amanpreet Kaur, Weifeng Lin, Vladyslav Dovhalyuk, Léna Driutti, Maria Letizia Di Martino, Miroslav Vujasinovic, J.-Matthias Löhr, Mikael E. Sellin and Daniel Globisch*



5302

Photoinduced crystal melting with luminescence evolution based on conformational isomerisation

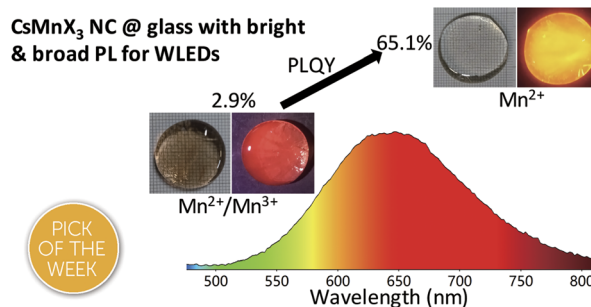
Mao Komura, Hikaru Sotome, Hiroshi Miyasaka, Takuji Ogawa and Yosuke Tani*



5309

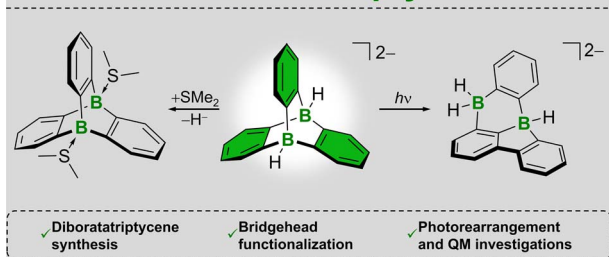
Solid-state synthesis of cesium manganese halide nanocrystals in glass with bright and broad red emission for white LEDs

Guangyong Xu, Chuying Wang, Yacong Li, Wen Meng, Guigen Luo, Min Peng, Bin Xu and Zhengtao Deng*



5316

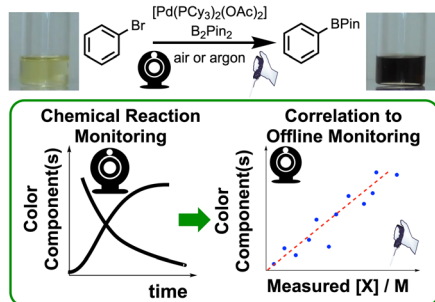
9,10-Diboratatriptycene



Synthesis, bridgehead functionalization, and photoisomerization of 9,10-diboratatriptycene dianions

Sven E. Prey, Jannik Gilmer, Samira V. Teichmann, Luis Čaić, Mischa Wenisch, Michael Bolte, Alexander Virovets, Hans-Wolfram Lerner, Felipe Fantuzzi and Matthias Wagner*

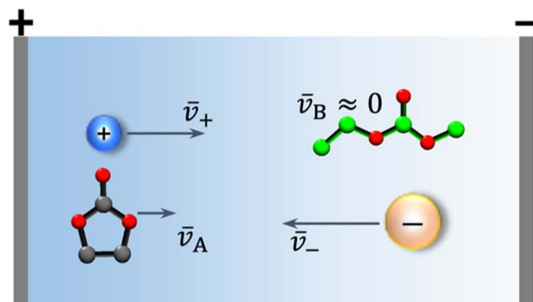
5323



Computer vision for non-contact monitoring of catalyst degradation and product formation kinetics

Chunhui Yan, Megan Cowie, Calum Howcutt, Katherine M. P. Wheelhouse, Neil S. Hodnett, Martin Kollie, Martin Gildea, Martin H. Goodfellow and Marc Reid*

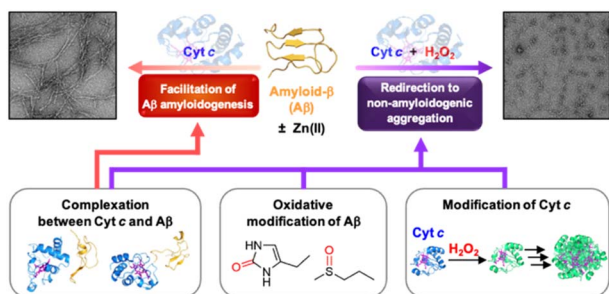
5332



Quantifying selective solvent transport under an electric field in mixed-solvent electrolytes

Chao Fang, David M. Halat, Aashutosh Mistry, Jeffrey A. Reimer, Nitash P. Balsara and Rui Wang*

5340



Unveiling the impact of oxidation-driven endogenous protein interactions on the dynamics of amyloid-β aggregation and toxicity

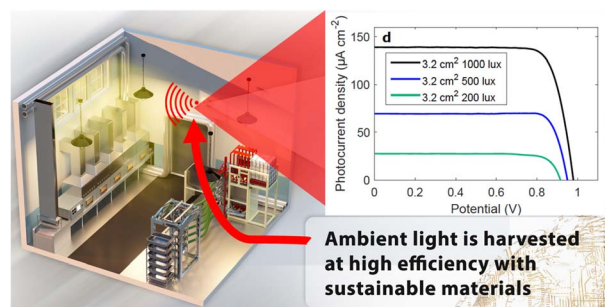
Zhi Du, Eunju Nam, Yuxi Lin, Mannkyu Hong, Tamás Molnár, Ikufumi Kondo, Koichiro Ishimori, Mu-Hyun Baik, Young-Ho Lee* and Mi Hee Lim*



5350

Emerging indoor photovoltaics for self-powered and self-aware IoT towards sustainable energy management

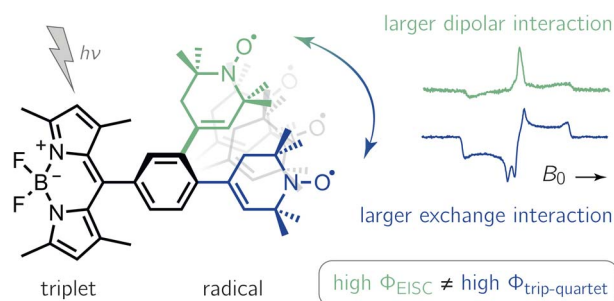
Hannes Michaels, Michael Rinderle, Iacopo Benesperi, Richard Freitag, Alessio Gagliardi and Marina Freitag*



5361

Distance dependence of enhanced intersystem crossing in BODIPY–nitroxide dyads

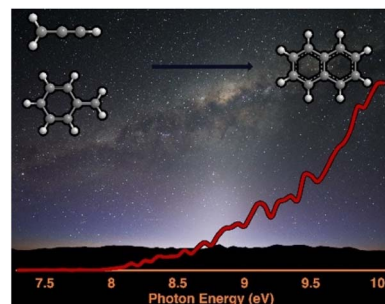
Maximilian Mayländer, Theresia Quintes, Michael Franz, Xavier Allonas, Andreas Vargis Jentsch* and Sabine Richert*



5369

Unconventional gas-phase preparation of the prototype polycyclic aromatic hydrocarbon naphthalene (C₁₀H₈) via the reaction of benzyl (C₇H₇) and propargyl (C₃H₃) radicals coupled with hydrogen-atom assisted isomerization

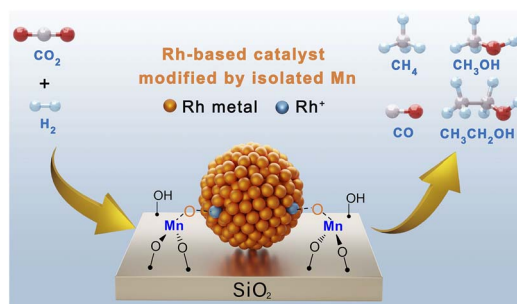
Chao He, Ralf I. Kaiser,* Wenchao Lu, Musahid Ahmed,* Vladislav S. Krasnoukhov, Pavel S. Pivovarov, Marsel V. Zagidullin, Valeriy N. Azyazov, Alexander N. Morozov and Alexander M. Mebel*



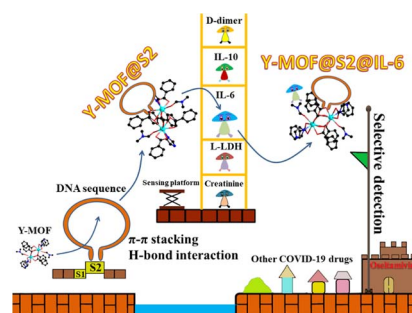
5379

The promotional role of Mn in CO₂ hydrogenation over Rh-based catalysts from a surface organometallic chemistry approach

Wei Zhou, Scott R. Docherty, Christian Ehinger, Xiaoyu Zhou and Christophe Copéret*



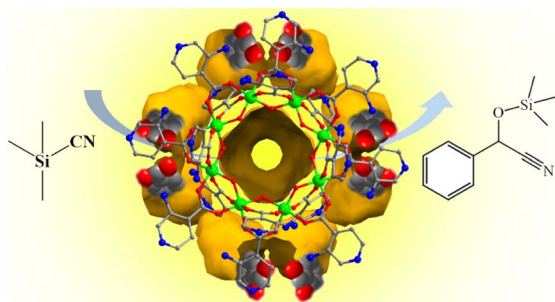
5386



A MOF/DNA luminescent sensing platform for detection of potential COVID-19 biomarkers and drugs

Xinrui Wang, Gilles Clavier, Yan Zhang, Kamal Batra, Nanan Xiao, Guillaume Maurin, Bin Ding,* Antoine Tissot* and Christian Serre*

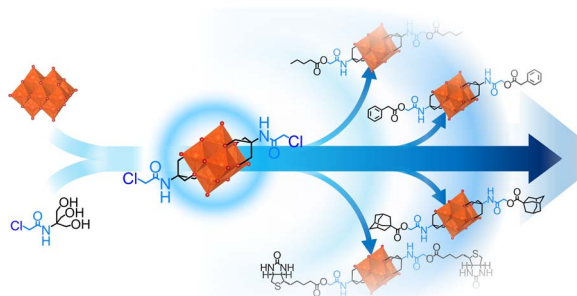
5396



Accurate binding of porous aluminum molecular ring catalysts with the substrate

Dan Luo, Han Xiao, Min-Yi Zhang, Shang-Da Li, Liang He, Hong Lv, Chun-Sen Li, Qi-Pu Lin, Wei-Hui Fang* and Jian Zhang

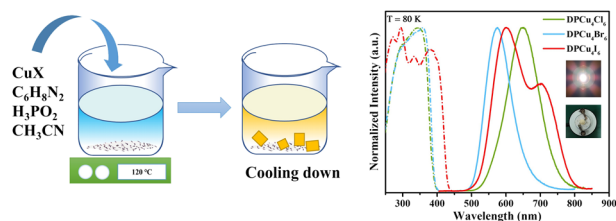
5405



Rational synthesis of elusive organic-inorganic hybrid metal-oxo clusters: formation and post-functionalization of hexavanadates

David E. Salazar Marcano, Givi Kalandia, Mhamad Aly Moussawi, Kristof Van Hecke and Tatjana N. Parac-Vogt*

5415



Photophysical studies for Cu(I)-based halides: broad excitation bands and highly efficient single-component warm white-light-emitting diodes

Shuigen Zhou, Yihao Chen, Kailei Li, Xiaowei Liu, Ting Zhang, Wei Shen, Ming Li, Lei Zhou* and Rongxing He*

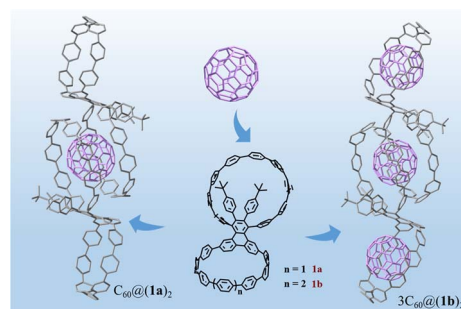


EDGE ARTICLES

5425

Regulating supramolecular interactions in dimeric macrocycles

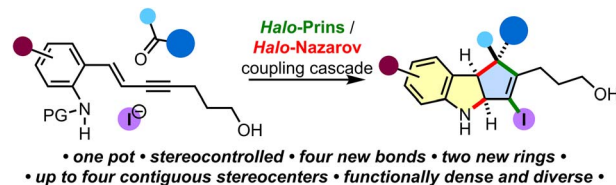
Pengwei Fang, Muqing Chen,* Nan Yin, Guilin Zhuang,*
Tianyun Chen, Xinyu Zhang and Pingwu Du*



5431

Nitrogen-interrupted *halo*-Prins/*halo*-Nazarov fragment coupling cascade for the synthesis of indolines

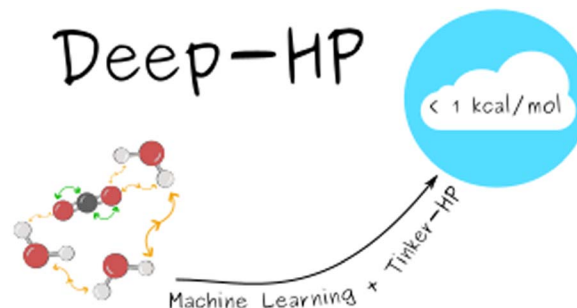
Aleksa Milosavljevic, Connor Holt and Alison J. Frontier*



5438

Scalable hybrid deep neural networks/polarizable potentials biomolecular simulations including long-range effects

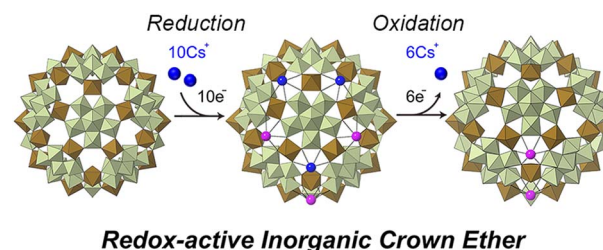
Théo Jaffrelot Inizan, Thomas Plé, Olivier Adjoua,
Pengyu Ren, Hatice Gökcan, Olexandr Isayev,
Louis Lagardère and Jean-Philip Piquemal*



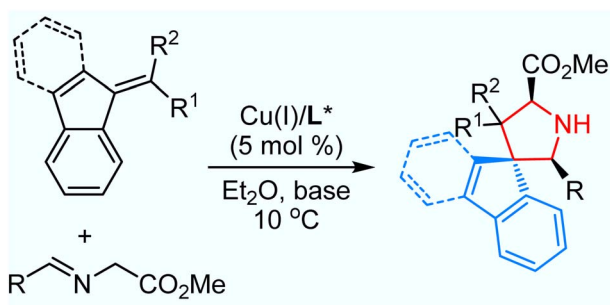
5453

A redox-active inorganic crown ether based on a polyoxometalate capsule

Nanako Tamai, Naoki Ogiwara, Eri Hayashi, Keigo Kamata,
Toshiyuki Misawa, Takeru Ito, Tatsuhiro Kojima,
Mireia Segado, Enric Petrus, Carles Bo and Sayaka Uchida*



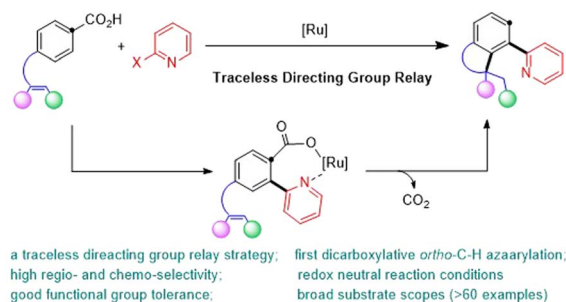
5460



Electron-rich benzofulvenes as effective dipolarophiles in copper(I)-catalyzed asymmetric 1,3-dipolar cycloaddition of azomethine ylides

Xin Chang, Xue-Tao Liu, Fangfang Li, Yuhong Yang, Lung Wa Chung* and Chun-Jiang Wang*

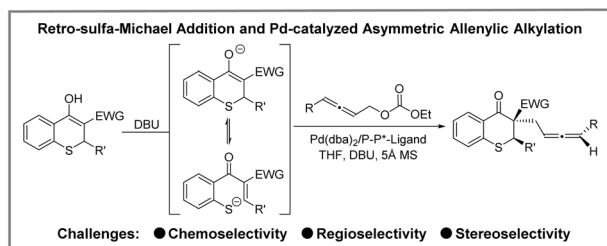
5470



Ruthenium-catalysed decarboxylative unsymmetric dual *ortho*-/*meta*-C–H bond functionalization of arenecarboxylic acids

Xiankai Li, Xiaofei Wang and Jing Zhang*

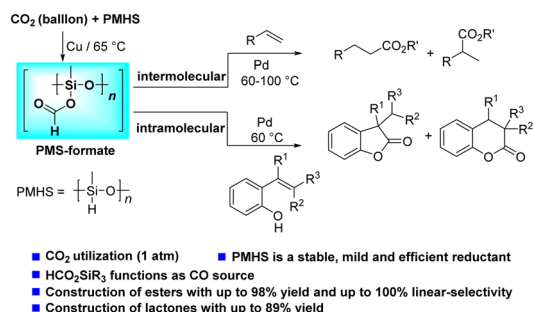
5477



Palladium-catalyzed asymmetric allenylc alkylation: construction of multiple chiral thiochromanone derivatives

Li-Xia Liu, Yu-Qing Bai, Xiang Li, Chang-Bin Yu* and Yong-Gui Zhou*

5483



Regioselective hydroesterification of alkenes and alkenylphenols utilizing CO₂ and hydrosilane

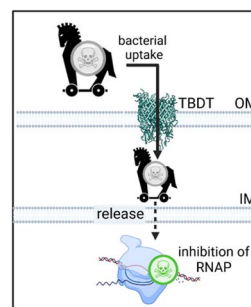
Meng-Meng Wang, Sheng-Mei Lu and Can Li*



5490

Siderophore conjugation with cleavable linkers boosts the potency of RNA polymerase inhibitors against multidrug-resistant *E. coli*

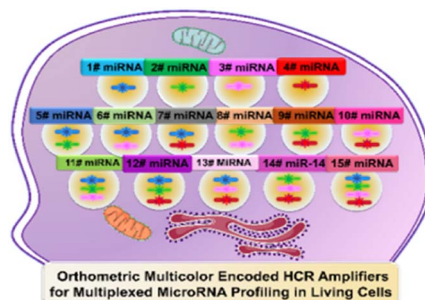
Carsten Peukert, Anna C. Vetter, Hazel L. S. Fuchs, Kirsten Harmrolfs, Bianka Karge, Marc Stadler and Mark Brönstrup*



5503

Orthometric multicolor encoded hybridization chain reaction amplifiers for multiplexed microRNA profiling in living cells

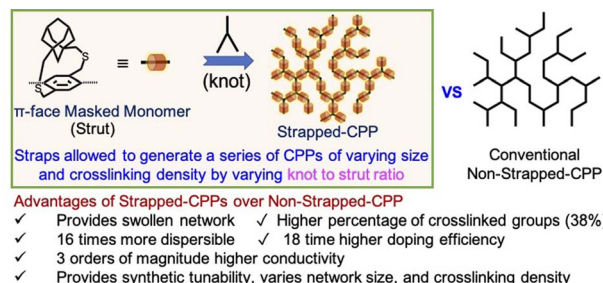
Wei Wei, Yiyi Zhang, Fan Yang, Liping Zhou, Yufan Zhang, Yeyu Wang, Shuangshuang Yang, Jinze Li and Haifeng Dong*



5510

Using molecular straps to engineer conjugated porous polymer growth, chemical doping, and conductivity

Manikandan Mohanan, Humayun Ahmad, Pooja Ajayan, Prashant K. Pandey, Benjamin M. Calvert, Xinran Zhang, Fu Chen, Sung J. Kim, Santanu Kundu and Nagarjuna Gavvalapalli*

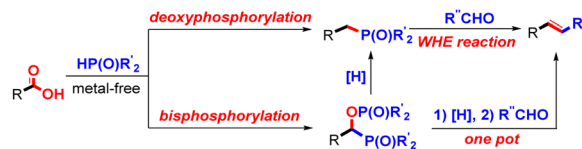


5519

Metal-free highly chemo-selective bisphosphorylation and deoxyphosphorylation of carboxylic acids

Liguang Gan, Tianhao Xu, Qihang Tan, Mengjie Cen, Lingling Wang, Jingwei Zhao, Kuang Liu, Long Liu, Wen-Hao Chen, Li-Biao Han,* Jacek E. Nycz* and Tieqiao Chen*

Carboxylic acids as alkyl source via bisphosphorylation and deoxyphosphorylation, and their conversion into alkenes in one pot.



- Readily available starting materials
- High step and atom economy
- Scalable
- High functional group tolerance
- Mild conditions
- Modification of complex APIs
- New transforming mode of carboxylic acids as alkyl source
- Controlled synthesis



CORRECTION

5527

Correction: Novel synthetic route for (parent) phosphetanes, phospholanes, phosphinanes and phosphhepanes

Stephan Reichl, Gábor Balázs and Manfred Scheer*

