Open Access Article. Published on 20 March 2024. Downloaded on 1/28/2026 1:55:55 AM.
This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.

Chemical Science

rsc.li/chemical-science

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 2041-6539 CODEN CSHCBM 15(12) 4189–4604 (2024)

Cover
See Chengchao Xu, Huan Tang, Jigang Wang *et al.*, pp. 4313–4321. Image reproduced by permission of Jigang Wang from *Chem. Sci.*, 2024, **15**, 4313.

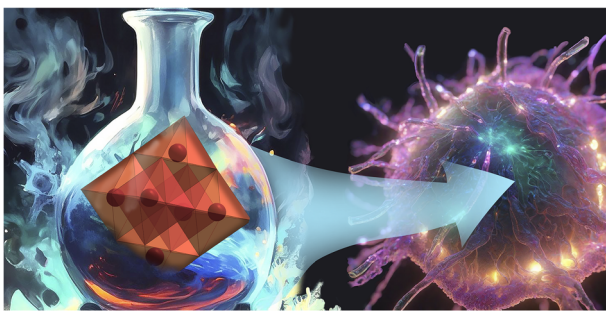
Inside cover
See Kirill Yu. Monakhov *et al.*, pp. 4202–4221. Image reproduced by permission of Kirill Yu. Monakhov from *Chem. Sci.*, 2024, **15**, 4202.

PERSPECTIVES

4202

Bioorthogonal chemistry of polyoxometalates – challenges and prospects

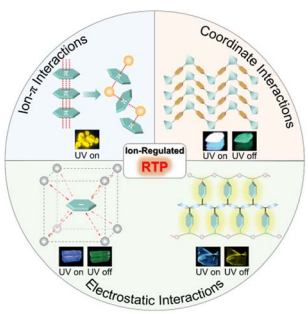
Stanislav K. Petrovskii, Elena V. Grachova and Kirill Yu. Monakhov*



4222

Recent progress in ion-regulated organic room-temperature phosphorescence

Wenbo Dai, Yitian Jiang, Yunxiang Lei, Xiaobo Huang, Peng Sun, Jianbing Shi, Bin Tong, Dongpeng Yan,* Zhengxu Cai* and Yuping Dong



View Article Online

ROYAL SOCIETY OF CHEMISTRY

NEW JOURNAL

RSC Sustainability

GOLD OPEN ACCESS

Dedicated to sustainable chemistry and new solutions

For an open, green and inclusive future

rsc.li/RSCSus

Fundamental questions
Elemental answers

Registered charity number: 207890

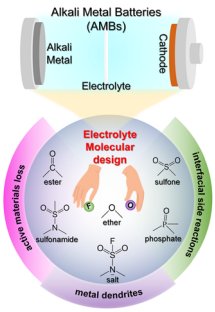
Open Access Article. Published on 20 March 2024. Downloaded on 1/28/2026 1:55:55 AM.
This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.

REVIEWS

4238

Recent advances in electrolyte molecular design for alkali metal batteries

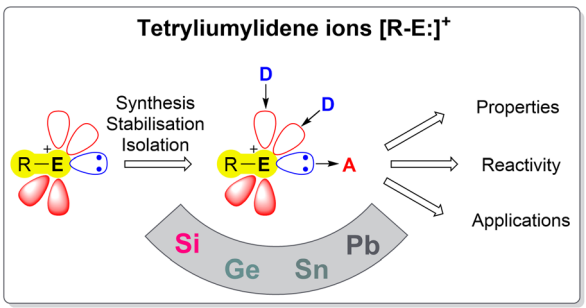
Digen Ruan, Zhuangzhuang Cui, Jiajia Fan, Dazhuang Wang, Yiying Wu* and Xiaodi Ren*



4275

Tetryliumylidene ions in synthesis and catalysis

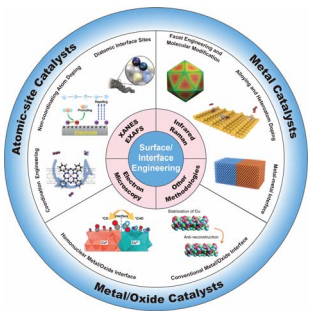
Sebastian Stigler, Shiori Fujimori, Arseni Kostenko and Shigeyoshi Inoue*



4292

Customizing catalyst surface/interface structures for electrochemical CO_2 reduction

Xin Tan, Haojie Zhu, Chang He, Zewen Zhuang, Kaian Sun, Chao Zhang* and Chen Chen*

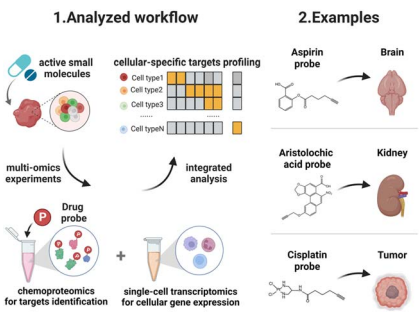


EDGE ARTICLES

4313

STEP: profiling cellular-specific targets and pathways of bioactive small molecules in tissues *via* integrating single-cell transcriptomics and chemoproteomics

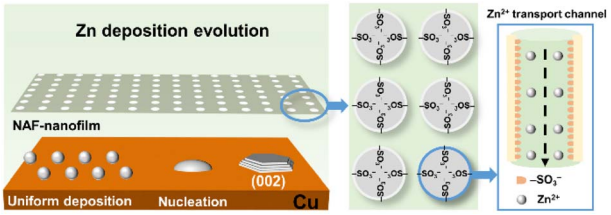
Jiayun Chen, Zheng Chu, Qian Zhang, Chen Wang, Piao Luo, Ying Zhang, Fei Xia, Liwei Gu, Yin Kwan Wong, Qiaoli Shi, Chengchao Xu,* Huan Tang* and Jigang Wang*



Open Access Article. Published on 20 March 2024. Downloaded on 1/28/2026 1:55:55 AM.
This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.

EDGE ARTICLES

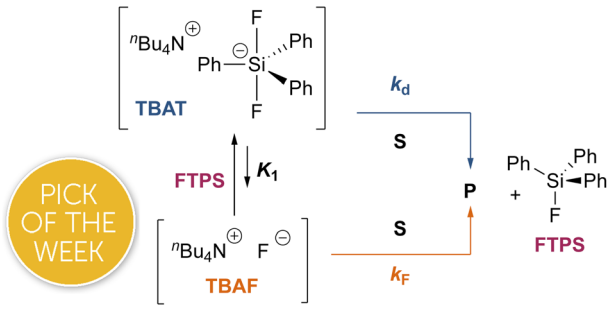
4322



***In situ* Nafion-nanofilm oriented (002) Zn electrodeposition for long-term zinc-ion batteries**

Da Zhang, Ziyang Song, Ling Miao, Yaokang Lv, Lihua Gan and Mingxian Liu*

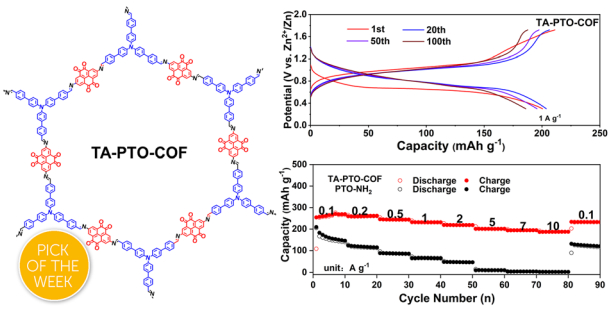
4331



Speciation and kinetics of fluoride transfer from tetra-*n*-butylammonium difluorotriphenylsilicate ('TBAT')

Maciej M. Kucharski, Allan J. B. Watson and Guy C. Lloyd-Jones*

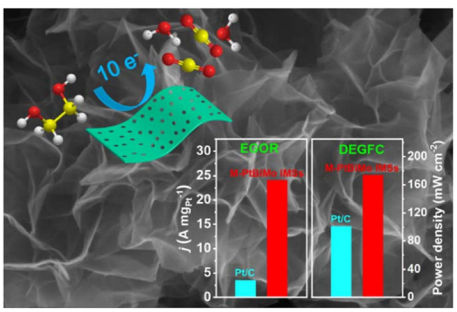
4341



A covalent organic framework as a dual-active-center cathode for a high-performance aqueous zinc-ion battery

Hongbao Li, Mengge Cao, Zhenli Fu, Quanwei Ma, Longhai Zhang, Rui Wang, Fei Liang, Tengfei Zhou and Chaofeng Zhang*

4349



Mesoporous Mo-doped PtBi intermetallic metallene superstructures to enable the complete electrooxidation of ethylene glycol

Xiaotong Yang, Qiang Yuan,* Tian Sheng* and Xun Wang*

This journal is © The Royal Society of Chemistry 2024

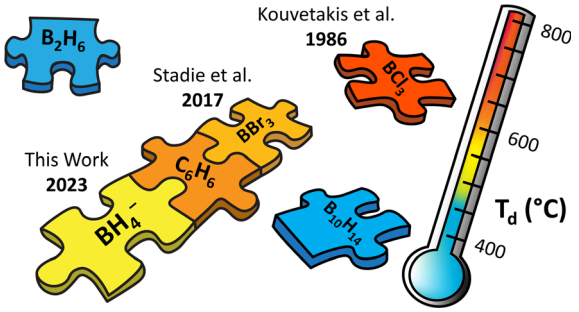
Open Access Article. Published on 20 March 2024. Downloaded on 1/28/2026 1:55:55 AM.
This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.

EDGE ARTICLES

4358

Halide-free synthesis of metastable graphitic BC_3

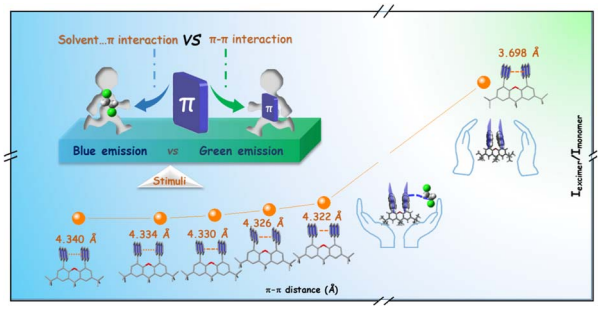
Devin McGlamery, Charles McDaniel, Dylan M. Ladd, Yang Ha, Martín A. Mosquera, Michael T. Mock and Nicholas P. Stadie*



4364

Controllable π−π coupling of intramolecular dimer models in aggregated states

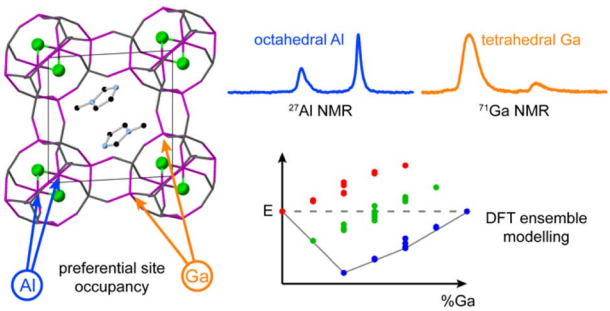
Qiuyan Liao, Aisen Li, Arui Huang, Jiaqiang Wang, Kai Chang, Hehua Li, Pengfei Yao, Cheng Zhong, Peidong Xie, Jinfeng Wang, Zhen Li* and Qianqian Li*



4374

Site-directed cation ordering in chabazite-type $Al_xGa_{1-x}PO_4$-34 frameworks revealed by NMR crystallography

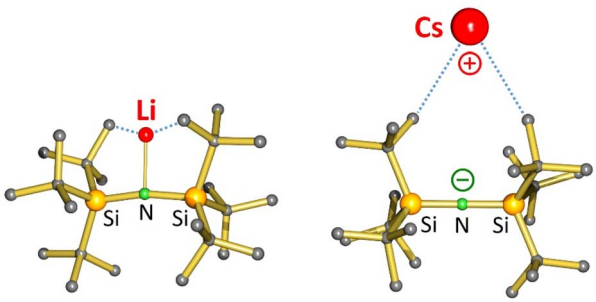
Daniel M. Dawson,* Jasmine A. Clayton, Thomas H. D. Marshall, Nathalie Guillou, Richard I. Walton* and Sharon E. Ashbrook*



4386

s-Block metal complexes of superbulky $(^tBu_3Si)_2N^-$: a new weakly coordinating anion?

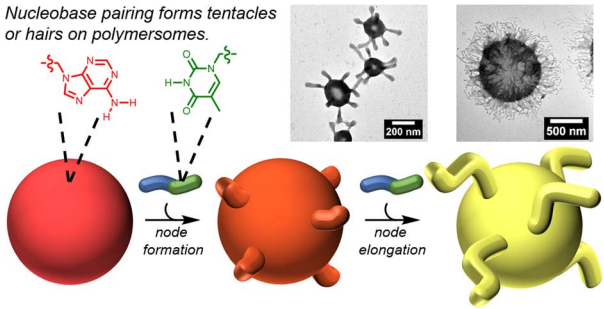
Christian Knüpfer, Lukas Klerner, Jonathan Mai, Jens Langer and Sjoerd Harder*



Open Access Article. Published on 20 March 2024. Downloaded on 1/28/2026 1:55:55 AM.
This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.

EDGE ARTICLES

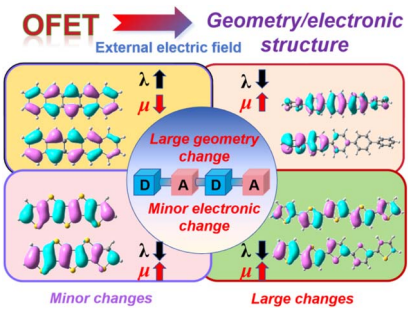
4396



Controlled node growth on the surface of polymersomes

Marjolaine Thomas, Spyridon Varlas, Thomas R. Wilks, Stephen D. P. Fielden* and Rachel K. O'Reilly*

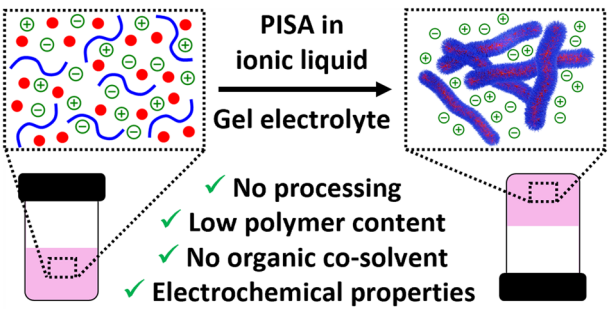
4403



In-depth theoretical analysis of the influence of an external electric field on charge transport parameters

Gui-Ya Qin, Xiao-Qi Sun, Rui Wang, Jing-Fu Guo, Jian-Xun Fan, Hui Li, Lu-Yi Zou and Ai-Min Ren*

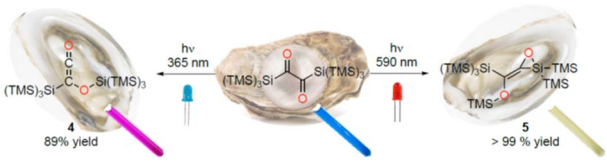
4416



Block copolymer synthesis in ionic liquid *via* polymerisation-induced self-assembly: a convenient route to gel electrolytes

Georgia L. Maitland, Mingyu Liu, Thomas J. Neal, James Hammerton, Yisong Han, Stephen D. Worrall, Paul D. Topham and Matthew J. Derry*

4427



Wavelength-dependent rearrangements of an α-dione chromophore: a chemical pearl in a bis(hypersilyl) oyster

Gabriel Glotz, Manfred Drusgala, Florian Hamm, Roland C. Fischer, Nađa Došlić, Anne-Marie Kelterer, Georg Gescheidt* and Michael Haas*

This journal is © The Royal Society of Chemistry 2024

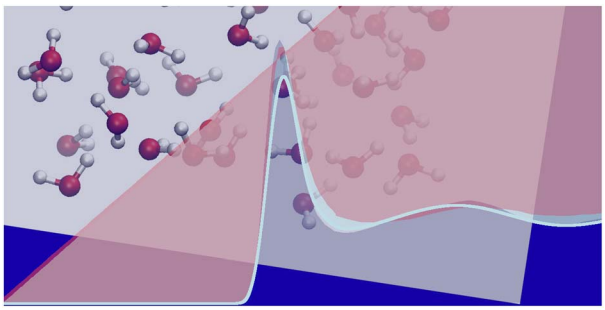
Open Access Article. Published on 20 March 2024. Downloaded on 1/28/2026 1:55:55 AM.
This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.

EDGE ARTICLES

4434

Structure and dynamics of liquid water from *ab initio* simulations: adding Minnesota density functionals to Jacob's ladder

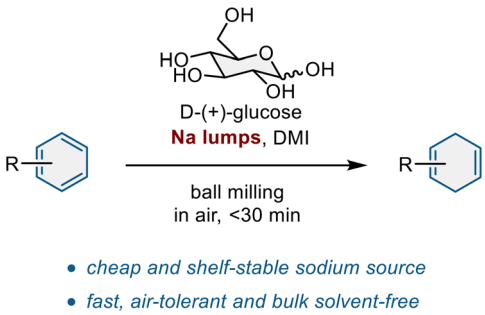
Justin Villard, Martin P. Bircher and Ursula Rothlisberger*



4452

Mechanochemistry enabling highly efficient Birch reduction using sodium lumps and D-(+)-glucose

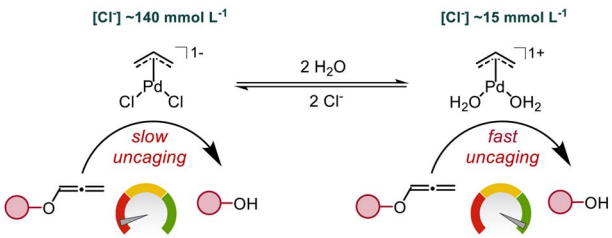
Keisuke Kondo, Koji Kubota* and Hajime Ito*



4458

Interplay of chloride levels and palladium(II)-catalyzed *O*-deallenylation bioorthogonal uncaging reactions

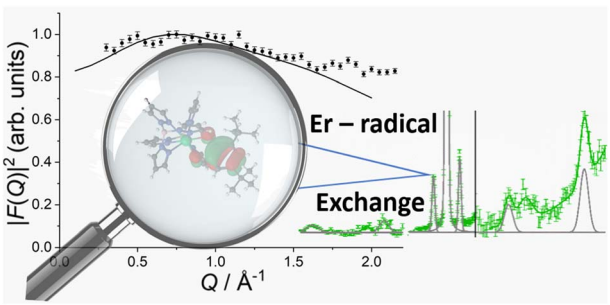
Gean M. Dal Forno, Eloah Latocheski, Claudio D. Navo, Brunno L. Albuquerque, Albert L. St John, Frédéric Avenier, Gonzalo Jiménez-Osés and Josiel B. Domingos*



4466

***Ab initio*-based determination of lanthanoid–radical exchange as visualised by inelastic neutron scattering**

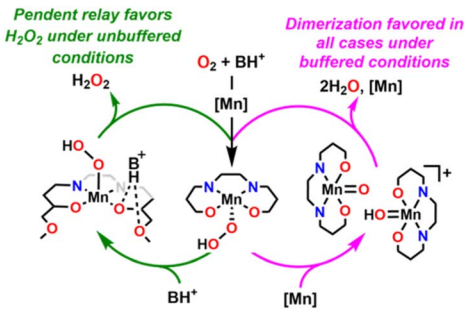
Maja A. Dunstan, Marcus J. Giansiracusa, Simone Calvello, Lorenzo Sorace, Anwen M. Krause-Heuer, Alessandro Soncini,* Richard A. Mole* and Colette Boskovic*



Open Access Article. Published on 20 March 2024. Downloaded on 1/28/2026 1:55:55 AM.
This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.

EDGE ARTICLES

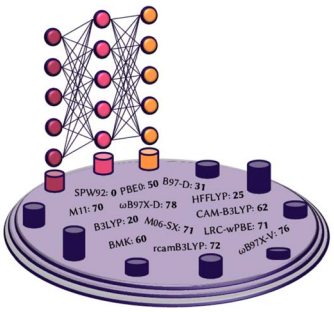
4478



Controlling product selectivity during dioxygen reduction with Mn complexes using pendent proton donor relays and added base

Emma N. Cook, Ian M. Courter, Diane A. Dickie and Charles W. Machan*

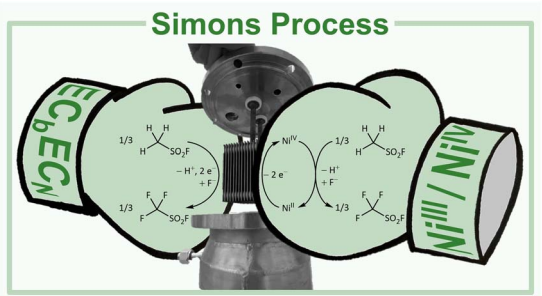
4489



DELFI: a computer oracle for recommending density functionals for excited states calculations

Davide Avagliano,* Marta Skreta, Sebastian Arellano-Rubach and Alán Aspuru-Guzik*

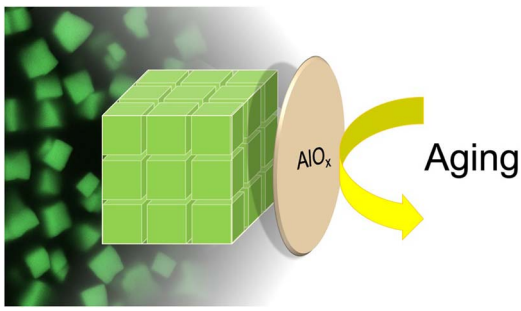
4504



Unravelling highly oxidized nickel centers in the anodic black film formed during the Simons process by *in situ* X-ray absorption near edge structure spectroscopy

Gene Senges, Ana Guilherme Buzanich, Tilen Lindič, Tyler A. Gully, Marlon Winter, Martin Radtke, Bettina Röder, Simon Steinhauer, Beate Paulus, Franziska Emmerling and Sebastian Riedel*

4510



Long live(d) $CsPbBr_3$ superlattices: colloidal atomic layer deposition for structural stability

Victoria Lapointe, Philippe B. Green, Alexander N. Chen, Raffaella Buonsanti and Marek B. Majewski*

This journal is © The Royal Society of Chemistry 2024

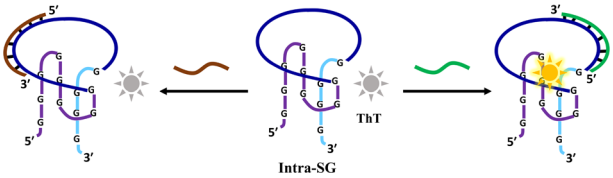
Open Access Article. Published on 20 March 2024. Downloaded on 1/28/2026 1:55:55 AM.
This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.

EDGE ARTICLES

4519

Topological effect of an intramolecular split G-quadruplex on thioflavin T binding and fluorescence light-up

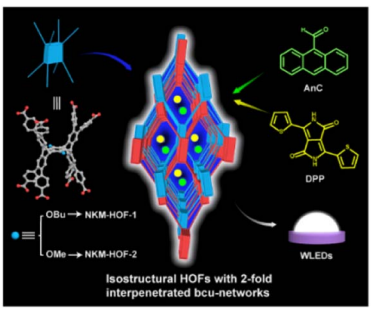
Mengmeng Lv, Jiangtao Ren* and Erkang Wang*



4529

Reticular synthesis of 8-connected carboxyl hydrogen-bonded organic frameworks for white-light-emission

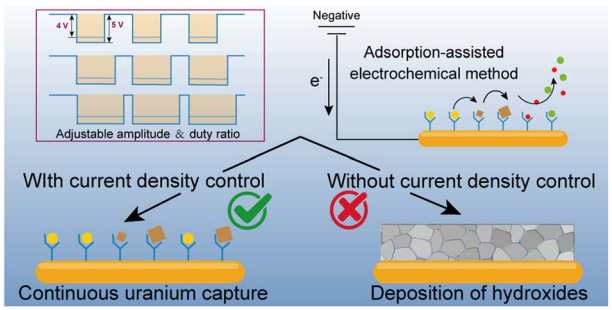
Xiao-Juan Xi, Yang Li, Feifan Lang, Jiandong Pang* and Xian-He Bu*



4538

A marine bacteria-inspired electrochemical regulation for continuous uranium extraction from seawater and salt lake brine

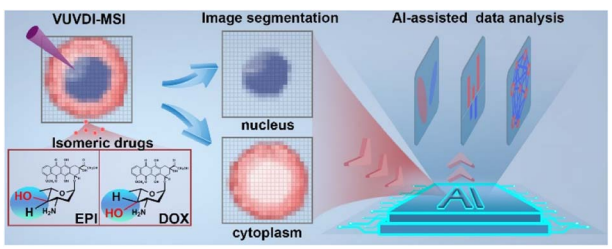
Linsen Yang, Yongchao Qian, Zhehua Zhang, Tingyang Li, Xiangbin Lin, Lin Fu, Shengyang Zhou, Xiang-Yu Kong, Lei Jiang and Liping Wen*



4547

AI-assisted mass spectrometry imaging with *in situ* image segmentation for subcellular metabolomics analysis

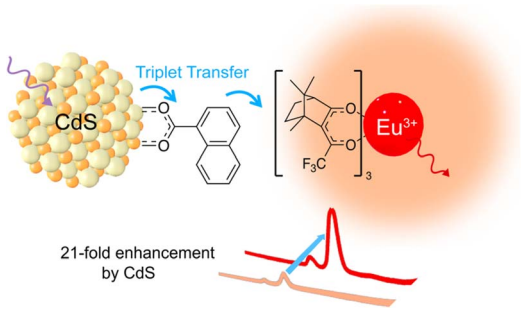
Cong-Lin Zhao, Han-Zhang Mou, Jian-Bin Pan, Lei Xing,* Yuxiang Mo, Bin Kang,* Hong-Yuan Chen and Jing-Juan Xu*



Open Access Article. Published on 20 March 2024. Downloaded on 1/28/2026 1:55:55 AM.
This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.

EDGE ARTICLES

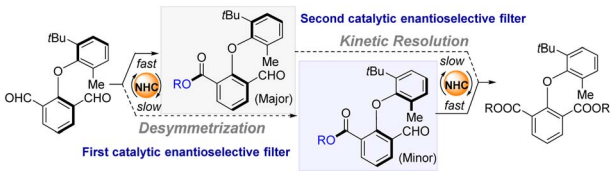
4556



Triplet energy transfer from quantum dots increases Ln(III) photoluminescence, enabling excitation at visible wavelengths

Tingting Huang, Sheng He, Anji Ni, Tianquan Lian* and Ming Lee Tang*

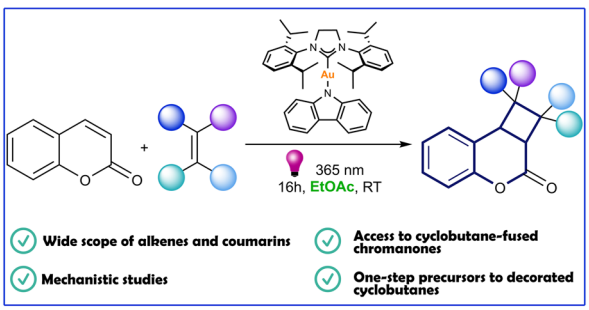
4564



Synthesis of axially chiral diaryl ethers *via* NHC-catalyzed atroposelective esterification

Yingtao Wu, Xin Guan, Huaqiu Zhao, Mingrui Li, Tianlong Liang, Jiaqiong Sun, Guangfan Zheng* and Qian Zhang*

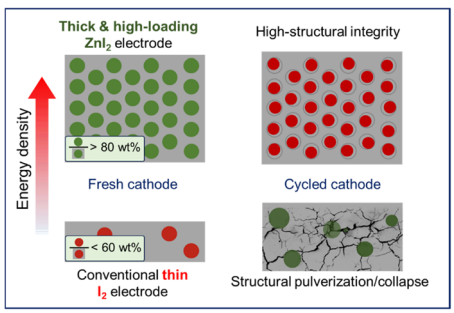
4571



Synthesis of cyclobutane-fused chromanones *via* gold-mediated photocatalysis

Vladislav A. Voloshkin, Marco Villa, Ekaterina A. Martynova, Marek Beliš, Kristof Van Hecke, Paola Ceroni* and Steven P. Nolan*

4581



Unleashing the high energy potential of zinc–iodide batteries: high-loaded thick electrodes designed with zinc iodide as the cathode

Jingkang Ma, Alireza Azizi, Erhuan Zhang, Hong Zhang,* Anqiang Pan* and Ke Lu*

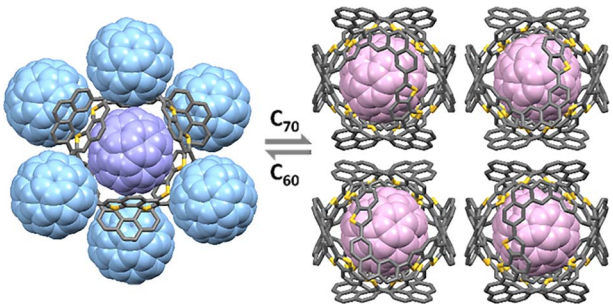
This journal is © The Royal Society of Chemistry 2024

EDGE ARTICLES

4590

From π-conjugated macrocycles to heterocycloarenes based on benzo[2,1-*b*:3,4-*b*′] dithiophene (BDTh): size- and geometry-dependent host–guest properties

Dongyue An, Rong Zhang, Jiangyu Zhu, Teng Wang, Yan Zhao, Xuefeng Lu* and Yunqi Liu



Open Access Article. Published on 20 March 2024. Downloaded on 1/28/2026 1:55:55 AM.
This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.