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IN THIS ISSUE

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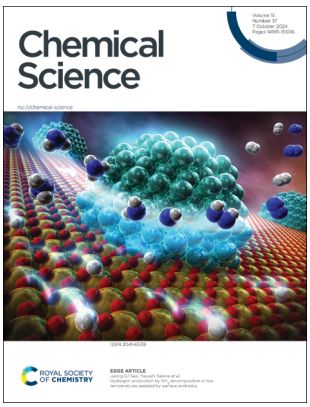
Cover
See Mahendiran Dharmasivam, Des R. Richardson *et al.*, pp. 15109–15124. Image reproduced by permission of Des R. Richardson and Mahendiran Dharmasivam from *Chem. Sci.*, 2024, **15**, 15109.



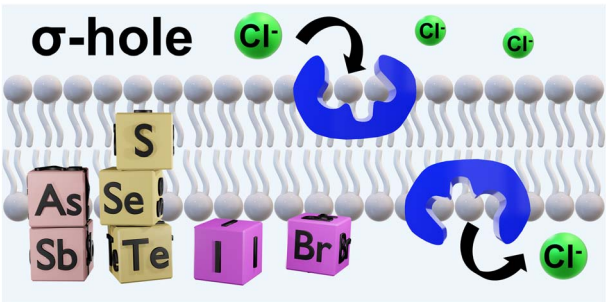
Inside cover
See Jeong Gil Seo, Yasushi Sekine *et al.*, pp. 15125–15133. Image reproduced by permission of Yasushi Sekine from *Chem. Sci.*, 2024, **15**, 15125.

PERSPECTIVE

15006

Anion transporters based on halogen, chalcogen, and pnictogen bonds: towards biological applications

Anurag Singh, Aaron Torres-Huerta, Franck Meyer and Hennie Valkenier*

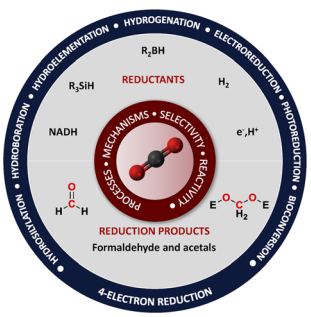


REVIEWS

15023

Four-electron reduction of CO_2: from formaldehyde and acetal synthesis to complex transformations

Sarah Desmons, Julien Bonin,* Marc Robert* and Sébastien Bontemps*



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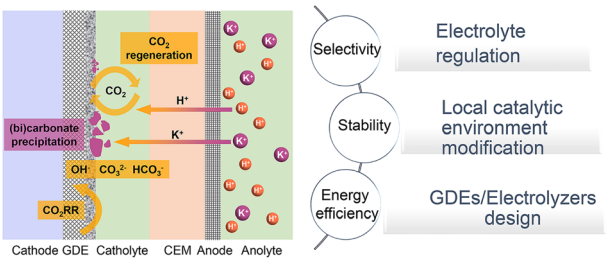
REVIEWS

15087

Accelerating acidic CO_2 electroreduction: strategies beyond catalysts

Bangwei Deng,* Daming Sun, Xueyang Zhao, Lili Wang, Feiyu Ma, Yizhao Li* and Fan Dong*

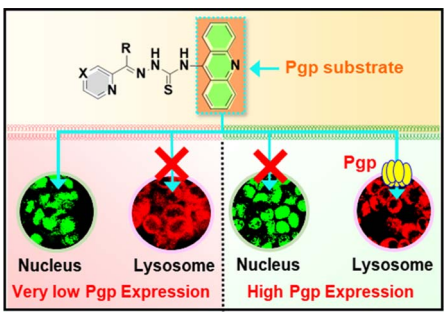


EDGE ARTICLES

15109

Targeting lysosomes by design: novel *N*-acridine thiosemicarbazones that enable direct detection of intracellular drug localization and overcome P-glycoprotein (Pgp)-mediated resistance

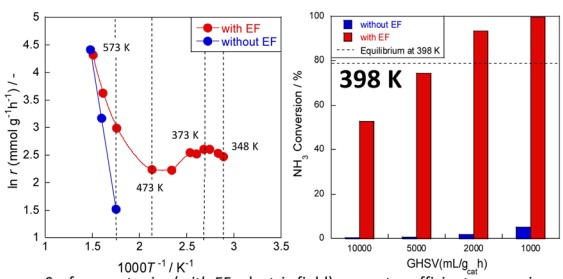
Busra Kaya, Henry Smith, Yanbing Chen, Mahan Gholam Azad, Tiffany M. Russell, Vera Richardson, Paul V. Bernhardt, Mahendiran Dharmasivam* and Des R. Richardson*



15125

Hydrogen production by NH_3 decomposition at low temperatures assisted by surface protonics

Yukino Ofuchi, Kenta Mitarai, Sae Doi, Koki Saegusa, Mio Hayashi, Hiroshi Sampei, Takuma Higo, Jeong Gil Seo* and Yasushi Sekine*

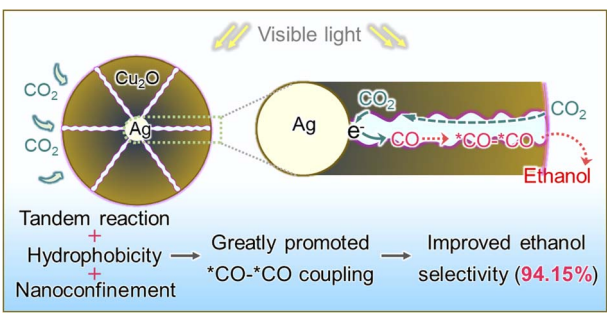


Surface protonics (with EF: electric field) promotes efficient ammonia decomposition at low temperatures.

15134

Nanoconfined tandem three-phase photocatalysis for highly selective CO_2 reduction to ethanol

Hailing Huo, Ting Hu, Zhiqing Zhong, Cheng Zhan, Chengxi Huang, Qiang Ju, Liang Zhang, Fang Wu, Erjun Kan* and Ang Li*



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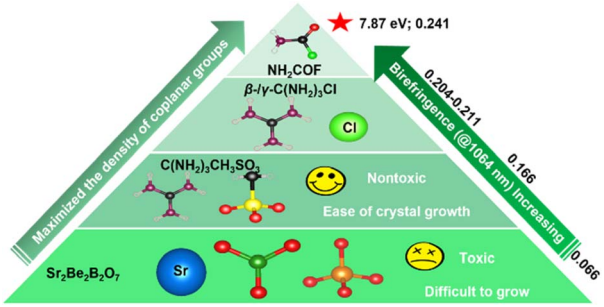
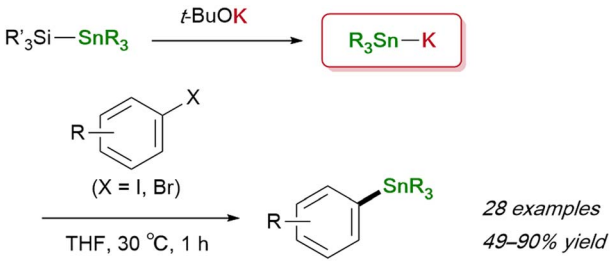


Strategically designed metal-free deep-ultraviolet birefringent crystals with superior optical properties

Yang Li, Xinglong Chen* and Kang Min Ok*

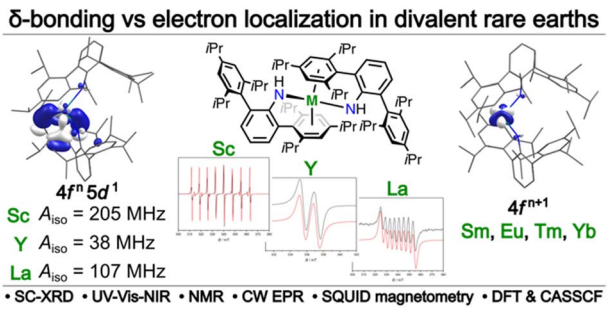
15152



Surefire generation of stannylpotassium: highly reactive stannyl anions and applications

Yuta Hiraoka, Taiki Imagawa, Kazuki Nakanishi, Hinata Kawabe, Masaaki Nakamoto, Takumi Tsushima and Hiroto Yoshida*

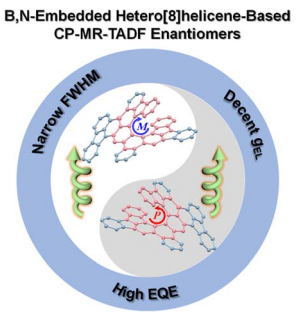
15160



δ-Bonding modulates the electronic structure of formally divalent nd^1 rare earth arene complexes

Ross E. MacKenzie, Tomáš Hajdu, John A. Seed, George F. S. Whitehead, Ralph W. Adams, Nicholas F. Chilton, David Collison, Eric J. L. McInnes and Conrad A. P. Goodwin*

15170



Efficient circularly polarized multiple resonance thermally activated delayed fluorescence from B,N-embedded hetero[8]helicene enantiomers

Tingting Huang, Li Yuan, Xueying Lu, Yupei Qu, Cheng Qu, Yincai Xu,* You-Xuan Zheng* and Yue Wang*

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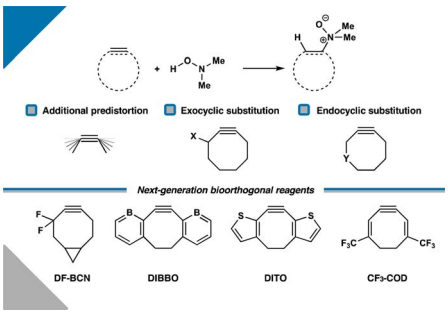
15178

Retro-Cope elimination of cyclic alkynes: reactivity trends and rational design of next-generation bioorthogonal reagents

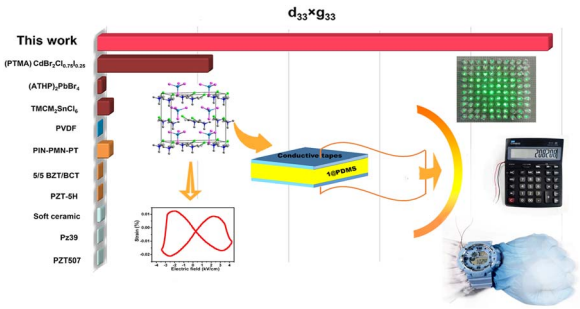
Steven E. Beutick, Song Yu, Laura Orian, F. Matthias Bickelhaupt and Trevor A. Hamlin*



15192

Achievement of a giant electromechanical conversion coefficient in a molecule-based ferroelectric

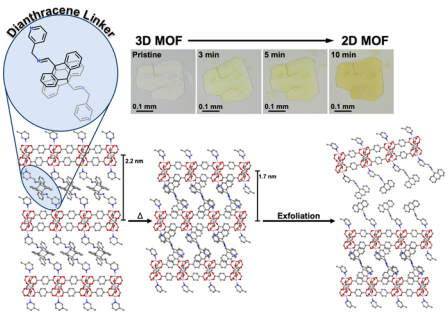
Bin Wang, Zhirui Li, Zhengxiao Tang, Haixia Zhao,* Lasheng Long* and Lansun Zheng



15198

Exfoliation of a metal–organic framework enabled by post-synthetic cleavage of a dipyridyl dianthracene ligand

Madison E. Logelin, Eric Schreiber, Brandon Q. Mercado, Michael J. Burke, Caitlin M. Davis and Amymarie K. Bartholomew*



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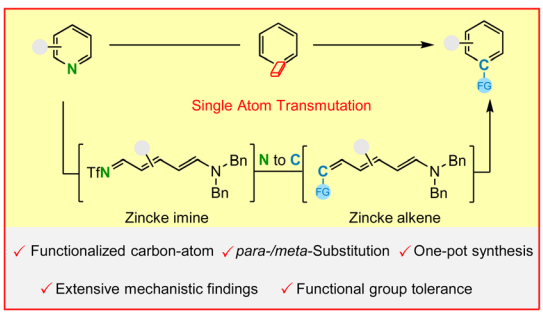
Nitrogen-to-functionalized carbon atom transmutation of pyridine

Fu-Peng Wu, Madina Lenz, Adhya Suresh, Achyut R. Gogoi, Jasper L. Tyler, Constantin G. Daniliuc, Osvaldo Gutierrez* and Frank Glorius*



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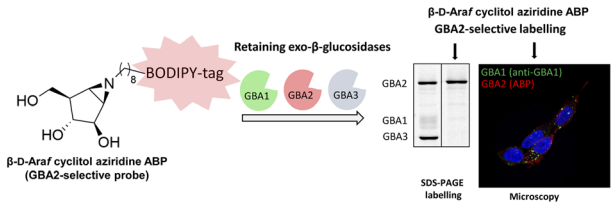
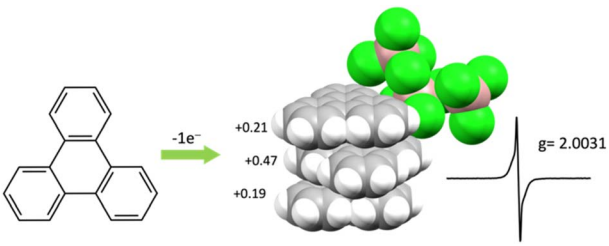


Selective labelling of GBA2 in cells with fluorescent β-D-arabinofuranosyl cyclitol aziridines

Qin Su, Max Louwerse, Rob F. Lammers, Elmer Maurits, Max Janssen, Rolf G. Boot, Valentina Borlandelli, Wendy A. Offen, Daniël Linzel, Sybrin P. Schröder, Gideon J. Davies, Herman S. Overkleeft, Marta Artola* and Johannes M. F. G. Aerts*

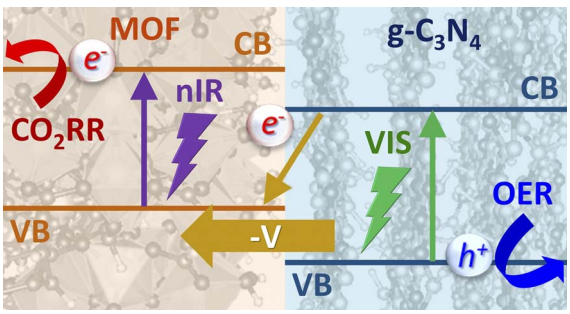
15221



A unique trimeric triphenylene radical cation: stacking aggregation, bonding, and stability

Rameswar Bhattacharjee, Megan E. McCormack, Zheng Zhou, Zheng Wei, Marina A. Petrukhina* and Miklos Kertesz*

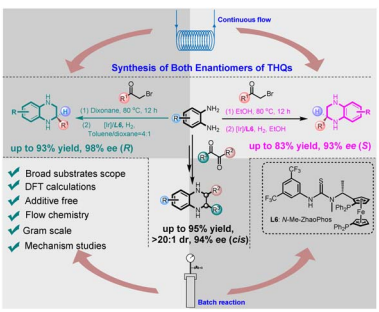
15232



Engineering MOF/carbon nitride heterojunctions for effective dual photocatalytic CO_2 conversion and oxygen evolution reactions

Valentin Diez-Cabanes, Kevin Granados-Tavera, Inderdip Shere, Gloria Cárdenas-Jirón and Guillaume Maurin*

15243



Highly enantioselective synthesis of both enantiomers of tetrahydroquinoxaline derivatives *via* Ir-catalyzed asymmetric hydrogenation

Ana Xu, Lanxing Ren, Junrong Huang, Yuxiang Zhu, Gang Wang, Chaoyi Li, Yongqiang Sun, Lijuan Song,* Hengzhi You* and Fen-Er Chen*

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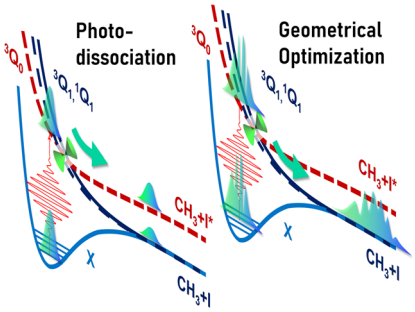
Absolute control over the quantum yield of a photodissociation reaction mediated by nonadiabatic couplings

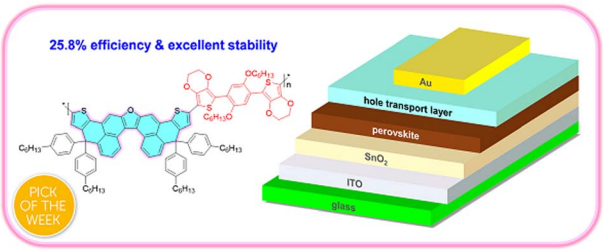
Ignacio R. Sola* and Alberto García-Vela*



15263

Conjugated polymers of an oxa[5]helicene-derived polycyclic heteroaromatic: tailoring energy levels and compatibility for high-performance perovskite solar cells

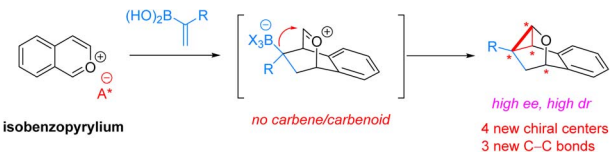
Yaohang Cai, Yuyan Zhang, Lingyi Fang, Yutong Ren, Jidong Zhang, Yi Yuan, Jing Zhang and Peng Wang*



15274

Organocatalytic enantio- and diastereoselective assembly of cyclopropane-incorporated polycyclic molecules *via* isobenzopyrylium ions

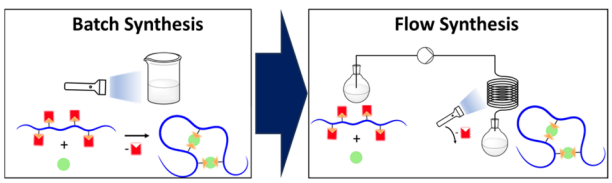
Shuxuan Liu, Chaoshen Zhang,* Zhengyu Han, Hai Huang and Jianwei Sun*



15280

Visible light photoflow synthesis of a Cu(II) single-chain polymer nanoparticle catalyst

Sebastian Gillhuber, Joshua O. Holloway, Kai Mundsinger, Jochen A. Kammerer, Jeffrey R. Harmer, Hendrik Frisch,* Christopher Barner-Kowollik* and Peter W. Roesky*



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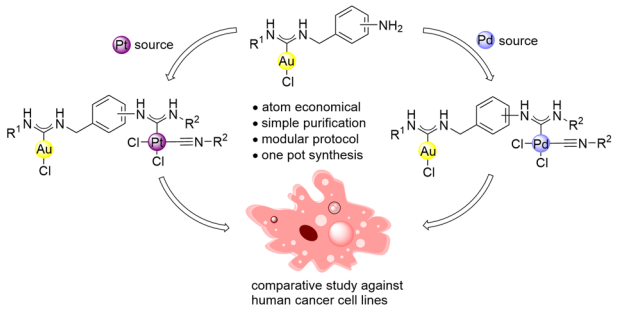
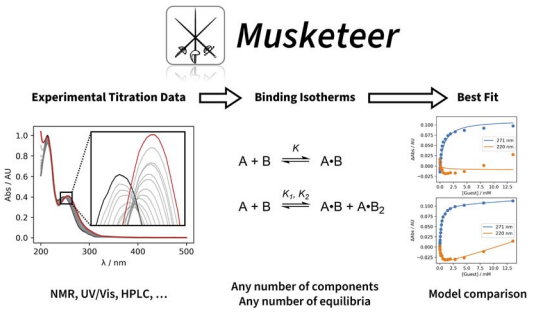


Comparative study of the antiproliferative activity of heterometallic carbene gold(I)–platinum(II) and gold(I)–palladium(II) complexes in cancer cell lines

Martin C. Dietl, Melina Maag, Sophia Ber, Frank Rominger, Matthias Rudolph, Isabella Caligiuri, Pacome K. Andele, Ibraheem A. I. Mkhalid, Flavio Rizzolio, Pablo A. Nogara, Laura Orian, Thomas Scattolin* and A. Stephen K. Hashmi*

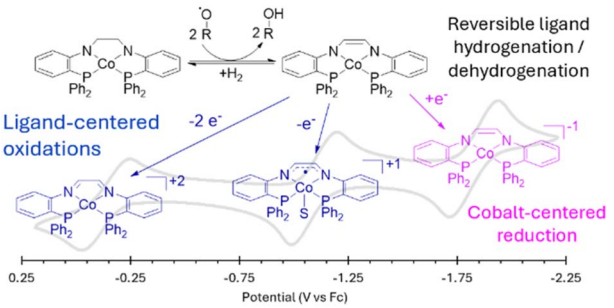
15299



Musketeer: a software tool for the analysis of titration data

Daniil O. Soloviev and Christopher A. Hunter*

15311



Hydrogen atom abstraction as a synthetic route to a square planar Co^{II} complex with a redox-active tetradentate PNNP ligand

Justin D. Miller, Mitchell M. Walsh, Kyounghoon Lee, Curtis E. Moore and Christine M. Thomas*

15321

Integrated "all-in-one" strategy to construct highly efficient Pd catalyst for CO_2 transformation

Lingfang Kong, Zekun Tao, Yunjia Li, Huiwen Gong, Yun Bai, Longbin Li, Xianjin Zhang, Zhonggao Zhou* and Yiwang Chen*

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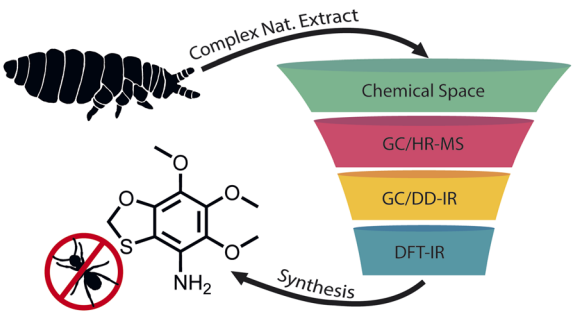
EDGE ARTICLES

15332

Identification of unique highly hetero-substituted benzenes as chemical weapons of springtails by a combination of trace analytical methods with DFT calculations and synthesis

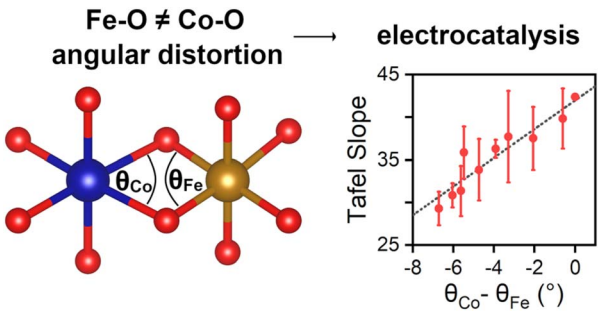
Anton Möllerke, Matthew Stell, Christian Schlawis, Ute Trauer-Kizilelma, Jennifer Herrmann, Hans Petter Leinaas, Stefan Scheu and Stefan Schulz*



15339

Interplay between element-specific distortions and electrocatalytic oxygen evolution for cobalt–iron hydroxides

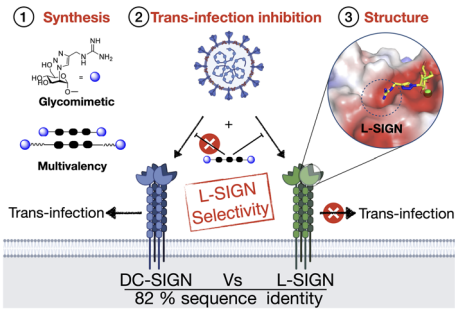
Elif Pınar Alsaç, Marlyn Boke, Justine R. Bissonnette and Rodney D. L. Smith*



15352

Unprecedented selectivity for homologous lectin targets: differential targeting of the viral receptors L-SIGN and DC-SIGN

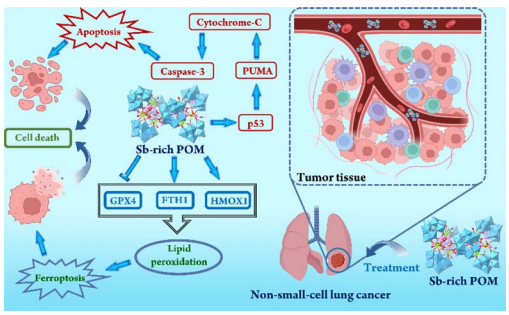
Clara Delaunay, Sara Pollastri, Michel Thépaut, Gianluca Cavazzoli, Laura Belvisi, Clémentine Bouchikri, Nuria Labiod, Fatima Lasala, Ana Gimeno, Antonio Franconetti, Jesús Jiménez-Barbero, Ana Ardá, Rafael Delgado, Anna Bernardi* and Franck Fieschi*



15367

Antitumor effects of a Sb-rich polyoxometalate on non-small-cell lung cancer by inducing ferroptosis and apoptosis

Jie-Wei Lin, Yang Zhou, Hui-Ping Xiao, Lei-Lei Wu, Peng-Cheng Li, Ming-Dong Huang, Dong Xie,* Peng Xu,* Xin-Xiong Li* and Zhi-Xin Li*



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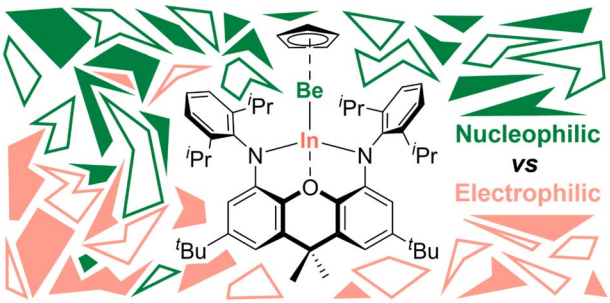
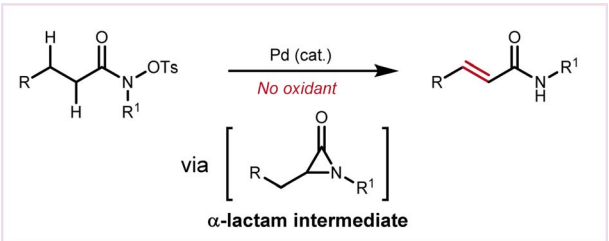


On the nature and limits of alkaline earth–triel bonding

Josef T. Boronski,* Liam P. Griffin, Caroline Conder, Agamemnon E. Crumpton, Lewis L. Wales and Simon Aldridge*

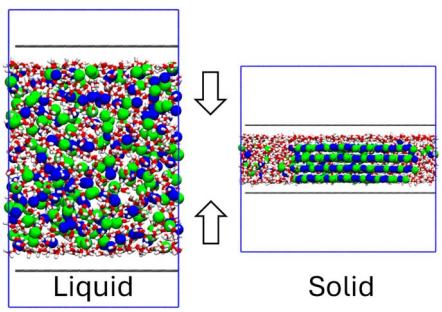
15385



Catalytic dehydrogenative synthesis of α,β-unsaturated secondary amides without external oxidants

Shaokang An, Guoyin Lai and Wenbo H. Liu*

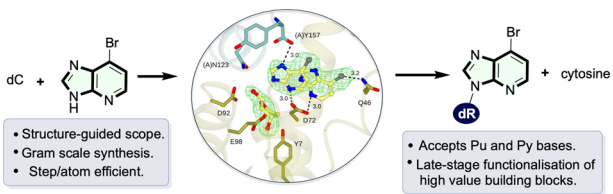
15391



Atomic scale insights into NaCl nucleation in nanoconfined environments

Ruiyu Wang and Pratyush Tiwary*

15399



Gram-scale enzymatic synthesis of 2′-deoxyribonucleoside analogues using nucleoside transglycosylase-2

Admir Salihovic, Alex Ascham, Andrea Taladriz-Sender, Samantha Bryson, Jamie M. Withers, Iain J. W. McKean, Paul A. Hoskisson, Gideon Grogan* and Glenn A. Burley*

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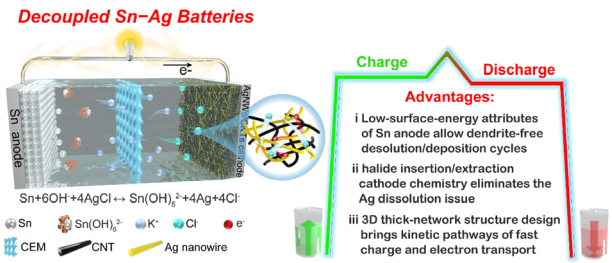
EDGE ARTICLES

15408

Decoupled tin–silver batteries with long cycle life and power output stability based on dendrite-free tin anode and halide insertion cathode chemistry

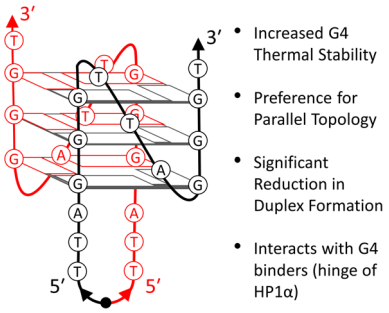
Feifei Shi, Yudong Wu, Binyan Wang, Jiawei Bai, Yihan Ren, Tao Yang, Funian Mo,* Derek Ho and Haibo Hu*



15417

Inverted strand polarity yields thermodynamically stable G-quadruplexes and prevents duplex formation within extended DNA

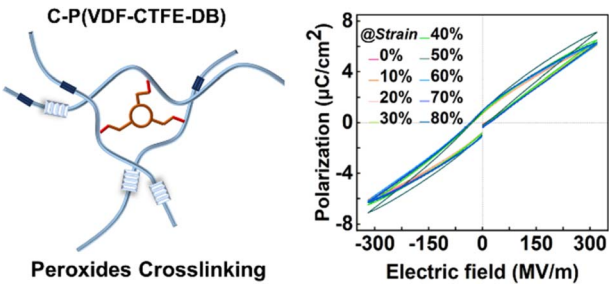
Bruce Chilton, Ruby J. Roach, Patrick J. B. Edwards, Geoffrey B. Jameson, Tracy K. Hale and Vyacheslav V. Filichev*



15432

Highly elastic relaxor ferroelectric *via* peroxide crosslinking

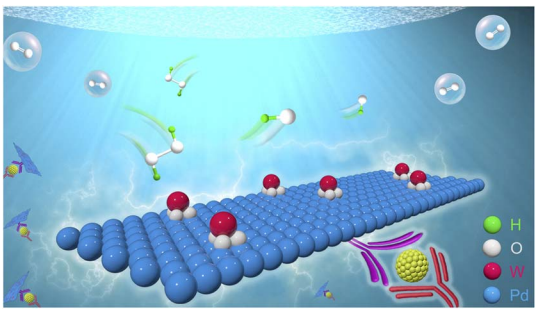
Liang Gao, Linping Wang and Ben-Lin Hu*



15440

Oxygen-bridged W-Pd atomic pairs enable H_2O_2 activation for sensitive immunoassays

Chengjie Chen, Dongbo Yan, Xiangkun Jia, Ruimin Li, Lijun Hu, Xiaotong Li, Lei Jiao,* Chengzhou Zhu, Yanling Zhai* and Xiaoquan Lu



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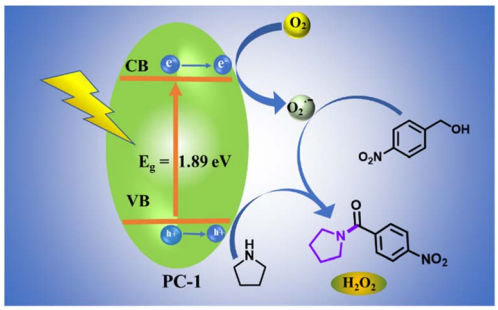
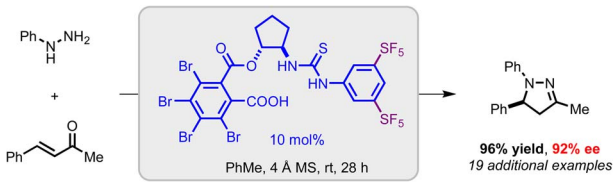
15448



Visible light-driven molecular oxygen activation for oxidative amidation of alcohols using lead-free metal halide perovskite

Vishesh Kumar, Ved Vyas, Deepak Kumar, Ashish Kumar Kushwaha and Arindam Indra*

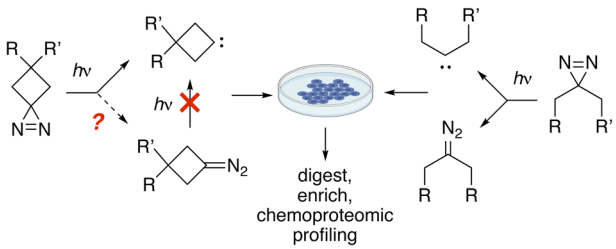
15456



Catalytic enantioselective synthesis of 2-pyrazolines *via* one-pot condensation/6π-electrocyclization: 3,5-bis(pentafluorosulfanyl)-phenylthioureas as powerful hydrogen bond donors

Moises A. Romero Reyes, Subhradeep Dutta, Minami Odagi, Chang Min and Daniel Seidel*

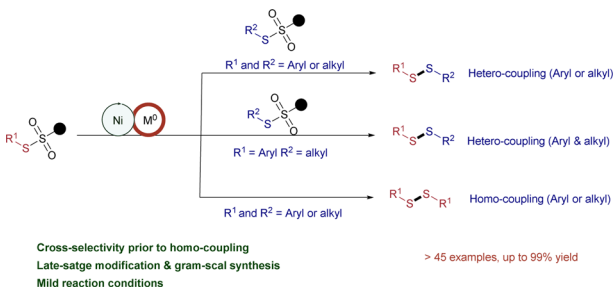
15463



Mechanistic differences between linear *vs.* spirocyclic dialkyldiazirine probes for photoaffinity labeling

Jessica G. K. O'Brien, Louis P. Conway, Paramesh K. Ramaraj, Appaso M. Jadhav, Jun Jin, Jason K. Dutra, Parrish Evers, Shadi S. Masoud, Manuel Schupp, Iakovos Saridakis, Yong Chen, Nuno Maulide, John P. Pezacki, Christopher W. am Ende,* Christopher G. Parker* and Joseph M. Fox*

15474



Nickel-catalyzed selective disulfide formation by reductive cross-coupling of thiosulfonates

Tingting Yuan, Xiang-Yu Chen, Tengfei Ji, Huifeng Yue, Kathiravan Murugesan and Magnus Rueping*

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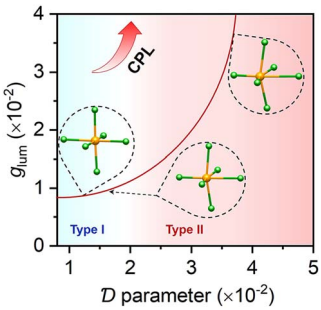
EDGE ARTICLES

15480

Boosting circularly polarized luminescence by optimizing off-centering octahedral distortion in zero-dimensional hybrid indium-antimony halides

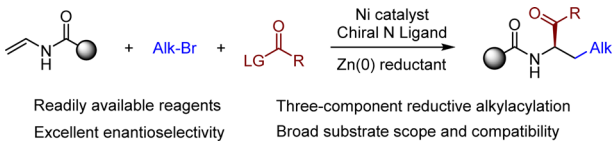
Yulian Liu, Yi Wei, Zhishan Luo, Bin Xu, Meiying He, Peibin Hong, Chen Li and Zewei Quan*



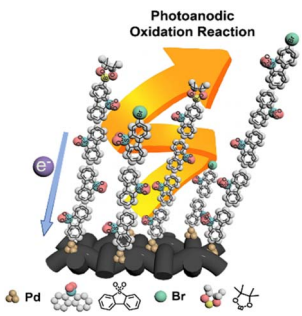
15489

Ni-catalyzed enantioselective three-component reductive alkylacylation of alkenes: modular access to structurally complex α-amino ketones

Jichao Xiao, Tingting Jia, Shuang Chen, Mengxiao Pan and Xingwei Li*



15496

Films of linear conjugated polymer as photoanodes for oxidation reactions

Shuming Chai, Shun Zhao, Jiaxin Su, Jinshui Zhang, Xiong Chen,* Reiner Sebastian Sprick* and Yuanxing Fang*