

# Chemical Science

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### Cover

See Nathan T. Coles, Samuel E. Neale, Christian Müller et al., pp. 5496–5506. Image reproduced by permission of Richard Otto Kopp from *Chem. Sci.*, 2024, 15, 5496.



### Inside cover

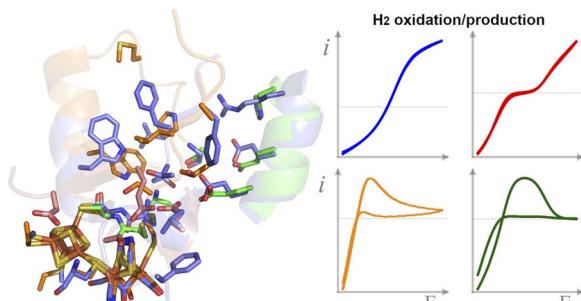
See Christophe Léger et al., pp. 5418–5433. Image reproduced by permission of Laurent Eisler from *Chem. Sci.*, 2024, 15, 5418. Artwork by Laurent Eisler.

## PERSPECTIVES

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### Outer-sphere effects on the O<sub>2</sub> sensitivity, catalytic bias and catalytic reversibility of hydrogenases

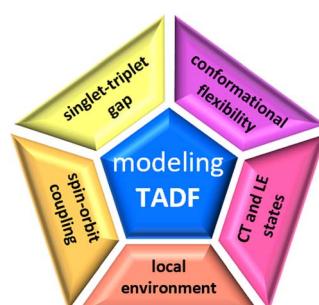
Andrea Fasano, Vincent Fourmond and Christophe Léger\*



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### Shedding light on thermally-activated delayed fluorescence

Francesco Di Maiolo, D. K. Andrea Phan Huu, Davide Giavazzi, Andrea Landi, Ottavia Racchi and Anna Painelli\*





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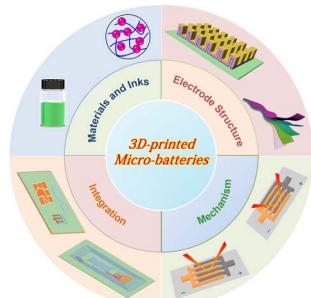
Fundamental questions  
Elemental answers

## REVIEWS

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**The status and challenging perspectives of 3D-printed micro-batteries**

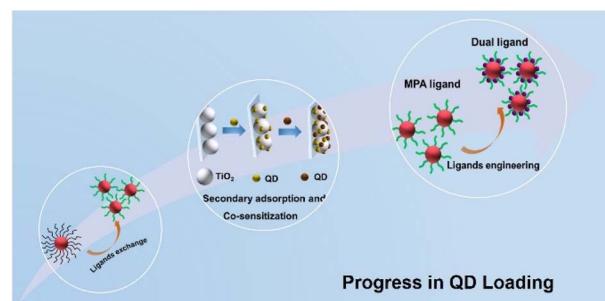
Jiaxin Ma, Shuanghao Zheng,\* Yinghua Fu, Xiao Wang, Jieqiong Qin and Zhong-Shuai Wu\*



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**Improving the efficiency of quantum dot-sensitized solar cells by increasing the QD loading amount**

Zhengyan Zhang, Wenran Wang, Huashang Rao, Zhenxiao Pan\* and Xinhua Zhong\*

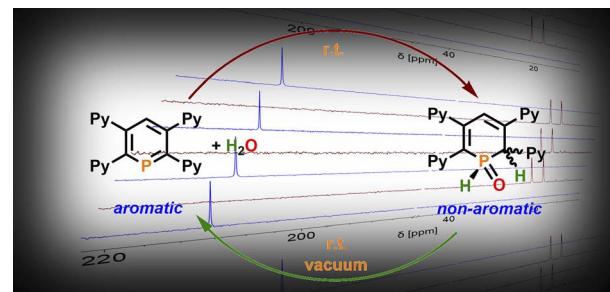


## EDGE ARTICLES

5496

**Highly selective, reversible water activation by P,N-cooperativity in pyridyl-functionalized phosphinines**

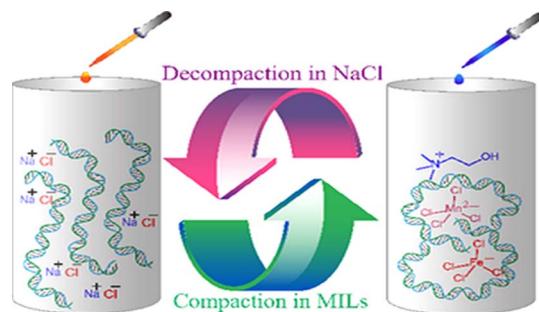
Richard O. Kopp, Sabrina L. Kleynemeyer, Lucie J. Groth, Moritz J. Ernst, Susanne M. Rupf, Manuela Weber, Laurence J. Kershaw Cook, Nathan T. Coles,\* Samuel E. Neale\* and Christian Müller\*



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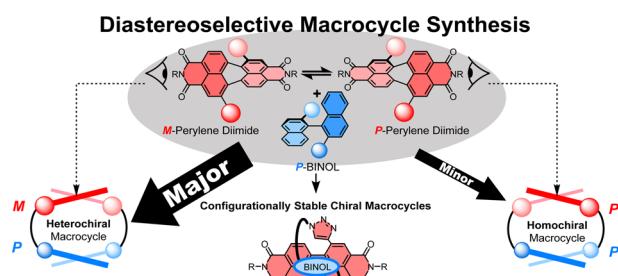
**Critical assessment of interactions between ct-DNA and choline-based magnetic ionic liquids: evidences of compaction**

Kiran Devi Tulsiyan, Saroj Kumar Panda, Malay Kumar Rana\* and Himansu S. Biswal\*



## EDGE ARTICLES

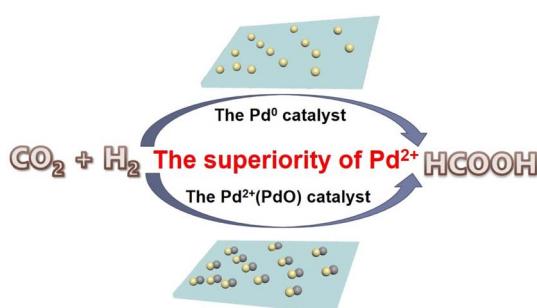
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**Investigating the diastereoselective synthesis of a macrocycle under Curtin–Hammett control**

Angus Yeung, Martijn A. Zwijnenburg, Georgia R. F. Orton, Jennifer H. Robertson and Timothy A. Barendt\*

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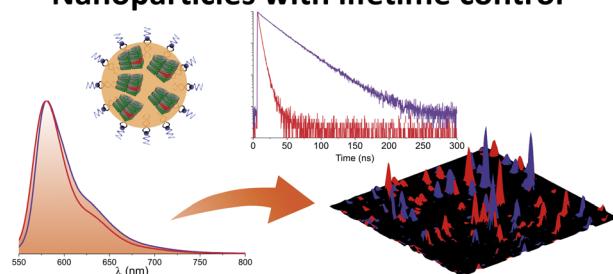


**The superiority of  $\text{Pd}^{2+}$  in  $\text{CO}_2$  hydrogenation to formic acid**

Yanyan Wang, Minghua Dong, Shaopeng Li, Bingfeng Chen, Huizhen Liu\* and Buxing Han\*

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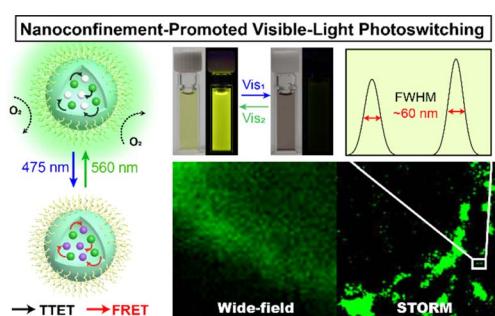
**Nanoparticles with lifetime control**



**Control of the fluorescence lifetime in dye based nanoparticles**

Stine G. Stenspil, Junsheng Chen, Mikkel B. Løisberg, Amar H. Flood and Bo W. Laursen\*

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**Amplifying dual-visible-light photoswitching in aqueous media via confinement promoted triplet–triplet energy transfer**

Wenhui Wang, Weixin Yang, Zhiwei Zhang, Jinghong Dai, Yisheng Xu and Junji Zhang\*

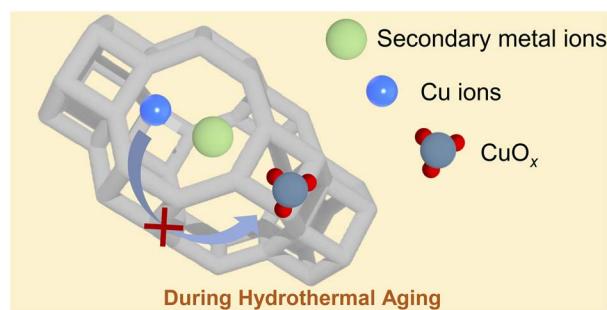


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**Improving the hydrothermal stability of Al-rich Cu-SZ-13 zeolite via Pr-ion modification**

Mengyang Chen, Wenru Zhao, Yingzhen Wei, Shi-Bin Ren, Yuxiang Chen, Donghai Mei,\* De-Man Han\* and Jihong Yu\*



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**Pendulum-like hemilability in a Ti-based frustrated Lewis Trio**

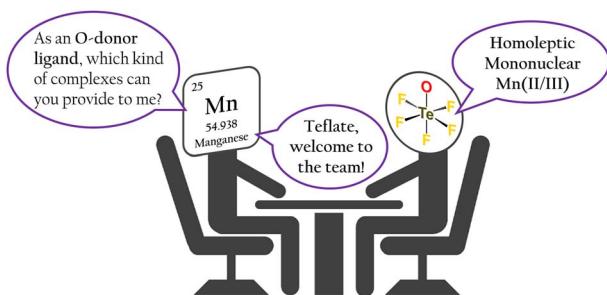
Errikos Kounalis, Dylan van Tongeren, Stanislav Melnikov, Martin Lutz and Daniël L. J. Broere\*



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**Questing for homoleptic mononuclear manganese complexes with monodentate O-donor ligands**

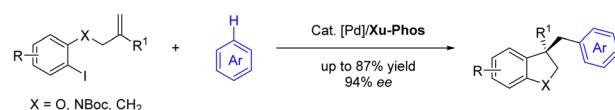
Alberto Pérez-Bitrián,\* Julen Munárriz,\* Konstantin B. Krause, Johanna Schlägl, Kurt F. Hoffmann, Johanna S. Sturm, Amiera N. Hadi, Christian Teutloff, Anja Wiesner, Christian Limberg and Sebastian Riedel\*



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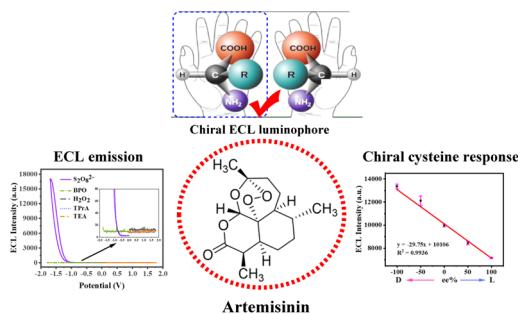
**Palladium/XuPhos-catalyzed enantioselective cascade Heck/intermolecular C(sp<sup>2</sup>)–H alkylation reaction**

Chao Fang, Quan-Pu Wang, Bing Xu, Zhan-Ming Zhang\* and Junliang Zhang\*



## EDGE ARTICLES

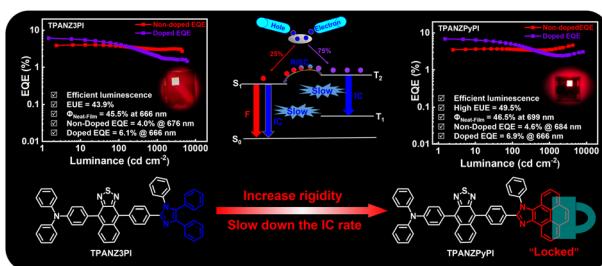
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### Artemisinin: a novel chiral electrochemiluminescence luminophore-assisted enantiospecific recognition and mechanism identification

Jiangyan Wang, Zhengang Han, Tianrui Shang, Yanjun Feng, Ruirui Liu and Xiaoquan Lu\*

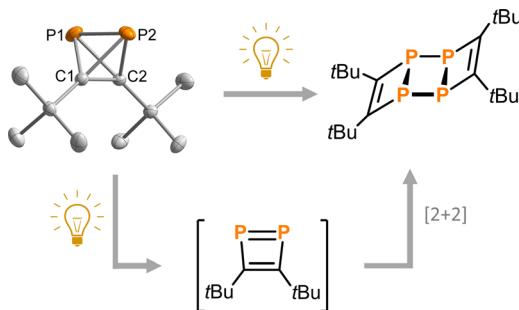
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### Efficient near-infrared emission benefits from slowing down the internal conversion process

Mingliang Xie, Yannan Zhou, Huayi Zhou, Chengling Ma, Qikun Sun, Shi-Tong Zhang, Yujian Zhang,\* Wenjun Yang and Shanfeng Xue\*

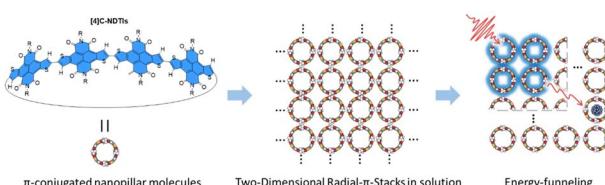
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### Structure and photochemistry of di-*tert*-butylidiphosphatetrahedrane

Gabriele Hierlmeier,\* Roger Jan Kutta, Peter Coburger, Hans-Georg Stammmer, Jan Schwabedissen, Norbert W. Mitzel,\* Maria Dimitrova, Raphael J. F. Berger, Patrick Nuernberger\* and Robert Wolf\*

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### Two-dimensional radial- $\pi$ -stacks in solution

Feng Su, Yongseok Hong, Guilan Zhang, Kongchuan Wu, Juno Kim, Zhi Chen, Hui-Jun Zhang, Dongho Kim\* and Jianbin Lin\*

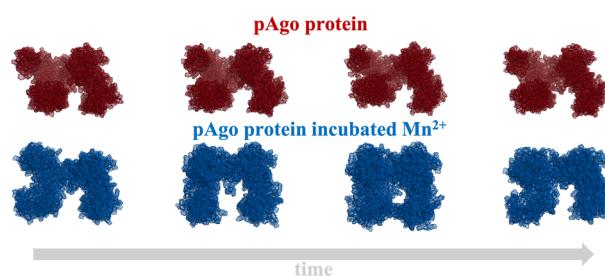


## EDGE ARTICLES

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**Mn<sup>2+</sup>-induced structural flexibility enhances the entire catalytic cycle and the cleavage of mismatches in prokaryotic argonaute proteins**

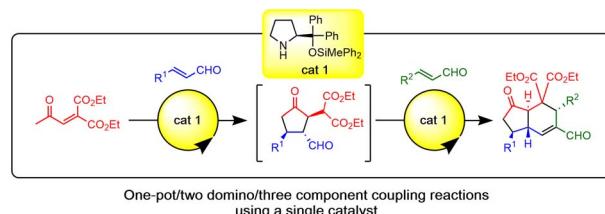
Lirong Zheng, Bingxin Zhou,\* Yu Yang, Bing Zan, Bozitao Zhong, Banghao Wu, Yan Feng, Qian Liu\* and Liang Hong\*



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**Organocatalyst-mediated asymmetric one-pot/two domino/three-component coupling reactions for the synthesis of *trans*-hydrindanes**

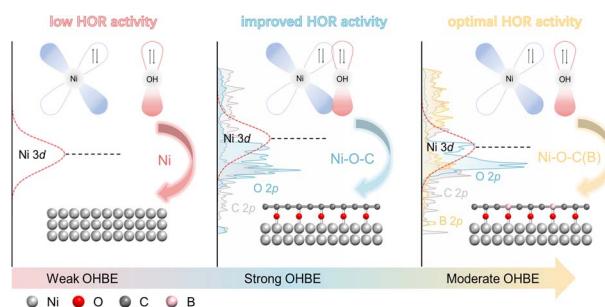
Naoki Mori, Toshiki Tachibana, Nariyoshi Umekubo and Yujiro Hayashi\*



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**Revealing the role of a bridging oxygen in a carbon shell coated Ni interface for enhanced alkaline hydrogen oxidation reaction**

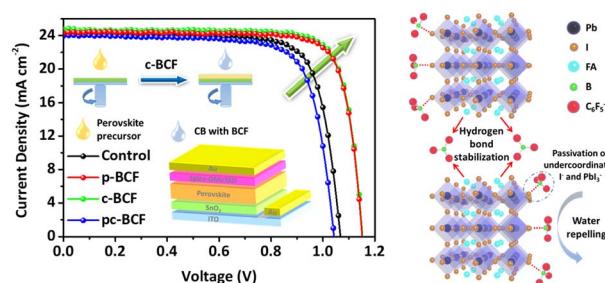
Pengyu Han, Xinyi Yang, Liqing Wu, Hongnan Jia and Wei Luo\*



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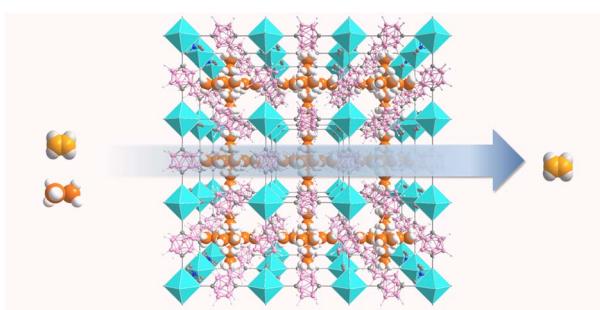
**Engineering the passivation routes of perovskite films towards high performance solar cells**

Liangzheng Zhu, Shendong Xu, Guozhen Liu, Long Liu, Han Zhou, Zhiqiang Ai, Xu Pan\* and Fapei Zhang\*



## EDGE ARTICLES

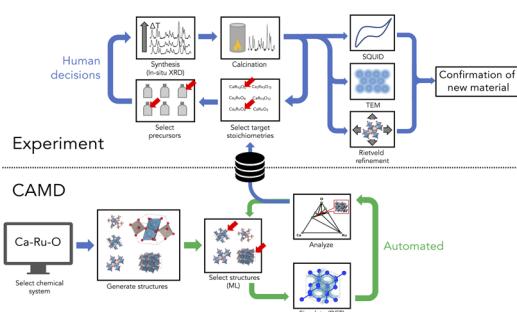
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**A novel hydrophobic carborane-hybrid microporous material for reversed  $C_2H_6$  adsorption and efficient  $C_2H_4/C_2H_6$  separation under humid conditions**

Lingyao Wang, Shuangshuang Wu, Jianbo Hu, Yunjia Jiang, Jiahao Li, Yongqi Hu, Yan Han, Teng Ben, Banglin Chen and Yuanbin Zhang\*

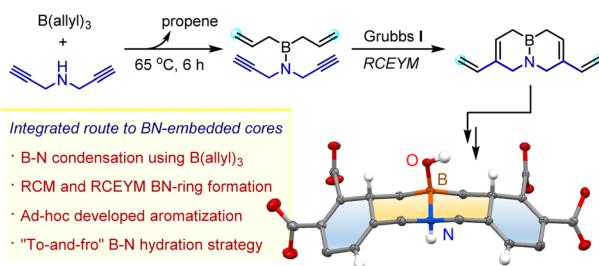
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**How the AI-assisted discovery and synthesis of a ternary oxide highlights capability gaps in materials science**

Joseph H. Montoya,\* Carolyn Grimley, Muratahan Aykol, Colin Ophus, Hadas Sternlicht, Benjamin H. Savitzky, Andrew M. Minor, Steven B. Torrisi, Jackson Goedjen, Ching-Chang Chung, Andrew H. Comstock and Shijing Sun

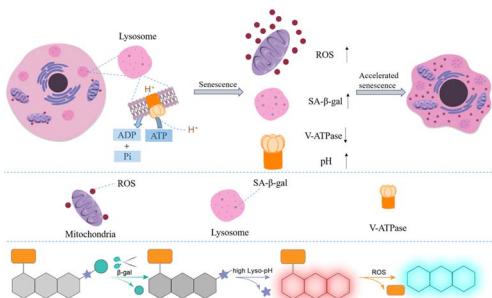
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**From propenolysis to enyne metathesis: tools for expedited assembly of 4a,8a-azaboranaphthalene and extended polycycles with embedded BN**

Federica Rulli, Guillem Sanz-Liarte, Pol Roca, Nina Martínez, Víctor Medina, Raimon Puig de la Bellacasa, Alexandr Shafir\* and Ana B. Cuenca\*

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**A near-IR ratiometric fluorescent probe for the precise tracking of senescence: a multidimensional sensing assay of biomarkers in cell senescence pathways**

Haihong Liu, Ruidian Lv, Fuxiang Song, Yaqun Yang, Fei Zhang, Liantao Xin, Peng Zhang,\* Qian Zhang\* and Caifeng Ding\*

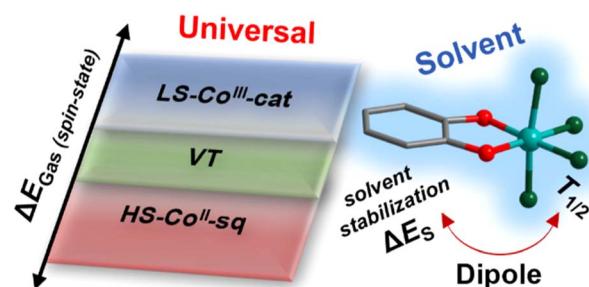


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**Predicting valence tautomerism in diverse cobalt-dioxolene complexes: elucidation of the role of ligands and solvent**

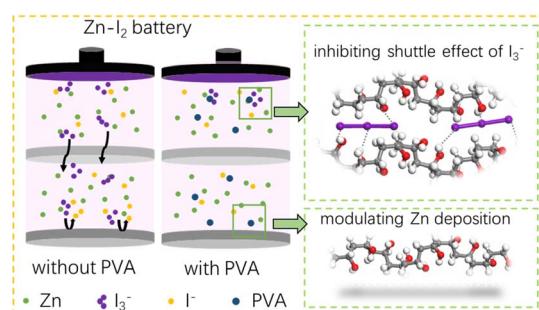
F. Zahra M. Zahir, Moya A. Hay, Jett T. Janetzki, Robert W. Gable, Lars Goerigk\* and Colette Boskovic\*



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**Restraining the shuttle effect of polyiodides and modulating the deposition of zinc ions to enhance the cycle lifespan of aqueous Zn–I<sub>2</sub> batteries**

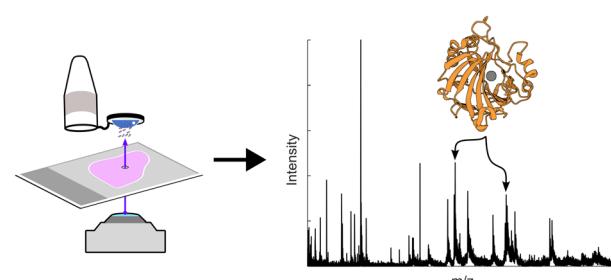
Qu Yue,\* Yu Wan, Xiaoqin Li, Qian Zhao, Taotao Gao, Guowei Deng, Bing Li and Dan Xiao\*



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**Laser capture microdissection and native mass spectrometry for spatially-resolved analysis of intact protein assemblies in tissue**

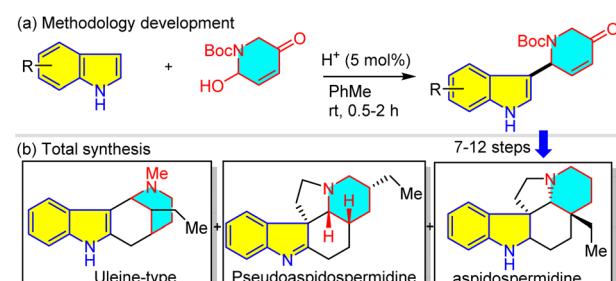
James W. Hughes, Emma K. Sisley, Oliver J. Hale and Helen J. Cooper\*



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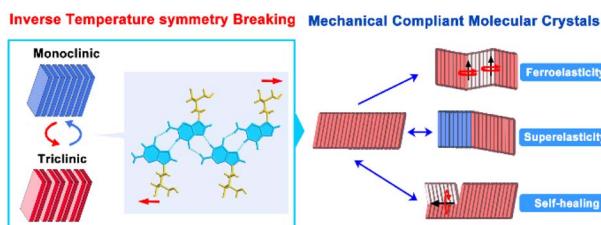
**Aza-Achmatowicz rearrangement coupled with intermolecular aza-Friedel–Crafts enables total syntheses of uleine and aspidosperma alkaloids**

Foqing Ma, Yunlong Li, Kornkamon Akkarasereenon, Huiying Qiu, Yuen Tszi Cheung, Zhihong Guo and Rongbiao Tong\*



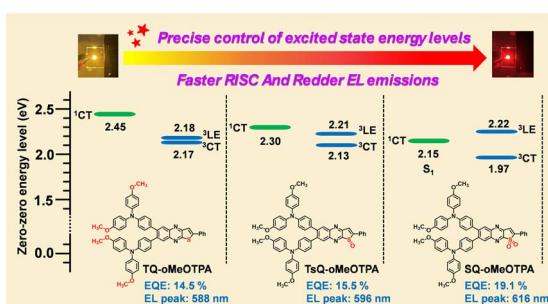
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**Shape memory and self-healing in a molecular crystal with inverse temperature symmetry breaking**

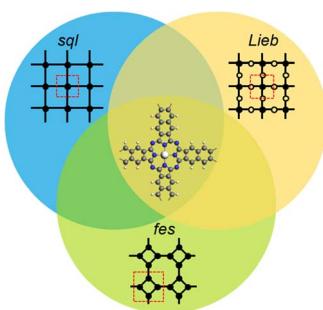
Jiantao Meng, Yuan Su, Hang Zhu and Ting Cai\*

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**Efficient red thermally activated delayed fluorescence emitters achieved through precise control of excited state energy levels**

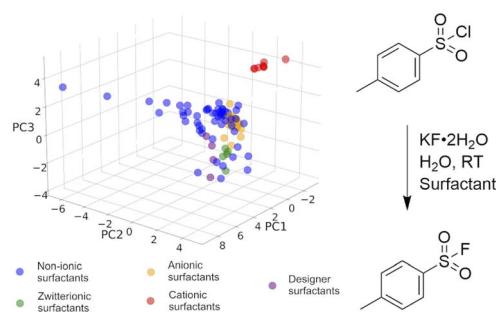
Bohua Zhang, Siqi Liu, Jiangxue Pei, Meiting Luo, Yi Chen, Qingyu Jia, Zhaoxin Wu and Dongdong Wang\*

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**Electronic Lieb lattice signatures embedded in two-dimensional polymers with a square lattice**

Yingying Zhang, Shuangjie Zhao, Miroslav Položij and Thomas Heine\*

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**Activation of fluoride anion as nucleophile in water with data-guided surfactant selection**

Krishna Sharma, Alison McCorry, Samuel Boobier, James Mottram, Rachel Napier, Ian W. Ashworth, A. John Blacker, Nikil Kapur, Stuart L. Warriner, Megan H. Wright and Bao N. Nguyen\*



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## Non-invasive diagnosis of bacterial and non-bacterial inflammations using a dual-enzyme-responsive fluorescent indicator

Yue He, Majun Yang, Jingyi Cui, Can Zhao, Bin Jiang, Jiayun Guan, Xiaobo Zhou, Miao He, Yaya Zhen, Yuxue Zhang, Rongrong Jing, Qi Wang,\* Yuling Qin\* and Li Wu\*

