

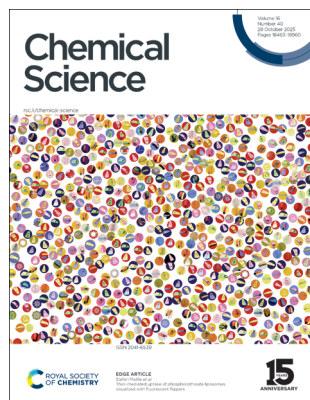
# Chemical Science

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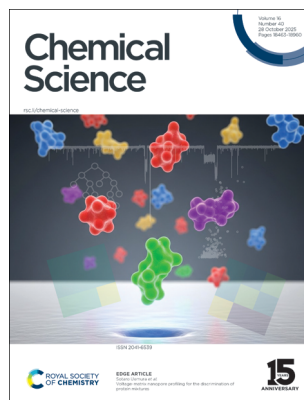
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## IN THIS ISSUE

ISSN 2041-6539 CODEN CSHCBM 16(40) 18463–18960 (2025)



**Cover**  
See Stefan Matile *et al.*, pp. 18599–18606. Image reproduced by permission of Stefan Matile from *Chem. Sci.*, 2025, 16, 18599.



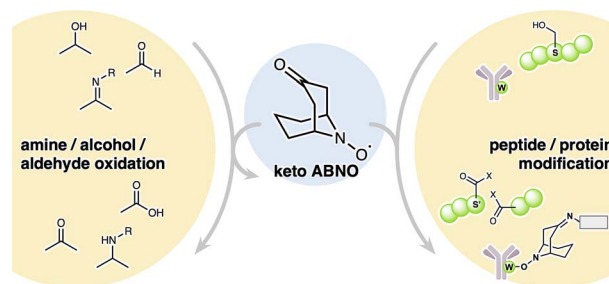
**Inside cover**  
See Sotaro Uemura *et al.*, pp. 18607–18615. Image reproduced by permission of Sotaro Uemura from *Chem. Sci.*, 2025, 16, 18607. Google Gemini was used in the process of creating the image.

## COMMENTARY

18478

### A reflection on ketoABNO: the crossing point between organic synthesis and protein modification

Moe Toyobe and Motomu Kanai\*

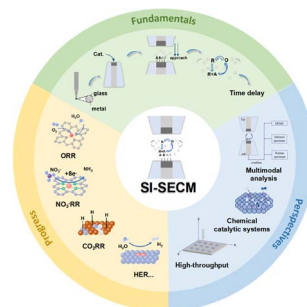


## PERSPECTIVES

18482

### Surface interrogation of advanced electrocatalysts by scanning electrochemical microscopy: fundamentals, progress and perspectives

Rui Yang, Lin Yang, Wenhao Yong, Panpan Li, Min Zhou\* and Zhaoyu Jin\*



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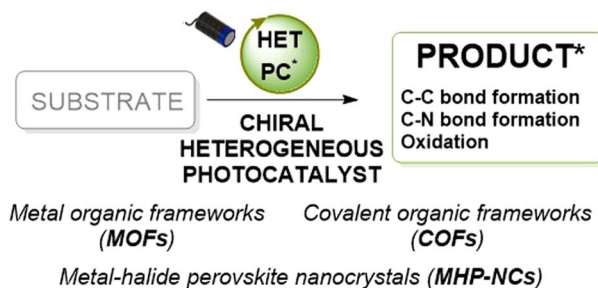
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## PERSPECTIVES

18496

### Chiral heterogeneous photocatalysts for enantioselective synthesis: standing on the shoulders of organocatalysis

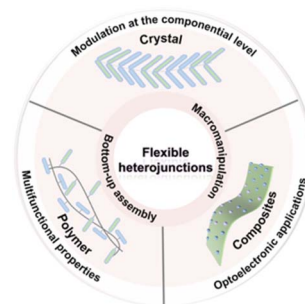
Camilla Callegari, Marco Moroni, Davide Ravelli\* and Lorenzo Malavasi\*



18504

### Emerging flexible heterojunctions: fabrication, properties and optoelectronic applications

Meiqi Dai and Dongpeng Yan\*

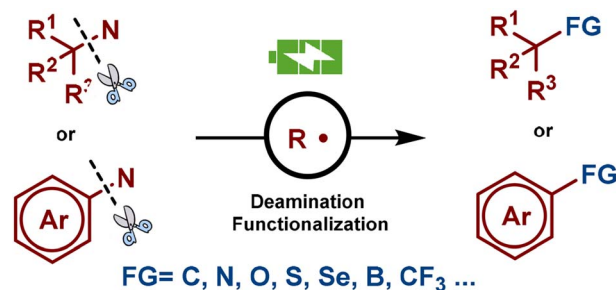


## REVIEWS

18519

### Electrochemical deamination functionalization via C–N bond cleavage and radical formation

Zhenlei Zou, Jie Dong, Yuntian Shi, Wangzhe Chen, Weigang Zhang\* and Yi Wang\*



18535

### Gas-mediated cancer therapy: advances in delivery strategies and therapeutic mechanisms

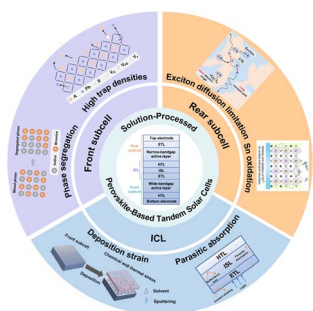
Jiaqi Yin, Jiarui Zhong, Wei Pan, Yanhua Li,\* Na Li\* and Bo Tang

Materials	Methods of Generation	Gas Types	Mechanisms of Action
<ul style="list-style-type: none"> <li>AuNPs</li> <li>MOFs</li> <li>COFs</li> </ul>	<ul style="list-style-type: none"> <li>Using O<sub>2</sub> carriers</li> <li>Intracellular H<sub>2</sub>O<sub>2</sub> decomposition</li> <li>In situ O<sub>2</sub> generation strategies</li> <li>Applying O<sub>2</sub> economizers</li> </ul>	Oxygen	<ul style="list-style-type: none"> <li>Hypoxia alleviation</li> <li>Promoting the production of ROS</li> <li>Enhancing other therapies (such as chemotherapy, RT, PDT)</li> </ul>
<ul style="list-style-type: none"> <li>Polymers</li> <li>Liposomes</li> </ul>	<ul style="list-style-type: none"> <li>Transition metal-carbonyl complexes</li> <li>Metal-free CO donors and nanosystems</li> <li>Converting CO<sub>2</sub> into CO</li> </ul>	Carbon monoxide	<ul style="list-style-type: none"> <li>Inhibiting mitochondrial respiration</li> <li>Deepening oxidative stress</li> <li>Inhibiting the expression of MMPs</li> <li>Improving EPR effect</li> <li>Macrophage reprogramming</li> </ul>
<ul style="list-style-type: none"> <li>Microorganisms</li> <li>Gas donors</li> </ul>	<ul style="list-style-type: none"> <li>NO delivery strategies based on endogenous stimuli</li> <li>NO delivery strategies based on exogenous stimuli</li> </ul>	Nitric oxide	<ul style="list-style-type: none"> <li>Inhibiting mitochondrial respiration</li> <li>Generating more toxic ROS</li> <li>Causing DNA damage</li> <li>Reversal of MDR</li> <li>Improving immunotherapy</li> </ul>
<ul style="list-style-type: none"> <li>Hydrogel</li> </ul>	<ul style="list-style-type: none"> <li>H<sub>2</sub> release based on exogenous stimuli</li> <li>H<sub>2</sub> release based on endogenous stimuli</li> <li>Direct transportation of H<sub>2</sub></li> </ul>	Hydrogen	<ul style="list-style-type: none"> <li>Reducing -OH and ONOO<sup>-</sup></li> <li>Anti-inflammatory</li> <li>Disruption of P-gp</li> <li>Deepening oxidative stress</li> </ul>



## REVIEWS

18559

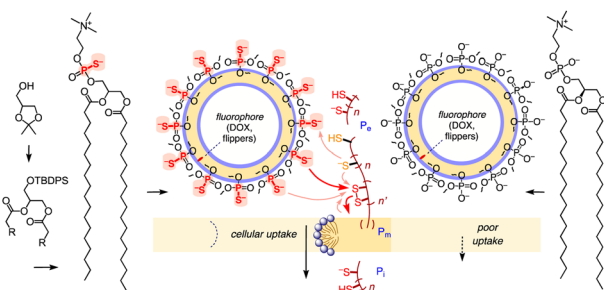


## Towards commercialization: perspectives and challenges of solution-processed perovskite-based tandem photovoltaics

Jiaxiang Lv, Liyun Le, Shuo Yao, Zengqi Huang\* and Yiwang Chen\*

## EDGE ARTICLES

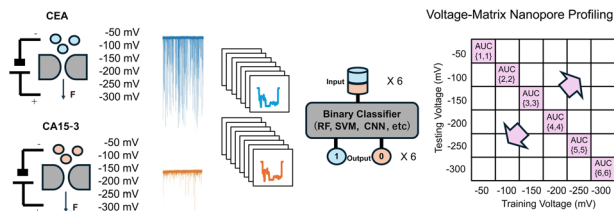
18599



## Thiol-mediated uptake of phosphorothioate liposomes, visualized with fluorescent flippers

Jules Bouffard, Felix Bayard, Naomi Sakai and Stefan Matile\*

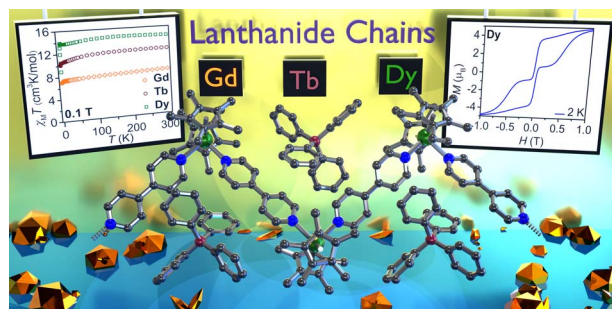
18607



## Voltage-matrix nanopore profiling for the discrimination of protein mixtures

Ryo Akita, Artem Lysenko, Keith A. Boroevich, Tatsuya Yokota, Daiki Kawai, Ryo Iizuka, Tatsuhiko Tsunoda and Sotaro Uemura\*

18616



## Magnetic hysteresis in 1D organometallic lanthanide chain compounds containing 4,4'-bipyridine

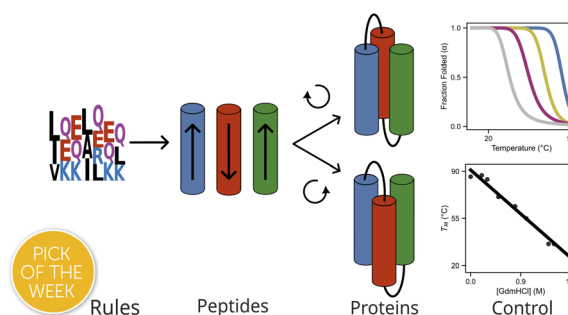
Ernesto Castellanos, Florian Benner, Saroshan Deshapriya and Selvan Demir\*



18632

### De novo designed 3-helix bundle peptides and proteins with controlled topology and stability

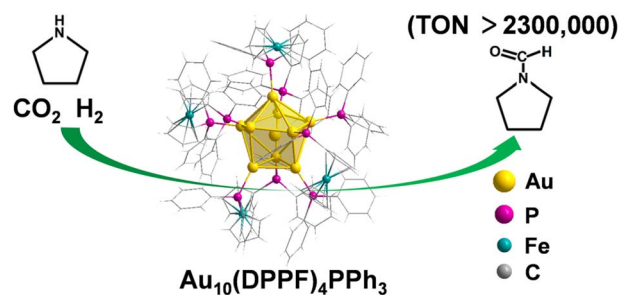
Xiyue Leng, Katherine I. Albanese, Lia R. Golub, Arthur A. Norman, Jonathan Clayden and Derek N. Woolfson\*



18642

### An atomically precise $\text{Au}_{10}(\text{DPPF})_4\text{PPh}_3$ cluster catalyst for N-hydroformylation of amines

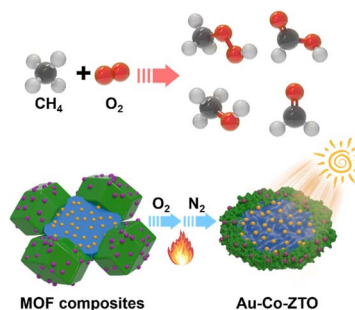
Guangjun Li, Guoao Li, Xinyi Liang, Yiqi Tian, Jinzhi Lu, Xinyi Xu, Xu Liu, Jing Ma, Shuhua Li\* and Yan Zhu\*



18652

### Engineered interface coverage and precise cocatalyst placement in MOF-derived heterojunction photocatalysts for selective methane oxidation

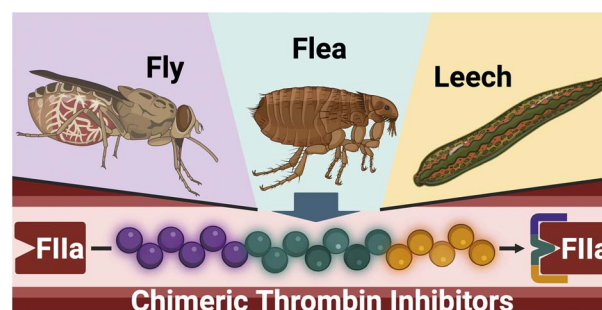
Wendi Zhao, Kang Sun, Jiayi Xu, Zhongyuan Lin, Qihui Chen,\* Maochun Hong and Hai-Long Jiang\*



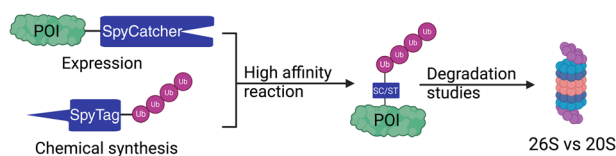
18660

### Engineering ultrapotent trivalent anticoagulants through hybridisation of salivary peptides from multiple haematophagous organisms

Joshua W. C. Maxwell, Jorge Ripoll-Rozada, Angus S. Mackay, Imala Alwis, Daniel J. Ford, Cameron B. J. Trought, Joana A. Santos, Rhyl E. Smythe, Joanna S. T. Liu, Zack Zuccolotto, Simone M. Schoenwaelder, Shaun P. Jackson, Pedro José Barbosa Pereira and Richard J. Payne\*



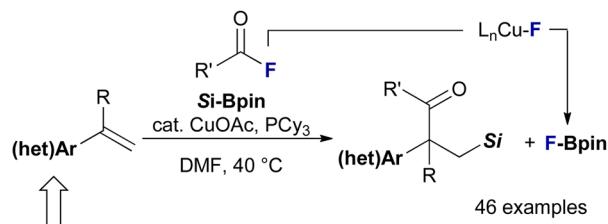
18673



### SpyTag/SpyCatcher-mediated protein ubiquitination to investigate 20S and 26S proteasomal degradation

Julia Kriegesmann, Shahar Levi, Mahdi Hasan, Eman Nassar, Michael Glickman and Ashraf Brik\*

18679

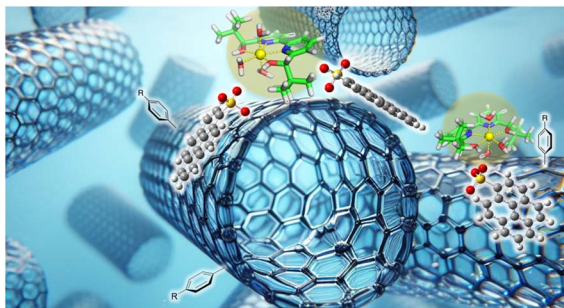


selectivity: ArCF<sub>3</sub> / ArF = 100 / 0; pyridine / benzene = 100 / 0

### Chemoselective Cu-catalyzed acylsilylation of vinyl arenes using silylboronates and acyl fluorides

Zhengyu Zhao, Jun Zhou, Seishu Ochiai, Sota Ikawa and Norio Shibata\*

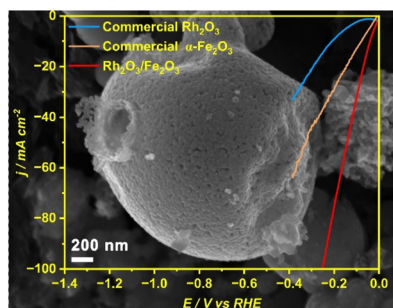
18686



### Noncovalent immobilization of chiral Lewis acids on single-walled carbon nanotubes as a tool for synthetic organic aquachemistry

Taku Kitanosono,\* Satoshi Tanaka, Dongxin Zhang, Tomoya Hisada, Yasuhiro Yamashita and Shu Kobayashi\*

18695



### Molecular precursor synthesis of the Rh<sub>2</sub>O<sub>3</sub>/Fe<sub>2</sub>O<sub>3</sub> spherical architecture for enhanced acidic HER activity and durability

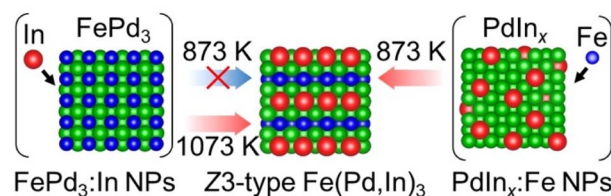
Muhammad Zulqarnain, Zheng Wei, Marcell Hollo, Kathleen A. Dunn and Evgeny V. Dikarev\*



18705

### Atomic diffusion barriers and inter-element miscibility guide the development of unexplored crystal phases

Kenshi Matsumoto,\* Masaki Kudo, Yasutomi Tatetsu, Ryota Sato, Ryo Takahata and Toshiharu Teranishi\*



18713

### pH guided pathways trigger tailoring of chiral luminescence in enantiomeric gold cluster assemblies

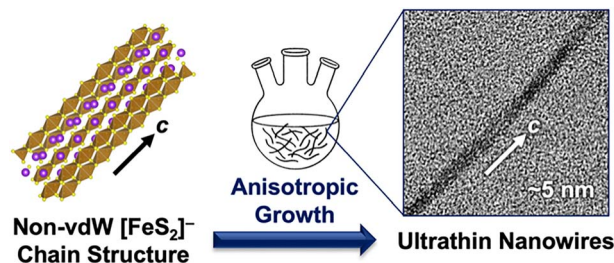
Camelia Dutta and Jatish Kumar\*



18722

### Colloidal synthesis of ultrathin $\text{KFeS}_2$ and $\text{RbFeS}_2$ magnetic nanowires with non-van der Waals 1D structures

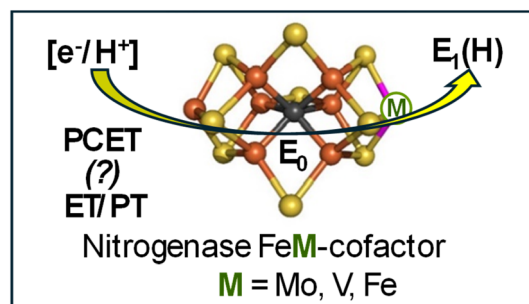
Zhaohong Sun, Ngoc Pham, Shahab Derakhshan\* and Richard L. Brutchey\*



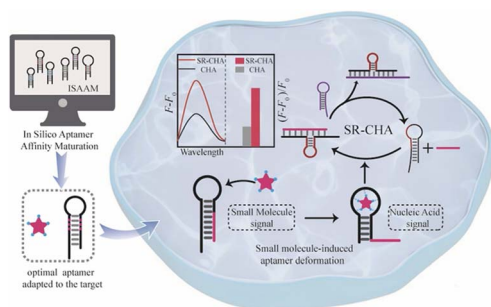
18729

### Proton transfer during reduction of the catalytic metallo-cofactors of the three nitrogenase isozymes

Roman Davydov, Dmitriy A. Lukoyanov, Derek F. Harris, Dennis R. Dean, Lance C. Seefeldt\* and Brian M. Hoffman\*



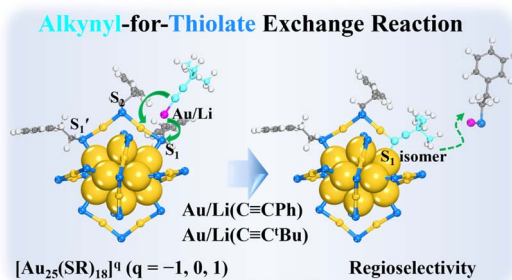
18739



### A structural reorganization-based catalytic hairpin assembly enabling small-molecule monitoring in living cells

Rui-Wen Wang, Wei-Guo Yang, Ming-Li Su, Jia-Min Qin, Jia-Qi Liu, Xiao-Han Yang, Jun-Yi Cao, Ruo Yuan, Ying Zhuo,\* Ming Chen,\* Chaoyong Yang\* and Wen-Bin Liang\*

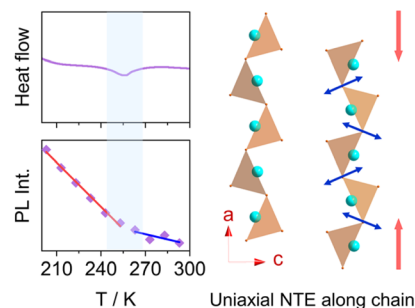
18748



### Revealing the exchange kinetics of thiol-capped Au<sub>25</sub> nanoclusters with alkyne ligands

Yuping Chen, Guoqing Bian, Zhikun Wu\* and Qing Tang\*

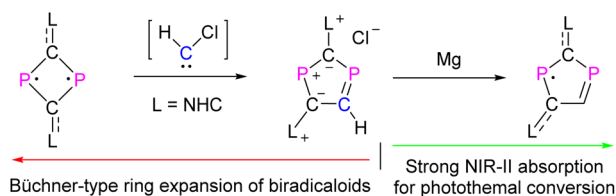
18766



### Thermally responsive multistate fluorescence coupled with uniaxial negative thermal expansion in 1D lead halide hybrids

Gang Yang, Wei Ye, Yueqi Shen, Dong-Sheng Shao,\* Jian-Lan Liu, Zheng-Fang Tian, Weihua Ning\* and Xiao-Ming Ren\*

18775



### Büchner-type ring expansion of aromatic main-group biradicaloids toward phosphorus radical-derived NIR-II photothermal materials

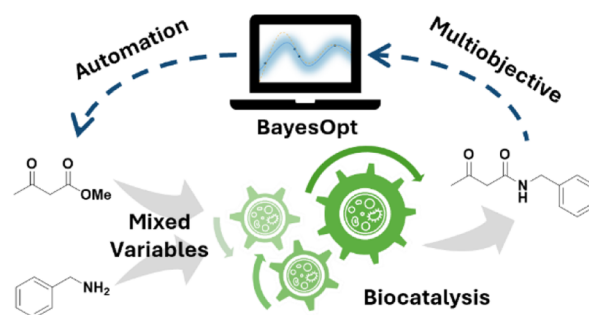
Shihua Liu, Shunlin Zheng, Jieli Lin, Hansjörg Grützmaier, Cheng-Yong Su and Zhongshu Li\*



18783

### Autonomous optimisation of biocatalytic reactions: enzymatic synthesis of *N*-benzyl acetoacetamide in continuous flow

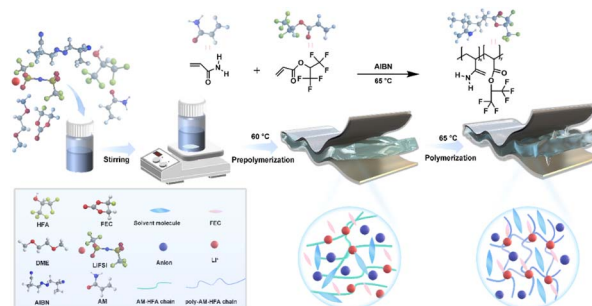
Matthew J. Takle, Sebastian C. Cosgrove and Adam D. Clayton\*



18791

### Dynamic networks of fluorine-rich acrylates enable highly conductive and flame-retardant electrolytes for lithium metal batteries

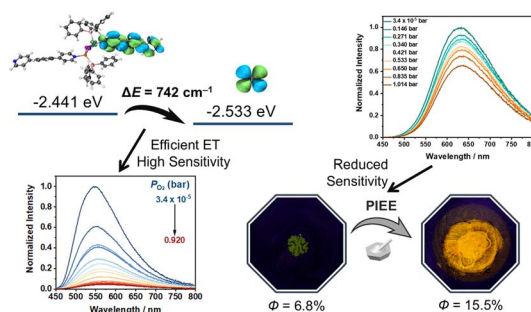
Junyi Gan, Yao Zhao, Zhan Jiang, Chenyu Yang, Da Ke, Qichao Wang,\* Ye Liu,\* Xiaohui Zeng\* and Tengfei Zhou\*



18799

### Tailoring luminescent oxygen sensitivity via structural design and its application in pressure-induced emission enhancement

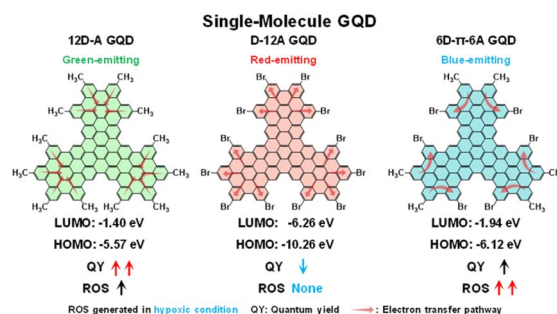
Hong-Jin Zhang, Zong-Ren Chen, Wan-Tao Chen, Jia-Wen Ye\* and Ling Chen\*



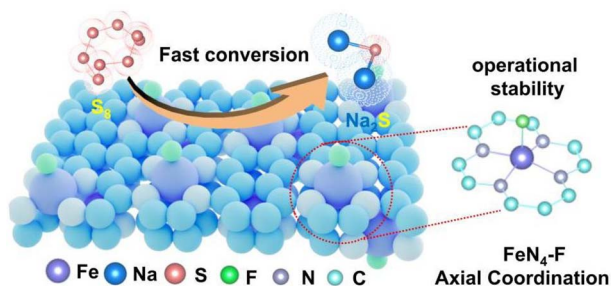
18806

### Single-molecule graphene quantum dots: enhancement of optical properties and promotion of photodynamic efficacy based on precise control of the electronic structure

Jintao Chen, Bin Li, Daoyuan Liu, Shiru Yin, Ji Qi, Zhenming Lu,\* Yi Liu\* and Tian Gao\*



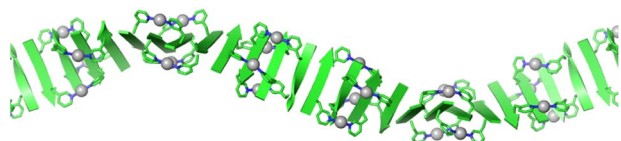
18821



### Axial fluorine coordination boosts the activity and durability of Fe single-atom catalysts in room-temperature Na–S batteries

Xue Zhong, Yujie Huang, Jieming Cai, Dongyang Cai, Zidong He, Zhenglei Geng, Wentao Deng, Guoqiang Zou, Hongshuai Hou\* and Xiaobo Ji

18832

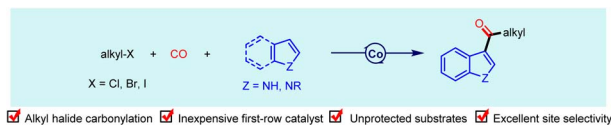


### Precise helical $\beta$ -sheet tapes via metal-crosslinking

### Engineering $\beta$ -sheet morphologies via metal cross-linking and side chain modifications

Eisuke Tsunekawa, Takahiro Nakama, Makoto Fujita\* and Tomohisa Sawada\*

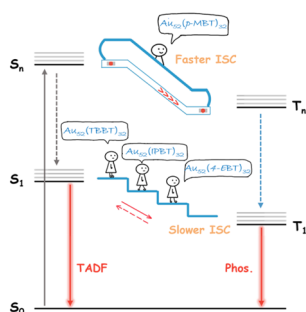
18838



### Cobalt-catalyzed direct carbonylative 3-acylation of (N–H)Indoles with alkyl halides

Chao Xu, Zhi-Peng Bao, Sufang Shao and Xiao-Feng Wu\*

18844



### Accelerated intersystem crossing enhances NIR emission in $\text{Au}_{52}(\text{SR})_{32}$ nanoclusters by surface ligand engineering

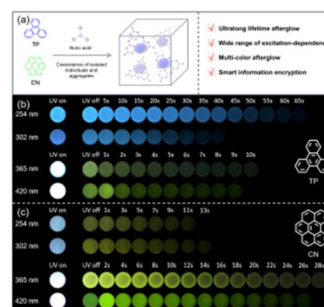
Linlin Zeng, Yitong Wang, Junjun Tan, Quanbing Pei, Jie Kong, Wei Zhang, Shuji Ye, Rongchao Jin,\* Yi Luo\* and Meng Zhou\*



18852

### Color-tunable ultralong room temperature afterglow in a wide excitation range from ultraviolet to visible light via doping boric acid with polyaromatic hydrocarbons

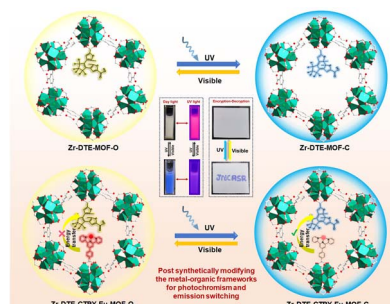
Siyu Yan, Yunze Huang, Weibo Zhang, Hongpu Xin, Jing Yang and Peng Li\*



18860

### On-demand photoswitching and energy transfer by post-synthetically confining $\text{Eu}^{3+}$ -complex and dithienylethene ligand in Zr-MOF-808

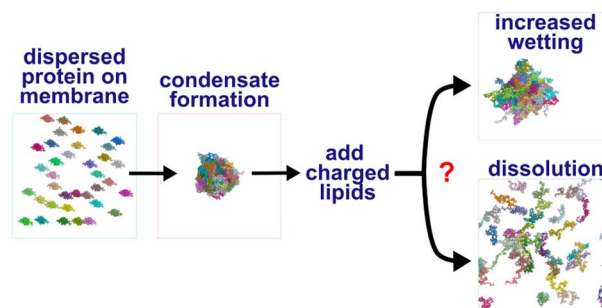
Sneha Raj V. Parambil, Joel Mathew John, Tarak Nath Das, Adarshi Bhattacharya and Tapas Kumar Maji\*



18869

### Simulations reveal a balance between protein–protein and protein–lipid interactions during condensation on membrane surfaces

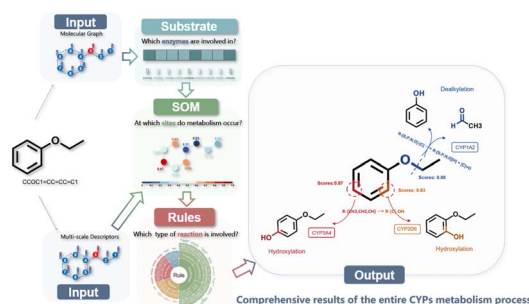
Ketsia Zinga, Yohan Lee, Shireen Pathak, Nishi Patel, Jeanne Stachowiak\* and Pengyu Ren\*



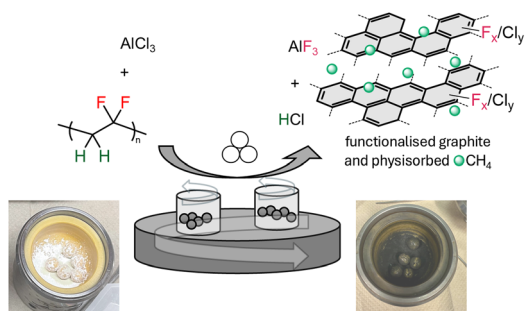
18884

### DeepMetab: a comprehensive and mechanistically informed graph learning framework for end-to-end drug metabolism prediction

Yiling Zhou, Dejun Jiang, Xiao Wei, Jiakai Yi, Yikun Wang, Youchao Deng and Dongsheng Cao\*



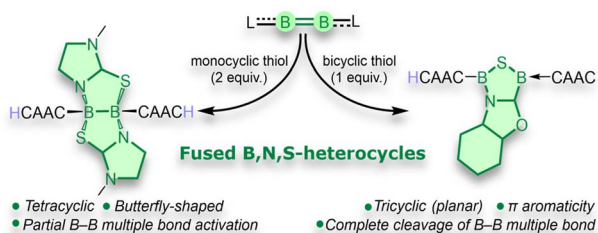
18903



### Lewis-acid induced mechanochemical degradation of polyvinylidene fluoride: transformation into valuable products

Minh Bui, Christian Heinekamp, Emil Fuhry, Steffen Weidner, Jörg Radnik, Mike Ahrens, Kerstin Scheurell, Kannan Balasubramanian,\* Franziska Emmerling\* and Thomas Braun\*

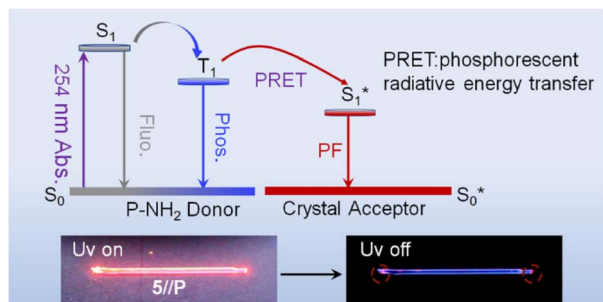
18911



### Simple, one-step syntheses of tri- and tetracyclic B,N,S-heterocycles from reactions of a diboracumulene with thiols

Christian Markl, Sourav Kar, Lukas Lubczyk, Kai Hammond, Rian D. Dewhurst and Holger Braunschweig\*

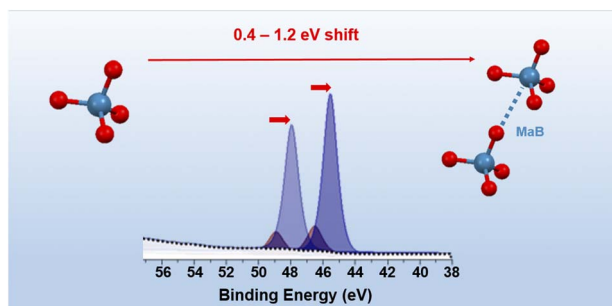
18919



### Flexible crystalline persistent fluorescence waveguides: a universal strategy for anti-counterfeiting and secure communication

Shun Liu, Linfeng Lan and Hongyu Zhang\*

18928



### Mature bond identification in non-crystalline materials by using X-ray photoelectron spectroscopy

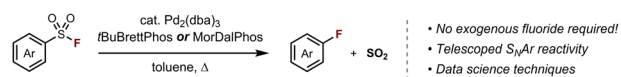
Oleg Semyonov, Nikita S. Antonkin, Amirbek D. Radzhabov, Andrea Pizzi,\* Cristina Lo Iacono, Olga Guselnikova, Sergi Burguera, Antonio Frontera,\* Giuseppe Resnati\* and Pavel S. Postnikov\*



18936

### Pd-catalyzed desulfonylative fluorination of electron-deficient (hetero)aryl sulfonyl fluorides

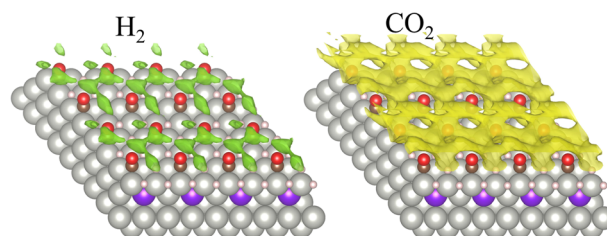
Jonathan R. Hall, Natalie P. Romer, Taylor E. Spiller, Matthew S. Sigman and Melanie S. Sanford\*



18942

### Multiscale modeling of gas adsorption and surface coverage in thermocatalytic systems

Jikai Sun and Jianzhong Wu\*



18952

### Making non-emissive [6]cycloparaphenylene fluorescent by simple multiple methyl substitution

Tomoki Kato, Daiki Imoto, Akiko Yagi\* and Kenichiro Itami\*

