

# Chemical Science

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**Cover**  
See Rudi Plesch, Takeshi Yamazaki *et al.*, pp. 19099–19109. Image reproduced by permission of SandboxAQ from *Chem. Sci.*, 2025, **16**, 19099. Adobe Firefly was used in the process of creating this image.



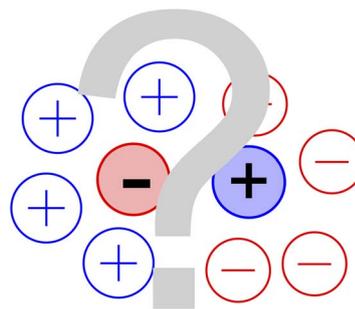
**Inside cover**  
See Zi-Shu Yang, Jun-Long Zhang *et al.*, pp. 19110–19117. Image reproduced by permission of Zi-Shu Yang and Jun-Long Zhang from *Chem. Sci.*, 2025, **16**, 19110.

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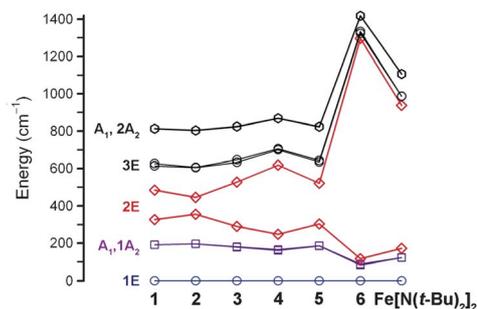
Tom Welton



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### A reflection on modelling and examination of paramagnetic molecules for magnetic storage and molecular spintronics

Mihail Atanasov,\* Shashank Vittal Rao and Frank Neese



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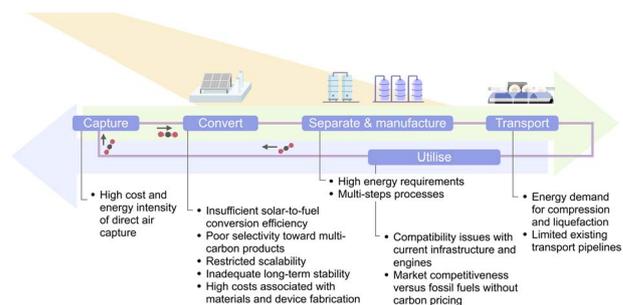
Fundamental questions  
Elemental answers

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## Artificial photosynthetic processes using carbon dioxide, water and sunlight: can they power a sustainable future?

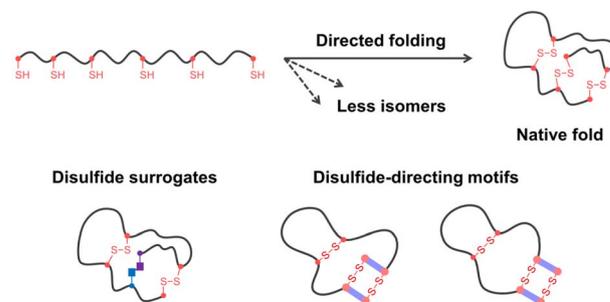
Qian Wang\* and Chanon Pornrunroj\*



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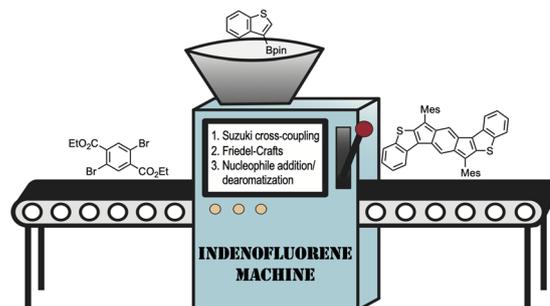
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Efrain Vidal, Jr, Gabrielle I. Warren, Joshua E. Barker and Michael M. Haley\*



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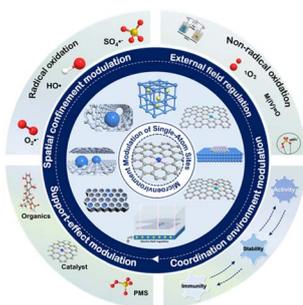
## Roles of adhesives in forming mechanically robust superhydrophobic coatings

Jinfei Wei, Mingyuan Mao, Bucheng Li and Junping Zhang\*



## REVIEWS

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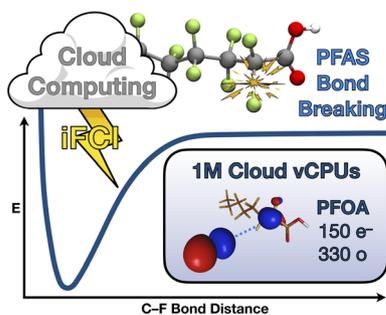


### Microenvironment modulation of single-atom sites and its applications in Fenton-like reactions

Na Wang,\* Jie Yang, Sixun Li, Ziqiu Ren\* and Qun Xu\*

## EDGE ARTICLES

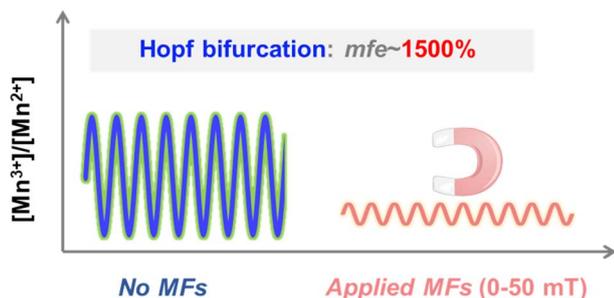
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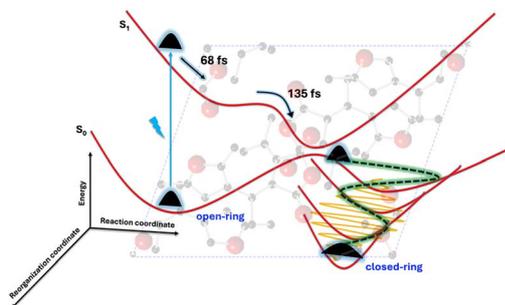
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### Amplification of magnetic field effects via critical dynamics in a nonlinear oscillatory system

Shaojun Zhang, Zi-Shu Yang,\* Bing-Wu Wang, Song Gao and Jun-Long Zhang\*

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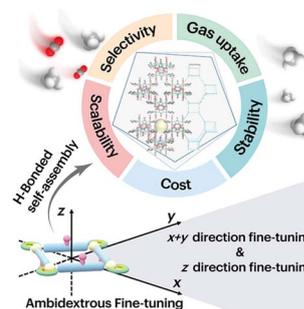
Soumyajit Mitra, Ming Zhang, Simon F. Bittmann, Jianxin Cai, Xiaolong Dong, R. Scott Murphy, Zheng Li\* and R. J. Dwayne Miller\*



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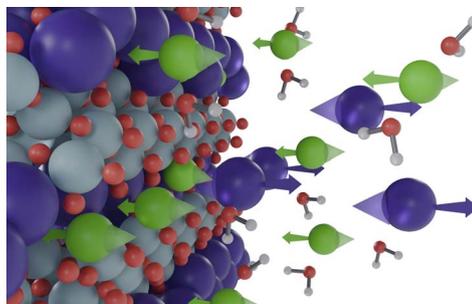
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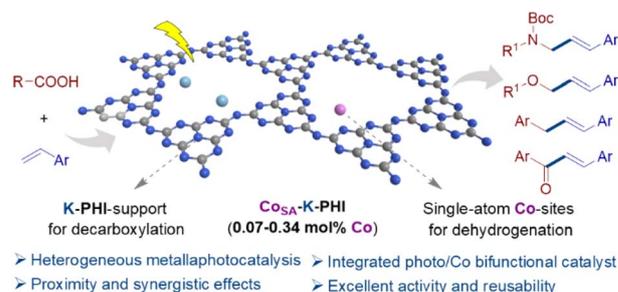
Charlie A. F. Nason, Ajay Piriya Vijaya Kumar Saroja, Wanjun Ren, Yingkangzi Mei, Asma Sarguroh, Yupei Han, Yi Lu, Jamie A. Gould, Tim I. Hyde, Veronica Celorrio, Gopinathan Sankar and Yang Xu\*



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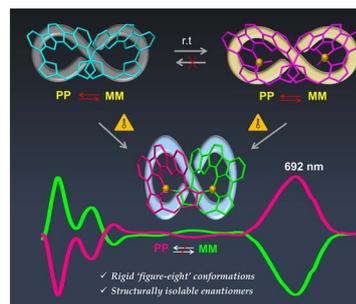
Qian Yang, Mengting Wu, Wanlin Wang, Wentao Wang,\*  
Han Wang, Yurong Tang,\* Magnus Rueping\*  
and Yunfei Cai\*



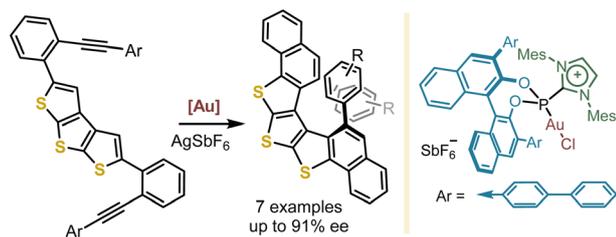
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### Bis-subporphyrin-like boron(III) complexes derived from indolo[2,3-a]carbazole-based cyclic bis-BODIPYs exhibiting persistent helical chirality

Aswini Spergen, Pranav V. Bal, Asif Khan Shameer Shameem, Arun Joshy, Anjana P. Nambiar, Alex P. Andrews and Gokulnath Sabapathi\*



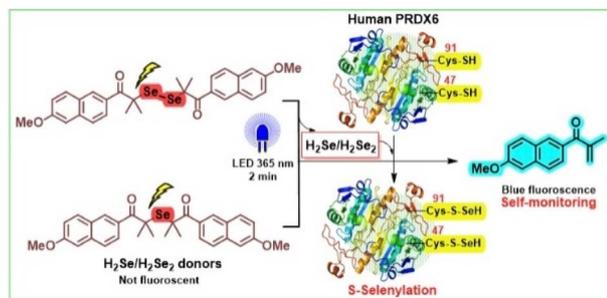
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Wei Fu, Martin Simon, Christopher Golz and Manuel Alcarazo\*

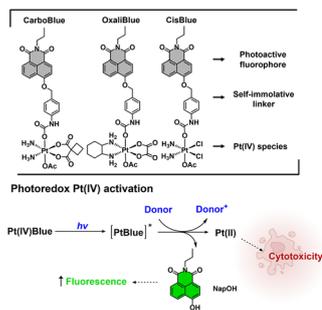
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Biswajit Roy, Eshani Das, Meg Shieh, Seiryu Ogata, Minkyung Jung, Hiroaki Fujita, Sen Zhang, Jerome R. Robinson, Takaaki Akaike and Ming Xian\*

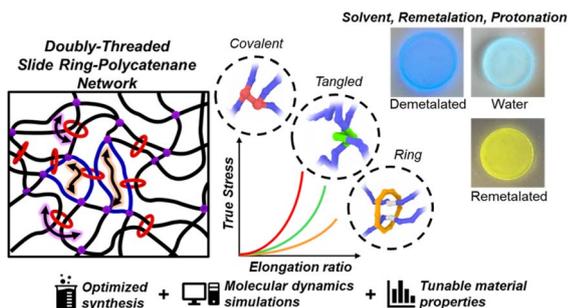
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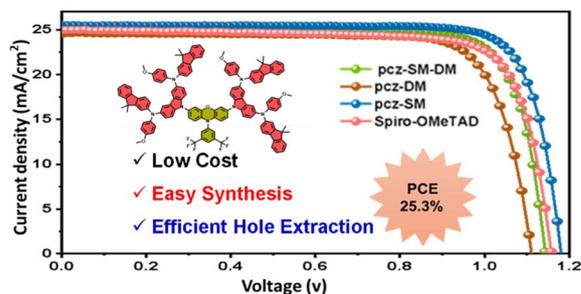
Guancen Liu, Jongwon Oh, Yuan Tian, Jerald E. Hertzog, Heyi Liang, Benjamin W. Rawe, Natsumi Nitta, Charlie A. Lindberg, Hojin Kim, Juan J. de Pablo\* and Stuart J. Rowan\*



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### Boosting planar perovskite solar cell performance via peripheral end-group engineering of phenoxazine-core hole transport materials

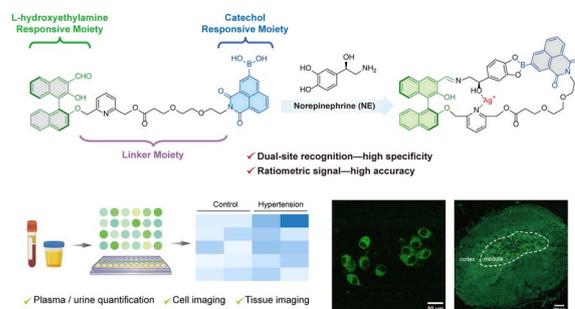
Murali Ravi, Ziyang Xia, Divya Kumar, Cheng Chen,\*  
Haixin Wang, Yi Tian, Balamurali Ravichandran  
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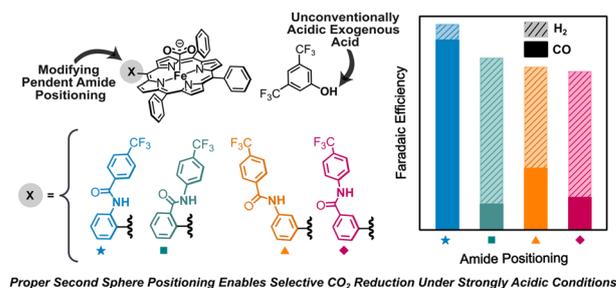
Fengzhi Wang, Jiawen Wang, Weiping Zhu,  
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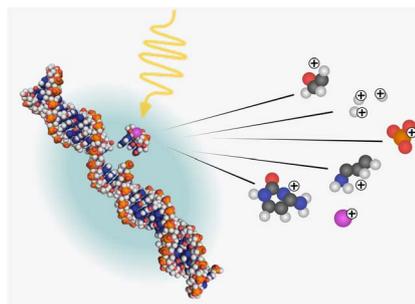
Kaeden Teindl, Jolene P. Reid and Eva M. Nichols\*



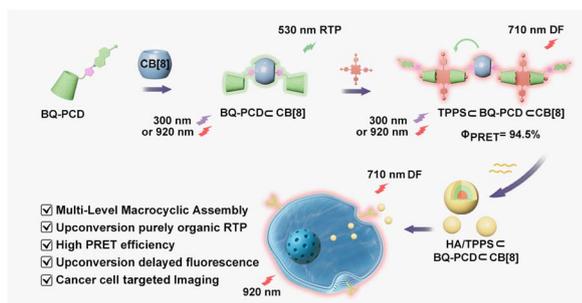
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Tomas André, Oscar Grånäs, Nicusor Timneanu,  
Juliette Leroux, Aarathi Nair, Laura Pille, Bart Oostenrijk,  
Sadia Bari, Olle Björneholm and Carl Caleman\*



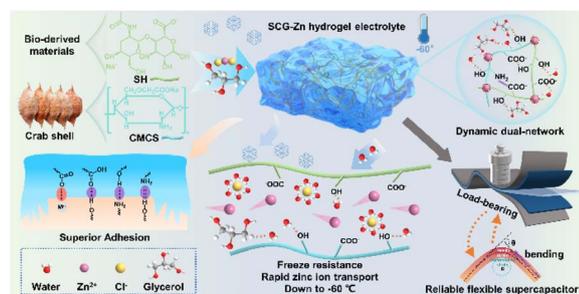
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### Multi-level macrocyclic assembly achieving organic upconversion delayed fluorescence for targeted cell imaging

Jie Niu, Xuan Wu, Jie Yu, Zhuo Lei, Ying-Ming Zhang,\*  
Li-Hua Wang, Jing Wu, Jie Han\* and Yu Liu\*

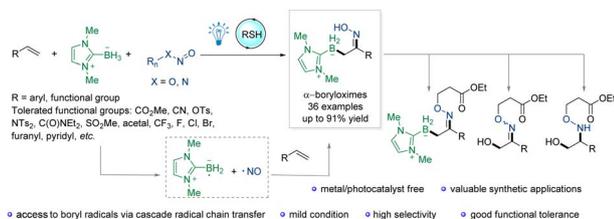
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Yibin Xing, Nannan Zhu, Ruixi He, Xiyao Wang,  
Renyang Han, Bing Du and Xuejuan Wan\*

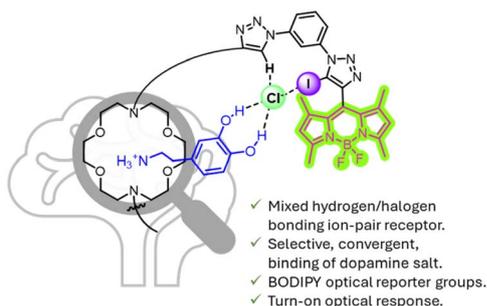
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Qiang Huang,\* Na Li, Panke Zhang and Hongji Li\*

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### A halogen bonding BODIPY-appended aza-crown ether for selective optical sensing of inorganic and organic ion-pair species

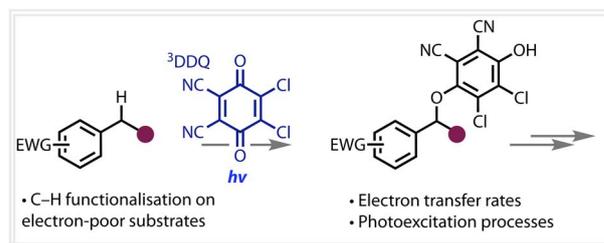
Jamie T. Wilmore, Andrew J. Taylor, Igor Marques,  
Vitor Félix and Paul D. Beer\*



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### Oxidative benzylic C(sp<sup>3</sup>)-H functionalisation of electron-poor substrates with photoexcited DDQ

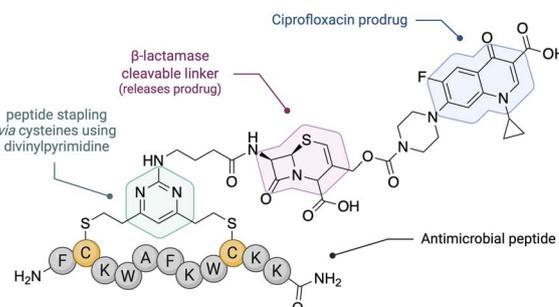
Alexander P. Atkins, Charlotte A. Smith, Deborin Ghosh, Hallam J. M. Greene, Ria G. Binyahan, Ciaran J. Greene, Joseph A. Tate, Andrew J. Orr-Ewing and Alastair J. J. Lennox\*



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### $\beta$ -Lactamase cleavable antimicrobial peptide–drug conjugates

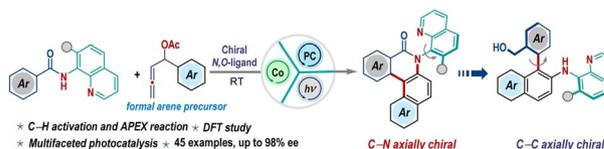
Tomas Deingruber, Josephine S. Gaynord, Bee Ha Gan, Kristina A. Kostadinova, Thomas J. O'Brien, Yaw Sing Tan, Jeremy S. Parker, Thomas A. Hunt, Jason S. Carroll, Martin Welch\* and David R. Spring\*



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### Multifaceted photocatalysis enables cobalt catalyzed enantioselective C–H activation and APEX reaction for C–N axially chiral molecules

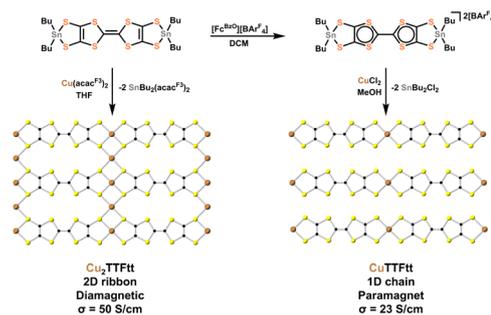
Mainak Koner, Nityananda Ballav, Anirudh J. Varma, Suman Ghosh, Tuhin Mondal, Rositha Kuniyil\* and Mahiuddin Baidya\*



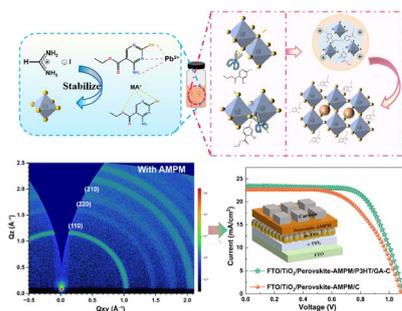
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### Pre-synthetic redox control of structure and properties in copper TTFtt coordination polymers

Ningxin Jiang, Saranya Velliyarat, Chen-Yu Lien, Ha L. Nguyen, Jan Hofmann, Jie-Hao Chen, Arun Ramanathan, Alexander S. Filatov, Henry S. La Pierre, Shrayesh Patel, Karena W. Chapman, Jan-Niklas Boyn and John S. Anderson\*



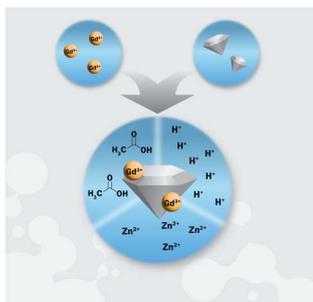
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### Multiple functional bulk passivator pyrimidine derivative stabilizing perovskite precursors for efficient carbon-based perovskite solar cells

Mengqi Geng, Jialiang Li, Ke Wang, Le Jiang, Dan Lu, Shoaib Iqbal, Yu Gu, Lixin Chen and Tingting Xu\*

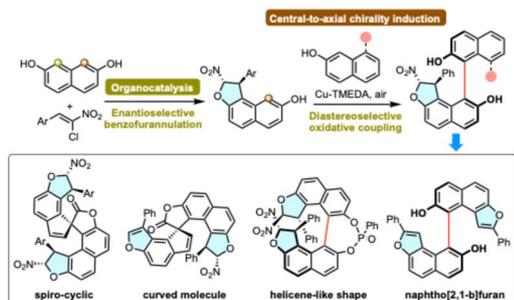
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### Quantum sensing of paramagnetic analytes by nanodiamonds in levitated microdroplets and aqueous solutions

Emily K. Brown, Zachary R. Jones, Adrish Sarkar, Brandon J. Wallace, Ashok Ajoy\* and Kevin R. Wilson\*

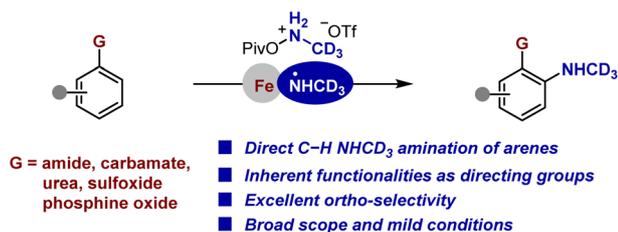
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Yang Yang, Guishun Bai, Mengmeng Qin, Juelian Wang, Yihuan Yang, Hong Wang,\* Damien Bonne,\* Jean Rodriguez and Xiaoze Bao\*

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### Synthesis of N-CD<sub>3</sub> aryl amines via iron-catalysed site-selective aromatic C-H amination

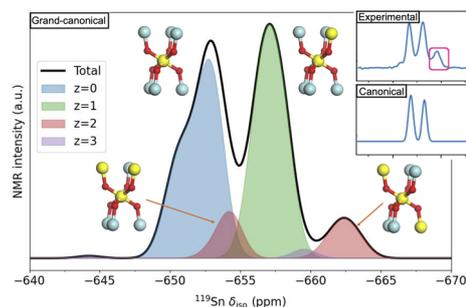
Meng-Meng Ren, Yin Yang and Fei Wang\*



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### Capturing local compositional fluctuations in NMR modelling of solid solutions

Ricardo Grau-Crespo,\* Said Hamad, Salvador R. G. Balestra, Ramsey Issa, Taylor D. Sparks, Arantxa Fernandes, Ben L. Griffiths, Robert F. Moran, David McKay and Sharon E. Ashbrook\*



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### Unveiling leaching–oxidizing–landing paths of Pd single-atom catalyzed Suzuki–Miyaura reaction by ambient mass spectrometry

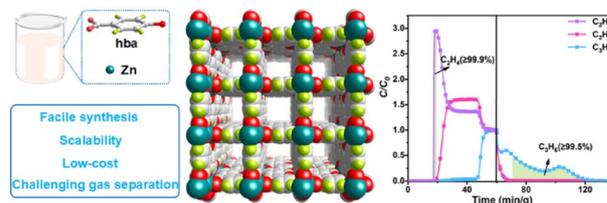
Yiyang Yin, Xiaorong Wang, Xiyang Ge, Xiaotong Shen, Xiaomin Liu, Xiang Li, Jin Ouyang and Na Na\*



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### Scalable synthesis of a low-cost Zn–MOF with a nonpolar pore surface for efficient separation of methanol-to-olefin products

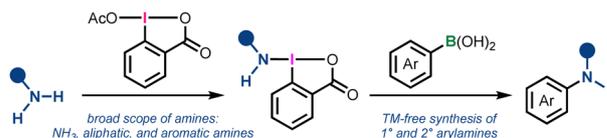
Yingying Zhang, Suyun Deng, Xingye Cui, Jixiang Yue, Hongliang Huang, Chaozhuang Xue,\* Huajun Yang\* and Lei Gan\*



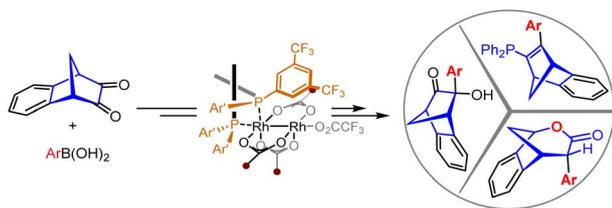
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### Versatile method for the synthesis of aminobenziodoxolones and its application to one-pot coupling of arylboronic acids with simple amines

Kazuki Kawanaka, Shusuke Narita, Kensuke Kiyokawa\* and Satoshi Minakata\*



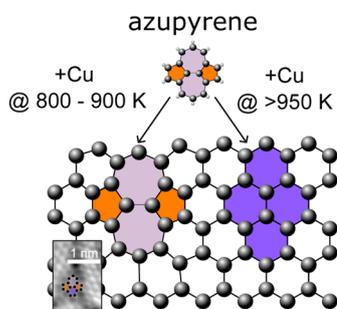
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### Chiral benzo[2.2.1] $\alpha$ -hydroxyketones from a dirhodium(II)/bisphosphine-catalyzed desymmetrization addition reaction

Shuming Zhan, Chengyu Wang, Longhui Duan\* and Zhenhua Gu\*

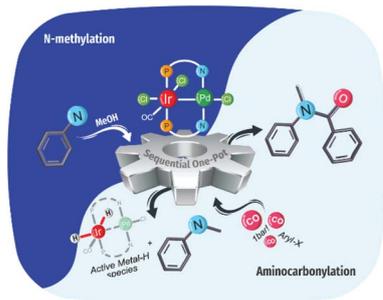
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### One-step synthesis of graphene containing topological defects

Benedikt P. Klein, Matthew A. Stoodley, Joel Deyerling, Luke A. Rochford, Dylan B. Morgan, David Hopkinson, Sam Sullivan-Allsop, Henry Thake, Fulden Eratam, Lars Sattler, Sebastian M. Weber, Gerhard Hilt, Alexander Generalov, Alexei Preobrajenski, Thomas Liddy, Leon B. S. Williams, Mhairi A. Buchan, Graham A. Rance, Tien-Lin Lee, Alex Saywell, Roman Gorbachev, Sarah J. Haigh, Christopher S. Allen, Willi Auwärter, Reinhard J. Maurer\* and David A. Duncan\*

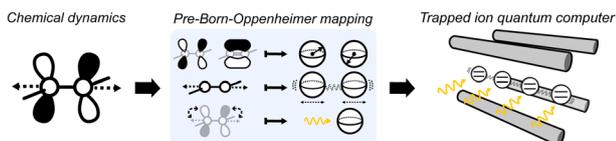
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### Sequential one-pot *N*-alkylation and aminocarbonylation of primary amines catalyzed by heterobimetallic Ir/Pd complexes

Amin Abdolrahimi, Philipp Woite, Konrad Kretschmar, Michael Roemelt,\* Thomas Braun\* and Ouchan He

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### Analog quantum simulation of coupled electron-nuclear dynamics in molecules

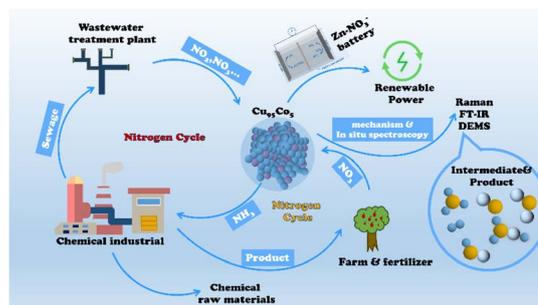
Jong-Kwon Ha and Ryan J. MacDonell\*



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### Insights into interfacial water and key intermediates on $\text{Cu}_{95}\text{Co}_5$ aerogels for electrocatalytic nitrate-to-ammonia conversion

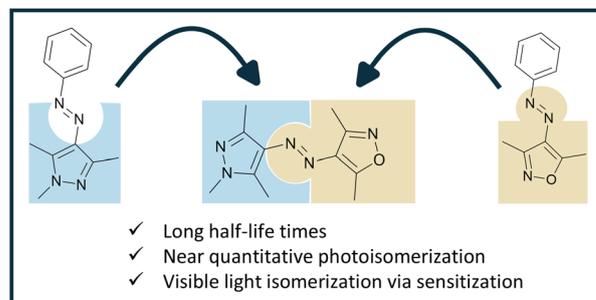
Ming Mu, Junjie Chen, Xiangxin Xue, Yumei Yang, Ruikai Qi, Yuezhu Wang, Di Liu, Lijia Shang, Wenji Jiang, Xinyi Shao, Zheng-jie Chen,\* Bing Zhao and Wei Song\*



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### Azobisheteroarene photoswitches based on isoxazoles and pyrazoles: tunable photostationary states, thermal relaxation and sensitization under confinement

Maximilian D. Seyfried, Julius Gemen, Leonard Wyszynski, Carl L. Giard, Constantin G. Daniliuc, Monika Schönhoff, Nikos L. Doltsinis, Frank Glorius and Bart Jan Ravoo\*



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### Tailoring flexibility of nanofluidic membranes for efficient separation of gases with similar kinetic diameters

Huijie Wang, Shuang Huan, Zhenyu Chu, Zongyou Yin and Chen Wang\*

