

# Chemical Science

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### Cover

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### Inside cover

See Mingoo Jin, Hajime Ito *et al.*, pp. 4485–4494. Image reproduced by permission of Alexander S. Mikhedov, Mingoo Jin and Hajime Ito from *Chem. Sci.*, 2023, **14**, 4485.

## EDITORIAL

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### How can you trust what you read?

May C. Copsey and Andrew I. Cooper

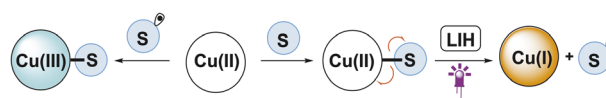


## PERSPECTIVES

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### Light-induced homolysis of copper(II)-complexes – a perspective for photocatalysis

Alexander Reichle and Oliver Reiser\*



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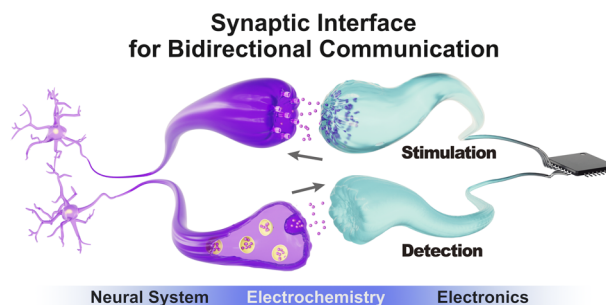


## PERSPECTIVES

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## Streamlining the interface between electronics and neural systems for bidirectional electrochemical communication

Wonkyung Cho, Sun-heui Yoon and Taek Dong Chung\*

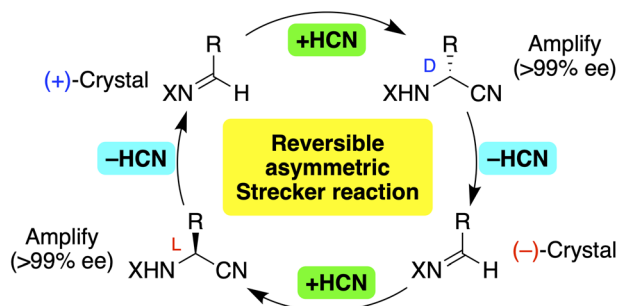


## EDGE ARTICLES

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## Chirally and chemically reversible Strecker reaction

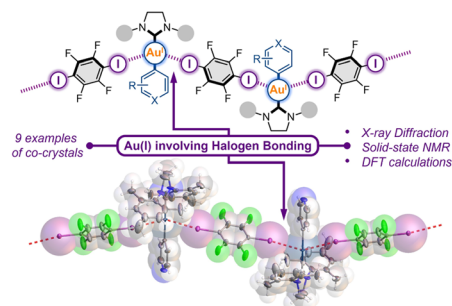
Yutaro Machida, Yudai Tanaka, Yuya Masuda, Aya Kimura and Tsuneomi Kawasaki\*



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## Exploring Au(I) involving halogen bonding with N-heterocyclic carbene Au(I) aryl complexes in crystalline media

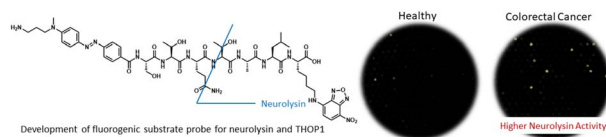
Alexander S. Mikhedov, Mingoo Jin\* and Hajime Ito\*



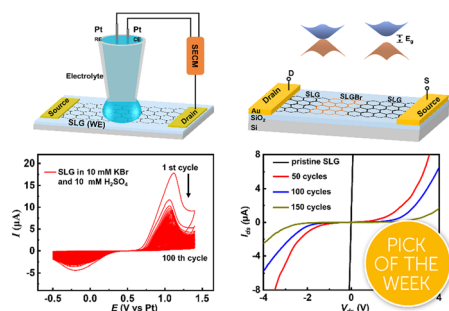
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## Development of fluorogenic substrates for colorectal tumor-related neuropeptidases for activity-based diagnosis

Norimichi Nagano, Yuki Ichihashi, Toru Komatsu,\* Hiroyuki Matsuzaki, Keisuke Hata, Toshiaki Watanabe, Yoshihiro Misawa, Misa Suzuki, Shingo Sakamoto, Yu Kagami, Ayumi Kashiro, Keiko Takeuchi, Yukihide Kanemitsu, Hiroki Ochiai, Rikiya Watanabe, Kazufumi Honda and Yasuteru Urano\*



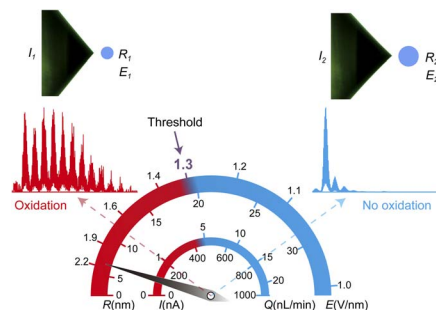
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### Electrochemical regulation of the band gap of single layer graphene: from semimetal to semiconductor

Lanping Zeng, Weiyang Song, Xiangfeng Jin, Quanfeng He, Lianhuan Han,\* Yuan-fei Wu, Corinne Lagrost, Yann Leroux, Philippe Hapiot, Yang Cao,\* Jun Cheng and Dongping Zhan\*

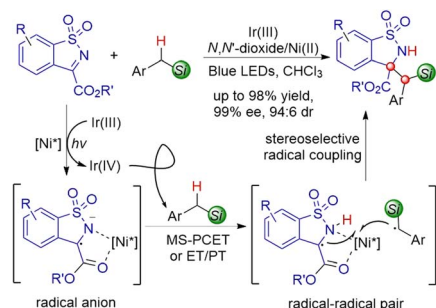
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### Tuning oxidative modification by a strong electric field using nanoESI of highly conductive solutions near the minimum flow rate

Zhongbao Han, Nozomu Omata, Takeshi Matsuda, Shoki Hishida, Shuuhei Takiguchi, Ryoki Komori, Riku Suzuki and Lee Chuin Chen\*

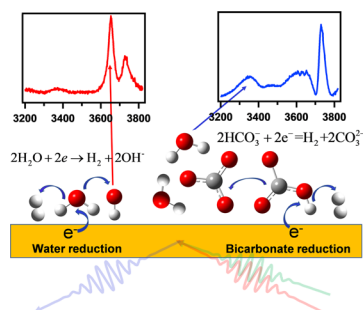
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### Visible-light-induced chemo-, diastereo- and enantioselective $\alpha$ -C(sp<sup>3</sup>)-H functionalization of alkyl silanes

Lili Feng, Xiaofan Chen, Ning Guo, Yuqiao Zhou, Lili Lin, Weidi Cao\* and Xiaoming Feng\*

4523



### Direct observation of bicarbonate and water reduction on gold: understanding the potential dependent proton source during hydrogen evolution

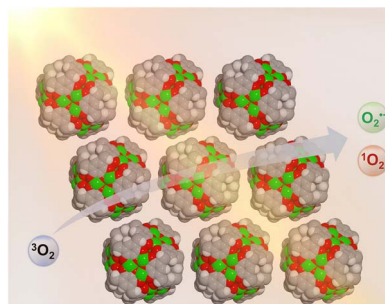
Gang-Hua Deng, Quansong Zhu, Jaclyn Rebstock, Tomaz Neves-Garcia and L. Robert Baker\*



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## A copper-seamed coordination nanocapsule as a semiconductor photocatalyst for molecular oxygen activation

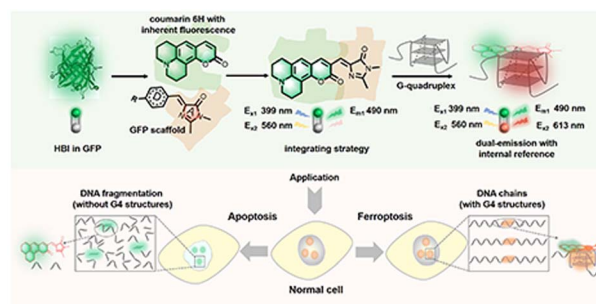
Xiangquan Hu, Meirong Han, Leicheng Wang, Li Shao, Yadav Peeyush, Jialei Du,<sup>\*</sup> Steven P. Kelley, Scott J. Dalgarno, David A. Atwood, Sisi Feng<sup>\*</sup> and Jerry L. Atwood<sup>\*</sup>



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## Engineering fluorescent protein chromophores with an internal reference for high-fidelity ratiometric G4 imaging in living cells

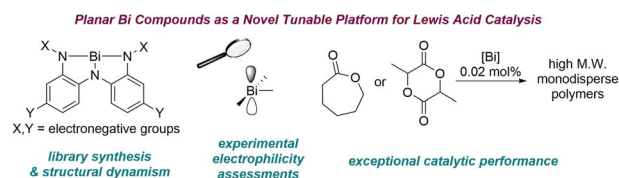
Jiao-Na Han, Caijun Zhong, Mingmin Ge, Shi Kuang<sup>\*</sup> and Zhou Nie<sup>\*</sup>



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## Planar bismuth triamides: a tunable platform for main group Lewis acidity and polymerization catalysis

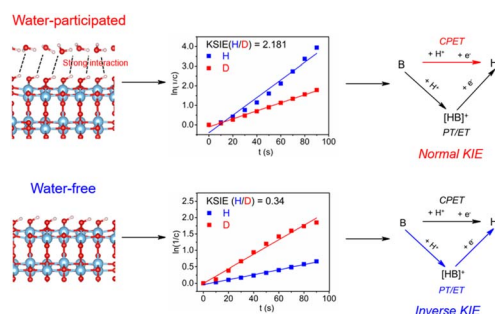
Tyler J. Hannah, W. Michael McCarvell, Tamina Kirsch, Joseph Bedard, Toren Hynes, Jacqueline Mayho, Karlee L. Bamford, Cyler W. Vos, Christopher M. Kozak, Tanner George, Jason D. Masuda and S. S. Chitnis<sup>\*</sup>



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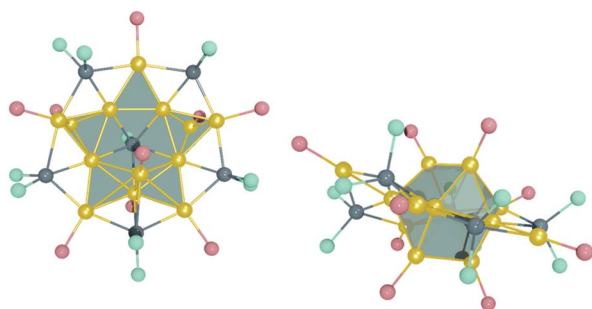
## Water molecule switching heterogeneous proton-coupled electron transfer pathway

Zhonghuan Liu, Wei Peng, Yuhua Lin, Xinyu Lin, Shikang Yin, Shuhan Jia, Dongge Ma, Yan Yan,<sup>\*</sup> Peng Zhou,<sup>\*</sup> Wanhong Ma<sup>\*</sup> and Jincui Zhao





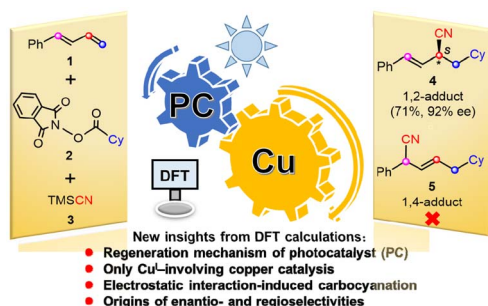
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### Synthesis and characterisation of four bimetallic gold–gallium clusters with Au–Ga rings as a new structural motif in gold cluster chemistry

Markus Strienz, Florian Fetzer and Andreas Schnepf\*

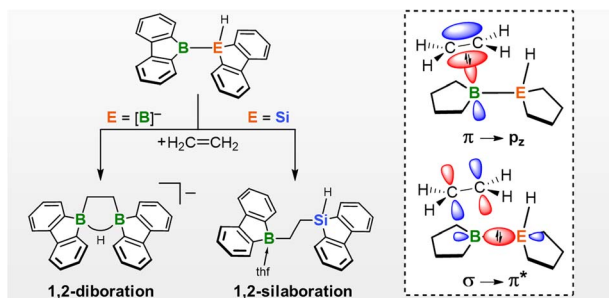
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### New insights into the mechanism of synergetic photoredox/copper(I)-catalyzed carbocyanation of 1,3-dienes: a DFT study

Yanhong Liu, Aili Feng, Rongxiu Zhu and Dongju Zhang\*

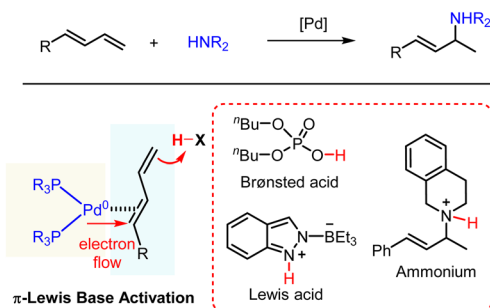
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### Catalyst-free diboration and silaboration of alkenes and alkynes using bis(9-heterofluorenyl)s

Jannik Gilmer, Timo Trageser, Luis Čaić, Alexander Virovets, Michael Bolte, Hans-Wolfram Lerner, Felipe Fantuzzi\* and Matthias Wagner\*

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### A metal $\pi$ -Lewis base activation model for Pd-catalyzed hydroamination of amines and 1,3-dienes

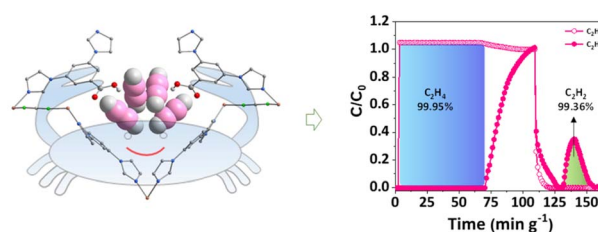
Xiao Yan, Xiu-Ming Yang, Peng Yan, Bo Zhao, Rong Zeng, Bin Pan, Ying-Chun Chen, Lei Zhu\* and Qin Ouyang\*



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### Formation and fine-tuning of metal–organic frameworks with carboxylic pincers for the recognition of a C<sub>2</sub>H<sub>2</sub> tetramer and highly selective separation of C<sub>2</sub>H<sub>2</sub>/C<sub>2</sub>H<sub>4</sub>

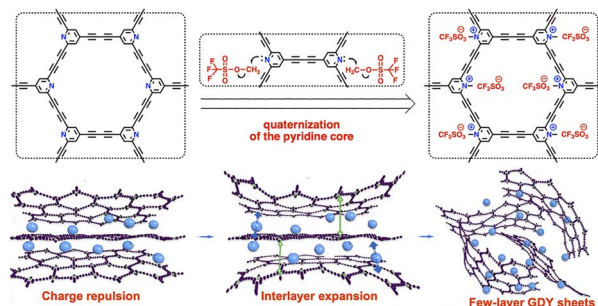
Yuefeng Duan, Yuhang Huang, Chongqing Wang, Qian Wang, Kai Ge, Zhiyong Lu, Huijie Wang, Jingui Duan,\* Junfeng Bai\* and Wanqin Jin



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### Scalable synthesis of soluble crystalline ionic-graphdiyne by controlled ion expansion

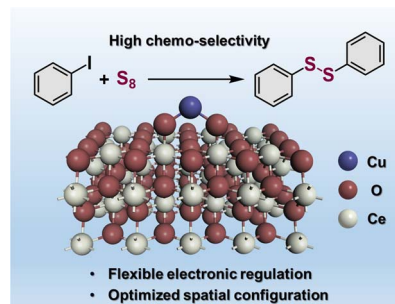
Lingling Wang, Lu Qi, Qinglei Zhang, Binghui Xue, Zhiqiang Zheng, Panchao Yin, Yurui Xue, Wenlong Yang\* and Yuliang Li\*



4620

### Single-atom copper catalyst for the S-arylation reaction to produce diaryl disulfides

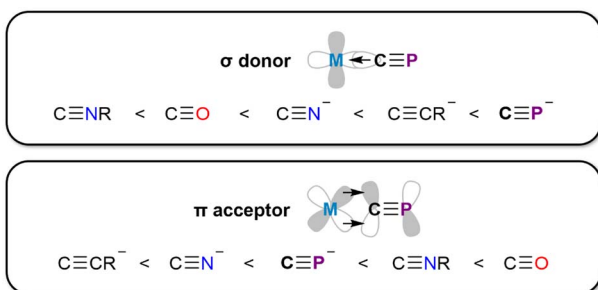
Yiming Zhao, Yan Zhou, Shanshan Lv, Han Li, Qikang Wu, Shaohuan Liu, Wanying Li, Taiyu Chen and Zheng Chen\*



4627

### Putting cyaphide in its place: determining the donor/acceptor properties of the κC-cyaphido ligand

Eric S. Yang, Emma Combey and Jose M. Goicoechea\*



**Photo-Activated RTP: Universality, Multicolor, Multi-level Anti-counterfeiting and Encryption**

The top panel illustrates the photo-activated RTP mechanism. A blue beam of light (365 nm) is directed at a mixture of BN-X (a blue crystalline structure) and PMMA (a transparent sphere). Upon irradiation, the mixture undergoes a transformation, indicated by a green arrow, to form BN-X@PMMA (a green crystalline structure inside a transparent sphere). The process is labeled with  $^1O_2$  and  $^3O_2$ . To the right, a 3D bar chart shows the photophysical properties of BN-X@PMMA: a blue bar for  $\lambda_{exc}$  (excitation wavelength), a green bar for  $\lambda_{em}$  (emission wavelength), and a red bar for  $\tau_p$  (photophysical lifetime).

The bottom panel illustrates the application of the photo-activated RTP mechanism in encryption and decryption. It shows a sequence of images of a green plant under UV light. The first image is labeled "UV OFF" and shows the plant in its original green color. The second image is labeled "0 s" and shows the plant in its original green color. The third image is labeled "4 s" and shows the plant in its original green color. The fourth image is labeled "6 s" and shows the plant in its original green color. The fifth image is labeled "7 s" and shows the plant in its original green color. The sixth image is labeled "12 s" and shows the plant in its original green color. The sequence is labeled "UV (30 s): RTP (a)" and "UV (00 s): RTP (d and e)".

**Donor- $\pi$ -Acceptor**

The diagram shows a Donor- $\pi$ -Acceptor (D- $\pi$ -A) molecule structure. The donor part is represented by a green stick figure with a "Push" label. The acceptor part is represented by a blue stick figure with a "Pull" label. The molecule consists of a central  $R_1$ -C $\equiv$ C- $R_2$  group, where  $R_1$  and  $R_2$  are defined in the legend. The molecule is shown in a bent conformation, with the donor and acceptor parts interacting via a charge transfer (CT) process, indicated by a red arrow labeled "CT". The molecule is labeled "BN-X".

**Legend:**

- a:  $R_1$ =H,  $R_2$ =OMe; b:  $R_1$ =H,  $R_2$ =Me; c:  $R_1$ =H,  $R_2$ =H; d:  $R_1$ =OMe,  $R_2$ =H; e:  $R_1$ =H,  $R_2$ =CN

Huangting Ding, Yitong Sun, Meng Tang, Jingyi Wen,  
Shiwen Yue, Ye Peng, Fei Li, Liyan Zheng, Suning Wang,  
Yonggang Shi\* and Qiue Cao\*

Reaction scheme showing the synthesis of Si-SDP from a Ts-protected allylamine derivative and  $\text{HSiEt}_3$  catalyzed by  $\text{Rh}(\text{cod})_2\text{BF}_4$  in DCE at 25 °C for 2 h, yielding 92% and 91% respectively.

Below the reaction, the structures of SDP and Si-SDP are shown, with Si-SDP labeled *this study*. A 3D molecular model of the Si-SDP complex is also displayed.

Fei Hou, Minjie Liu, Tong Ru, Zequn Tan, Yingtang Ning\*  
and Fen-Er Chen\*

high  $pK_a$

low  $pK_a$

reaction time

Nina S. Pappas and Jarad A. Mason\*