

# Journal of Materials Chemistry C

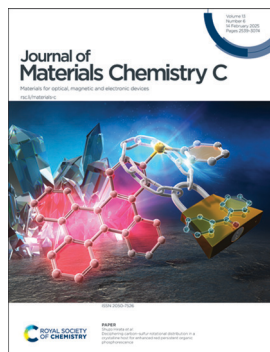
Materials for optical, magnetic and electronic devices

[rsc.li/materials-c](https://rsc.li/materials-c)

The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

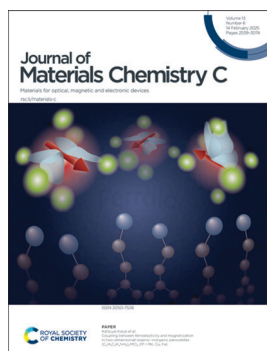
## IN THIS ISSUE

ISSN 2050-7526 CODEN JMCCCX 13(6) 2539–3074 (2025)



### Cover

See Shuzo Hirata *et al.*, pp. 2654–2660.  
Image reproduced by permission of Shuzo Hirata from *J. Mater. Chem. C*, 2025, 13, 2654.



### Inside cover

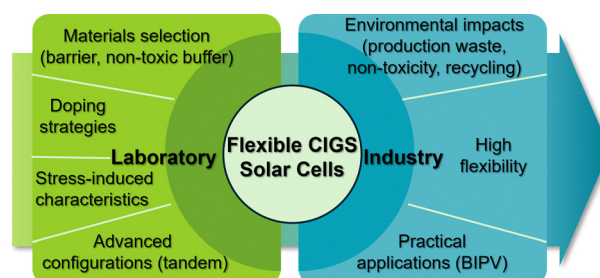
See Katsuya Inoue *et al.*, pp. 2661–2672.  
Image reproduced by permission of Katsuya Inoue from *J. Mater. Chem. C*, 2025, 13, 2661.

## REVIEWS

2554

### Flexible Cu(In,Ga)Se<sub>2</sub> photovoltaics for bending applications: advances from materials to panels

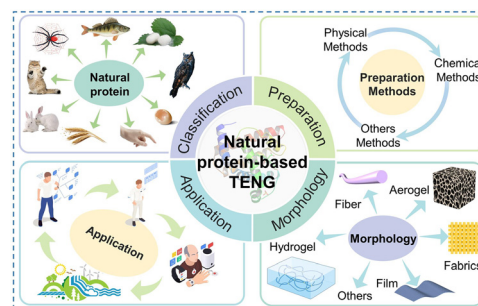
Ha Kyung Park and William Jo\*



2578

### Native proteins for triboelectric nanogenerators

Yuxuan Huang, Haiyan Zheng,\* Jianquan Zhang, Yue Shen and Xinrong Xu



**GOLD  
OPEN  
ACCESS**

# EES Batteries

**Exceptional research on  
batteries and energy storage**

**Part of the EES family**

**Join  
in** | Publish with us  
**rsc.li/EESBatteries**

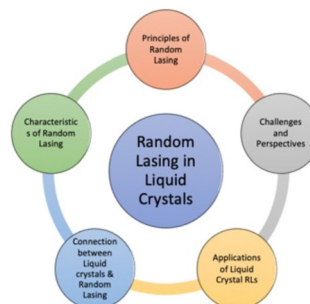


## REVIEWS

2606

**Random lasing in liquid crystals: advances, challenges, and future directions**

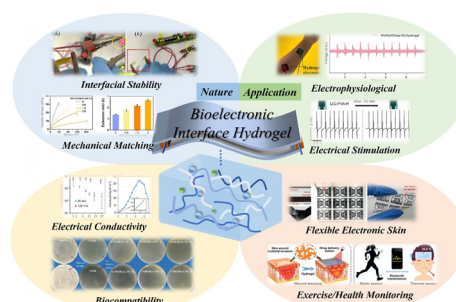
Aneela Ahmad, Haitao Dai,\* Shouzhong Feng, Zhenda Chen, Zolkefl Mohmaed, Abdul Aziz Khan, Xichen Hao, Yuhang Wang, Najam Iqbal and Darakhshan Mehvish



2620

**Hydrogel-based soft bioelectronic interfaces and their applications**

Caicai Jiao,\* Jiahui Liu, Shuo Yan, Zhiwei Xu, Zhaoru Hou and Wenlong Xu\*

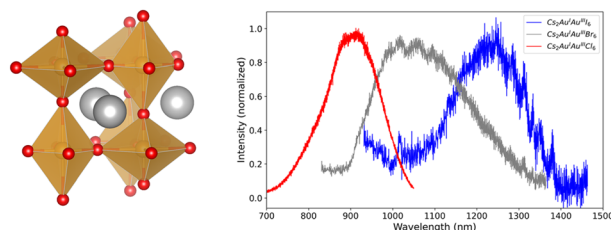


## COMMUNICATION

2646

**Low-temperature synthesis of mixed valence gold halide perovskites and exploration of their photoluminescence properties**

Alexandre Py-Renaudie, Ange B. Chambissie Kameni, Paul-Alexis Pavard, Nathanaelle Schneider, Géraud Delport, Pallavi Singh, Damien Aureau, Mathieu Frégnaux, David Cahen, Jean-François Guillemales and Philip Schulz\*

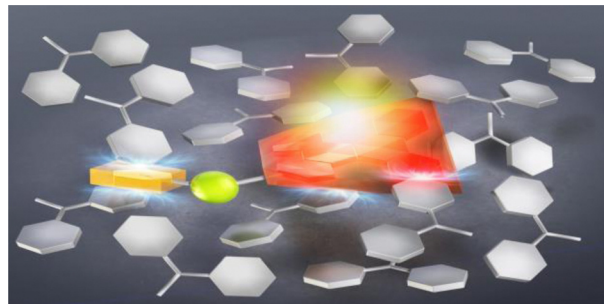


## PAPERS

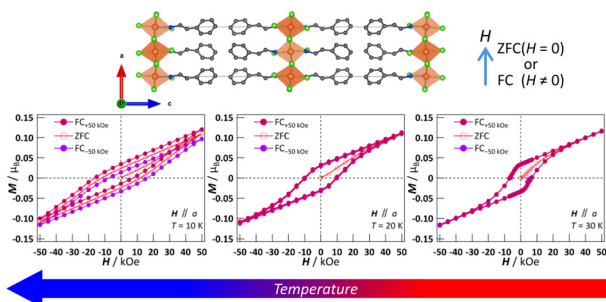
2654

**Deciphering carbon–sulfur rotational distribution in a crystalline host for enhanced red persistent organic phosphorescence**

Sakuya Ueda, Kazuki Fujita, Bahadur Sk and Shuzo Hirata\*



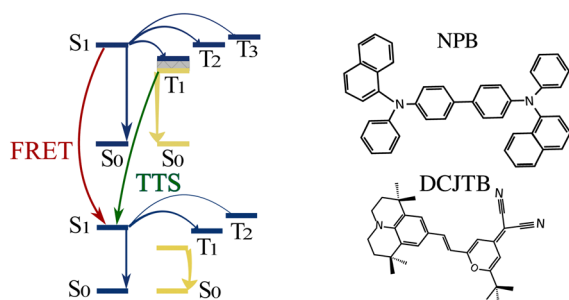
2661



### Coupling between ferroelasticity and magnetization in two-dimensional organic-inorganic perovskites $(\text{C}_6\text{H}_5\text{C}_2\text{H}_4\text{NH}_3)_2\text{MCl}_4$ ( $\text{M} = \text{Mn}, \text{Cu}, \text{Fe}$ )

Naoto Tsuchiya, Saya Aoki, Yuki Nakayama, Goulven Cosquer, Sadafumi Nishihara, Miguel Pardo-Sainz, José Alberto Rodríguez-Velamazán, Javier Campo and Katsuya Inoue\*

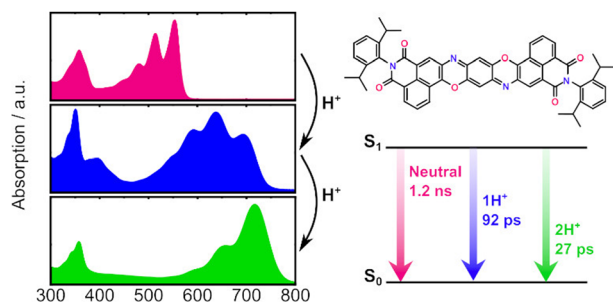
2673



### Exploring the triplet-to-singlet conversion mechanism in persistent luminescence: insights from a host-guest system

Fernando Teixeira Bueno, Tiago de Sousa Araújo Cassiano, Piotr de Silva, Pedro Henrique de Oliveira Neto and Leonardo Evaristo de Sousa\*

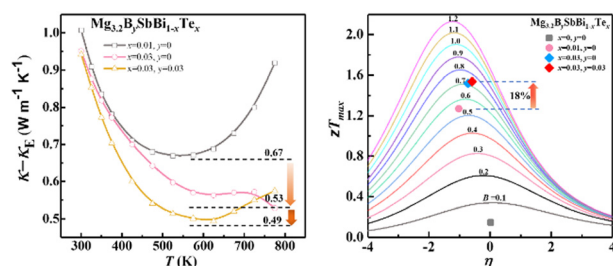
2681



### Controlling optoelectronic properties through protonation with $\pi$ -extended triphenyldioxazine diimides

Rhea Kumar, Mario Taddei, Vasilis Petropoulos, Mattia Russo, Federico Vernuccio, Giulio Cerullo, Dario Polli, Artur Nenov, Nicola Demitri, Maurizio Prato,\* Margherita Maiuri\* and Jacopo Dosso\*

2689

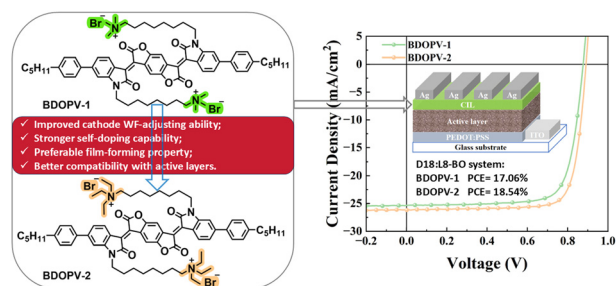


### Enhanced thermoelectric performance of $\text{Mg}_3\text{Sb}_2$ -based materials by codoping with B and Te

Lijun Zhai, Jian Wang, Lin Cheng, Minghao Lv, Lu Gao, Zhongyuan Yang, Yanli Li, Yan Zhang, Hongxia Liu\* and Zhigang Sun\*

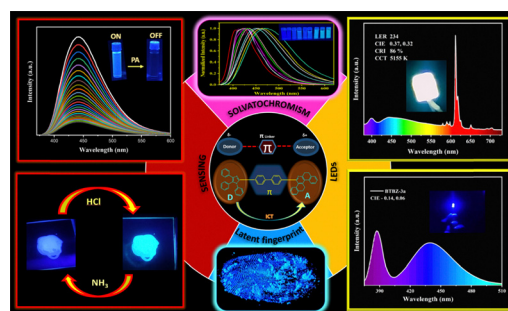


Guiting Chen,\* Long Wang, Hongli Wu, Long Li,  
Baitian He,\* Chuanbo Dai and Zhicai He\*



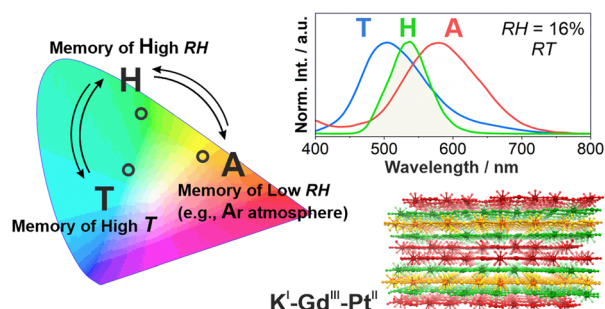
## Benzil-imidazole blue fluorophores and their applications in blue/white light-emitting diodes, sensing and anticounterfeiting

Bhabana Priyadarshini Debata,  
Manojkumar Dhanthala Thiagarajan, Prathap R.,  
Jaipal Devesing Girase, Sathiyarayanan Kulathu Iyer,  
Sabita Patel\* and Sivakumar Vaidyanathan\*



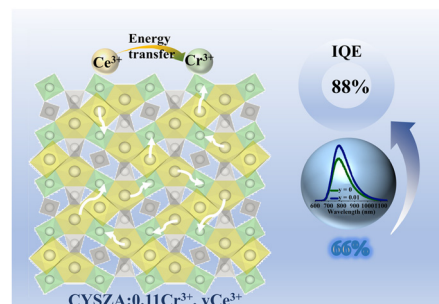
# Optical memory effect in a dynamic gadolinium–tetracyanidoplatinate coordination polymer for sensing deviations in temperature and humidity

Maciej Wyczesany, Michał Heczko, Mateusz Reczyński,  
Barbara Sieklucka and Szymon Chorazy\*

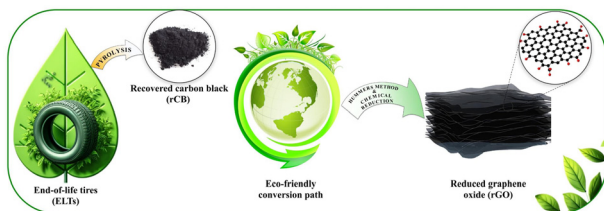


# Multi-site occupancy high-efficient $\text{CaY}_2\text{ScZrAl}_3\text{O}_{12}:\text{Cr}^{3+}, \text{Ce}^{3+}$ phosphors for application in broadband NIR pc-LEDs

Xiaole Xing, Xiaobin Wei, Yining Wang,  
Lingkang Yu and Mengmeng Shang\*



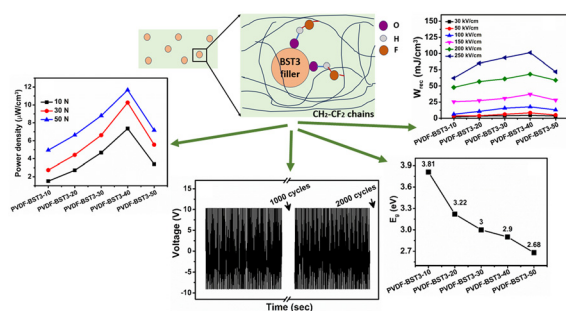
2753



### Chemical conversion of recovered carbon black (rCB) from end-of-life tires (ELTs) pyrolysis to reduced graphene oxide (rGO): from waste to advanced materials

Bartosz Dziejarski,\* Jarosław Serafin,\*  
Diego Felipe Hernández-Barreto,  
Juan Carlos Moreno-Piraján, Liliana Giraldo,  
Narcis Homs, Renata Krzyżyńska, Klas Andersson and  
Pavleta Knutsson

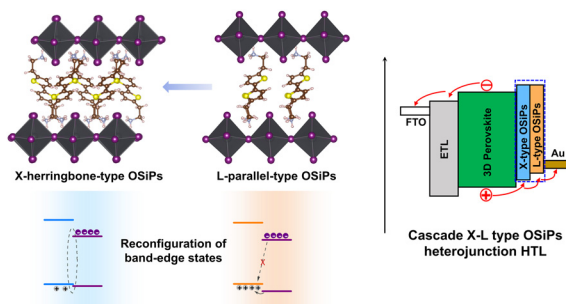
2768



### Multifunctional piezoelectric PVDF–Ba<sub>0.97</sub>Sr<sub>0.03</sub>TiO<sub>3</sub> composite films for electrostatic energy storage, bio/force sensing, and optical applications

P. Elorika,\* Sharmistha Anwar and Shahid Anwar\*

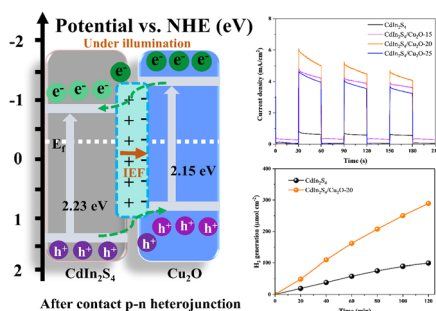
2780



### Reconfiguration of band-edge states *via* intermolecular packing in organic semiconductor-incorporated perovskites

Jia Xu, Zhun Liu,\* Xieli Wei, Junqiang Lu,  
Qifeng Liang and Jijun Zhao

2790



### A highly efficient 3D/0D CdIn<sub>2</sub>S<sub>4</sub>/Cu<sub>2</sub>O photoanode with a p–n type heterojunction for boosted photoelectrochemical water splitting under visible light irradiation

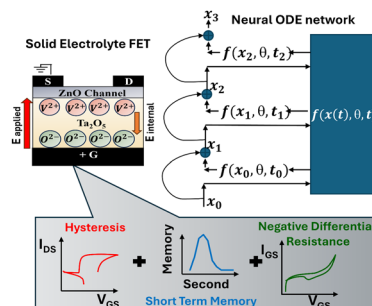
Qi Wang, Chengwei Hu,\* Lanlan Zhang, Yuanhu Lei,  
Zonghan Hu, Zihang Wang, Yupei Qiao and Bing Lv\*



2804

## Neural ordinary differential equations for predicting the temporal dynamics of a ZnO solid electrolyte FET

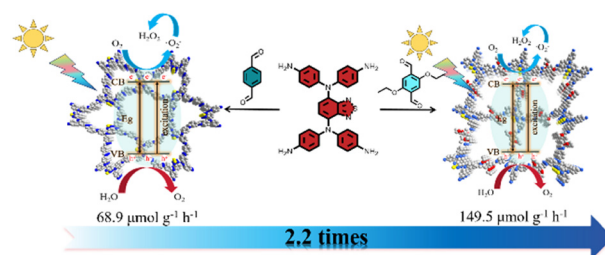
Ankit Gaurav, Xiaoyao Song, Sanjeev Kumar Manhas and Maria Merlyne De Souza\*



2814

## Side-chain regulated topology of 2D covalent organic frameworks and its impact on photocatalytic synthesis of H<sub>2</sub>O<sub>2</sub>

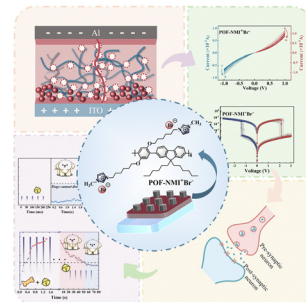
Shuai Sun, Chao-Qin Han,\* Jia-Xin Guo, Lei Wang, Ze-Yang Wang, Gonghao Lu\* and Xiao-Yuan Liu\*



2822

## Conjugated polyelectrolyte with a backbone integrated by benzene and fluorene for mimicking neural synapses and associative learning

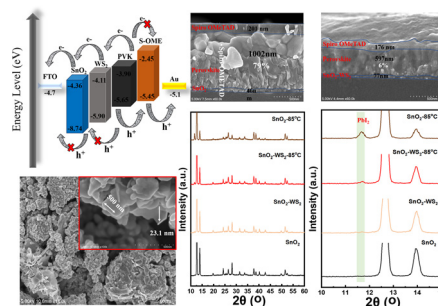
Jiaxuan Liu, Kexin Wang, Kejia Zhao, Qian Chen, Haidong He,\* Xinzhu Wang\* and Yu Chen\*



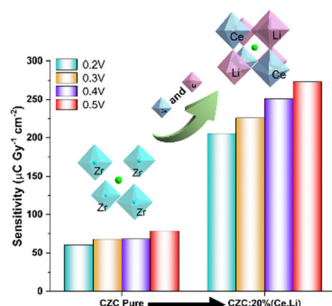
2834

## High-efficiency self-powered perovskite photodetector with an electron-enhancing SnO<sub>2</sub>/WS<sub>2</sub> double electron transport layer

Vo Pham Hoang Huy and Chung Wung Bark\*



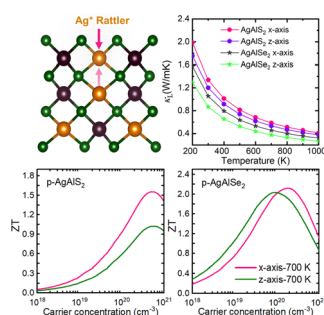
2844



### A novel co-substitution strategy for the design, growth, and optoelectronic performance optimization of $\text{Cs}_2\text{ZrCl}_6\text{:Ce,Li}$ single crystals

Xinhui Jia, Hechun Jiang, Xi Chong, Weirui Ju, Ting Feng, Zhiwei Zhao, Hao Wei, Jing Li,\* Shibo Cheng\* and Jiyang Wang

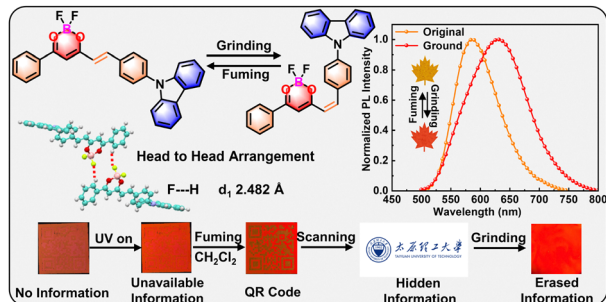
2853



### Ultralow lattice thermal conductivity and superior thermoelectric performance in $\text{AgAlS}_2$ and $\text{AgAlSe}_2$

Muhammad Faizan,\* Shaojie Li, Zhongwei Liu, Zewei Li, Jiahao Xie, Kun Zhou, Yuhao Fu\* and Lijun Zhang\*

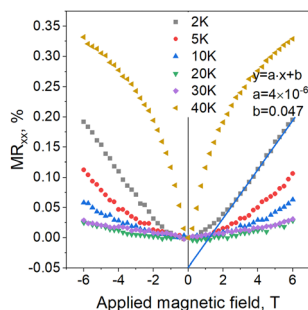
2868



### C=C bond enables difluoroboron $\beta$ -diketonate derivatives with high contrast mechanoresponsive luminescence for reversible writing and information encryption

Yan Xia, Geng Li, Xiangkai Yin, Jie Li,\* Juemin Zhao, Kunpeng Guo,\* Yaxing Tang and Hua Wang\*

2875



### Ultra-thin and thin CrSi films on Si(111): II. Transport and magnetic properties

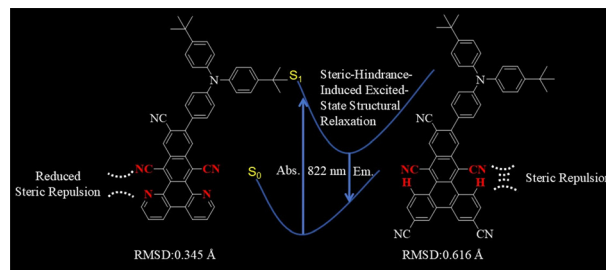
Nikolay G. Galkin,\* Evgenii Yu. Subbotin, Konstantin N. Galkin, Dmitrii L. Goroshko, Olga A. Goroshko, Dmitri B. Migas, Andrew B. Filonov, Ivan A. Tkachenko and Aleksei Yu. Samardak



2887

### Pentacarbonitrile-based efficient near-infrared thermally activated delayed fluorescence OLEDs via suppressing excited-state structural relaxation

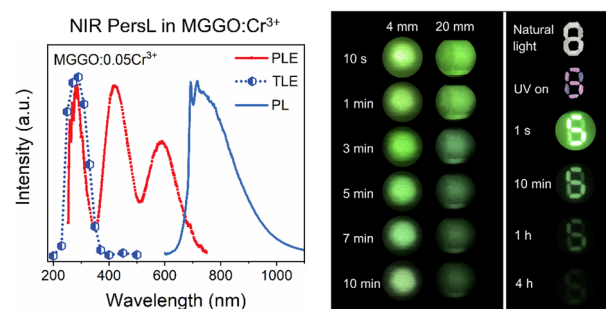
Shengkai Hu, Yang Li, Kai Zhang,\* Dong-Ying Zhou,\*  
Liang-Sheng Liao and Jian Fan\*



2895

### Ultralong near-infrared persistent luminescence in a Cr<sup>3+</sup>-doped gallogermanate for multifunctional applications

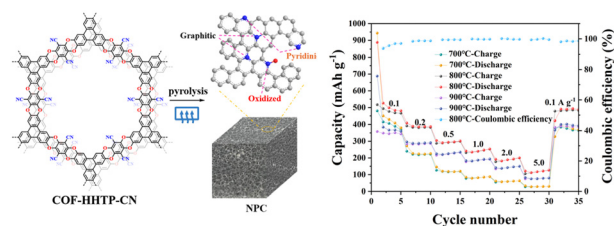
Fangyi Zhao, Yuhe Shao, Qinan Mao, Yiwen Zhu,  
Heyi Yang, Yang Ding, Quanlin Liu\* and Jiasong Zhong\*



2905

### Introduction of sidewall C≡N: a high-temperature-resistant COF for lithium-ion storage

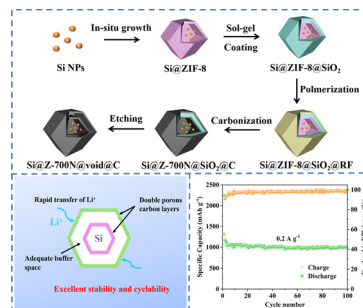
Jiahui Yuan, Zhenyu Zhang, Yajie Feng, Fuzhou Chen,  
Wei Ding, Yizi Zhang, Hongxing Jia\* and Zhengrong Gu\*



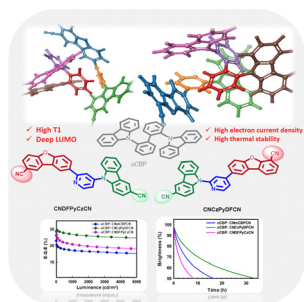
2912

### Yolk-double shell structured bread-like Si@Z-700N@void@C nanocomposites as high stability anodes for lithium-ion batteries

Weixiao Dong, Xiaojie Sun, Tuo Zhang and Ping Chen\*



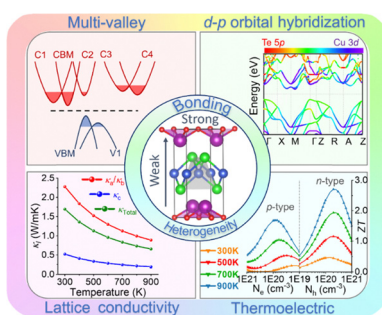
2923



### Unveiling a pyridine-based exciplex host for efficient stable blue phosphorescent organic light-emitting diodes

Subramanian Muruganantham, Young Hun Jung, Hye Rin Kim, Jung Ho Ham, Ramanaskanda Braveenth, Kenkera Rayappa Naveen, Mi Young Chae\* and Jang Hyuk Kwon\*

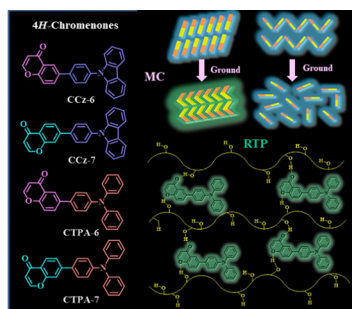
2932



### Antibonding Cu (d)–Te (p) states and bonding inhomogeneity in inducing low lattice thermal conductivity and extraordinary thermoelectric properties of the layered heteroanionic NdCuOTe material: a first-principles study

Shuwei Tang,\* Wanrong Guo, Da Wan, Xiaodong Li, Tuo Zheng, Hao Wang, Qingshun Li, Xiuling Qi and Shulin Bai\*

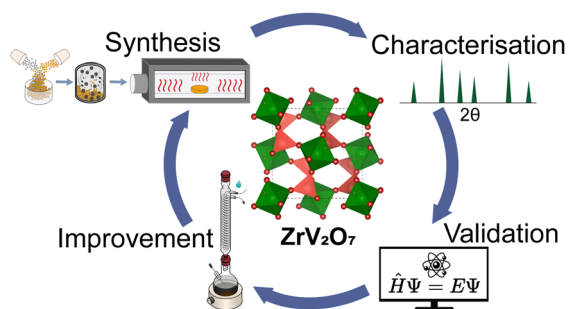
2947



### Solid-state emissions of 4*H*-chromenones with simple structures: mechanochromism and polymer-based doped ultralong room-temperature phosphorescence

Huaiying Huang, Miao Chang Liu, Xiaoyu Qiu, Jiayin Qian, Wenbo Dai, Yunxiang Lei,\* Qiuping Ding, Huayue Wu\* and Xiaobo Huang\*

2956



### Synthesis and phase purity of the negative thermal expansion material ZrV<sub>2</sub>O<sub>7</sub>

Aistė Miliūtė, Joana Bustamante, Stephanos Karafiludis, Moritz Zöllner, Mustapha Eddah, Franziska Emmerling, Björn Mieller,\* Janine George\* and Tomasz M. Stawski\*

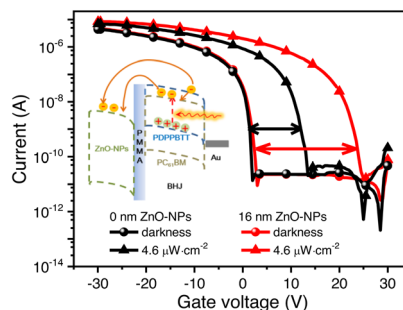


## PAPERS

2969

### Ultrahigh detectivity of near-infrared organic phototransistor assisted by additional electron trap sites in a dielectric layer

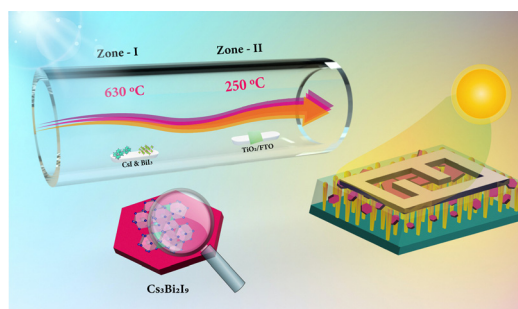
Meihua Shou,\* Jiaxin Zheng, Xingpeng Liu, Jiadong Zhou, Zengqi Xie, Qing Liao,\* Haiou Li\* and Linlin Liu\*



2978

### Layered $\text{Cs}_3\text{Bi}_2\text{I}_9$ perovskite nanosheets on $\text{TiO}_2$ nanorods for high-performance heterostructure photodetectors

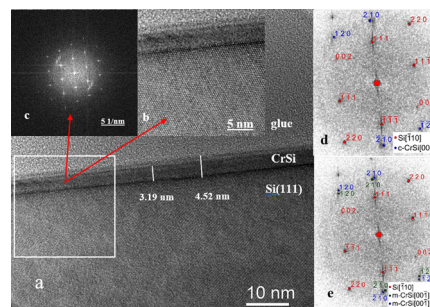
Gunasekaran Ashokan, Sadhasivam Subramani, Gowthambabu Vellingiri, Anbarasan Nallathambi and Jeganathan Kulandaivel\*



2987

### Ultra-thin and thin CrSi films on Si(111): I. Formation and crystal structure

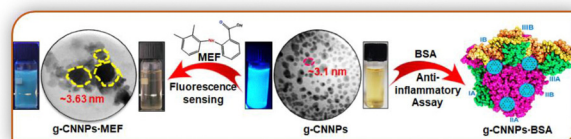
Nikolay G. Galkin,\* Konstantin N. Galkin, Oleg V. Kropachev, Sergey A. Dotsenko, Dmitrii L. Goroshko, Dmitri B. Migas, Andrew B. Filonov, Natalia V. Skorodumova, Andrey V. Gerasimenko and Anton K. Gutakovskii



3000

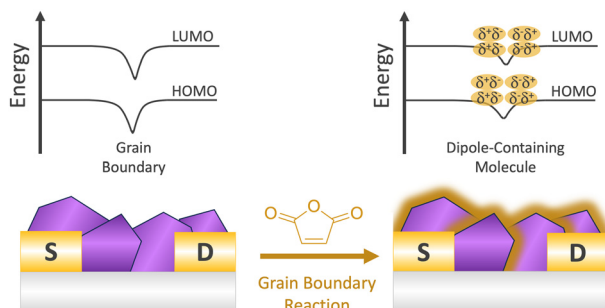
### Nanoporous and morphology-transforming g-CNNPs for trace-level detection of mefenamic acid in urine samples and *in vitro* protein denaturation inhibition

Anusree S. Gangadharan, Daniel T. Thangadurai,\* Nandhakumar Manjubaashini and Devaraj Nataraj



## PAPERS

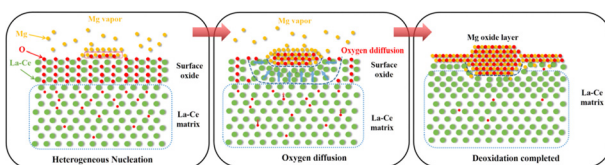
3011



### Selective reaction at grain boundaries addressing organic field effect transistor trap states

Feifei Li, Matthew C. Williams, Matthew Waldrip, Colin Tyznik, Tharushi D. Ambagaspitiya, Derek Dremann, Katherine Leslee Asetre Cimat, Oana D. Jurchescu and Jacob W. Ciszek\*

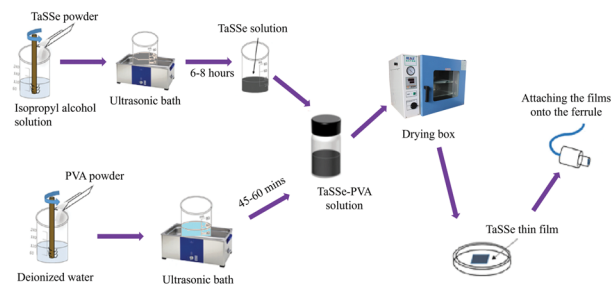
3020



### Magnesium vapor-assisted deoxidation of La–Ce alloys through micro-alloying

Wenxia Xie, Congli Lu, Xuechen Ren, Baoqiang Xu, Bin Yang and Fei Wang\*

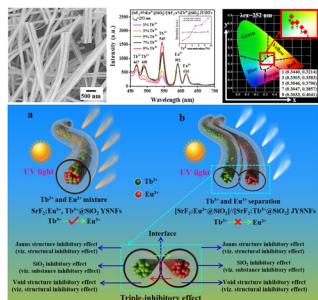
3028



### Optical nonlinearity of Janus material TaSse and its applications in fiber lasers

Huiran Yang, Chenhao Lu, Yiqing Xie, Shengyue Gu, Xupeng Li, Mengting Qi, Dongdong Han, Pu Wang and Lu Li\*

3036



### A facile neoteric technique to achieve [SrF<sub>2</sub>:Eu<sup>3+</sup>@SiO<sub>2</sub>]/[SrF<sub>2</sub>:Tb<sup>3+</sup>@SiO<sub>2</sub>] Janus yolk–shell nanofibers with ideal white-light emission via triple-inhibiting energy transfer between Tb<sup>3+</sup> and Eu<sup>3+</sup> ions

Ning Li, Hong Shao,\* Xiaohan Liu, Haina Qi, Dan Li, Wensheng Yu, Guixia Liu, Xiangting Dong\* and Xuejian Zhang\*

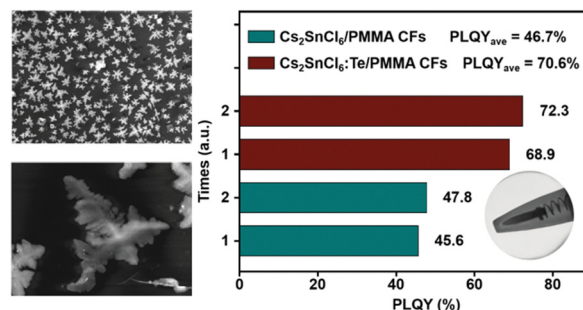


## PAPERS

3047

***In situ* growth of Te-doped Cs<sub>2</sub>SnCl<sub>6</sub> scintillator composite films for X-ray imaging**

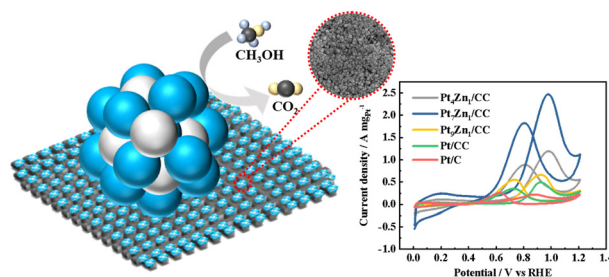
Junnan Wang, Zeyu Wang,\* Nikolai V. Gaponenko, Jindou Shi, Zheyuan Da, Chen Zhang, Yongqiang Ji, Qing Yao, Youlong Xu and Minqiang Wang



3054

**Ultra-high activity methanol oxidation electrocatalyzed by a flexible integrated Pt–Zn array electrode**

Yulan Liu, Yu Zhang, Xiaoyu Tian, He Wang and Lili Huo\*



3062

**A high-efficiency blue-LED-excitable broadband Cr<sup>3+</sup>/Ni<sup>2+</sup> co-doped garnet phosphor toward next-generation spectroscopy applications**

Lucheng Liu, Yuanhong Liu, Tongyu Gao, Guantong Chen, Ronghui Liu\* and Xiaodong Li\*

