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Materials for optical, magnetic and electronic devices

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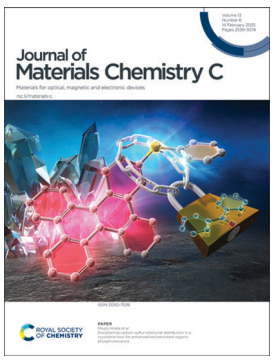
IN THIS ISSUE

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



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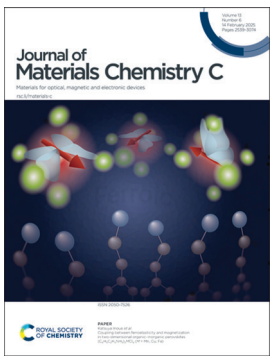

Inside cover
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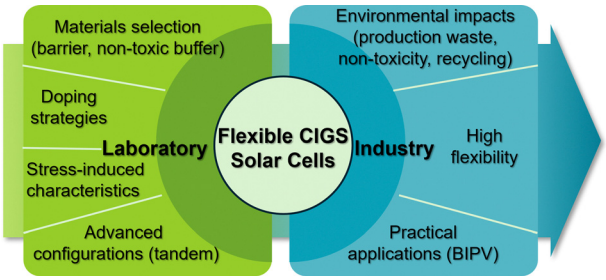
REVIEWS

2554

Flexible Cu(In,Ga)Se_2 photovoltaics for bending applications: advances from materials to panels

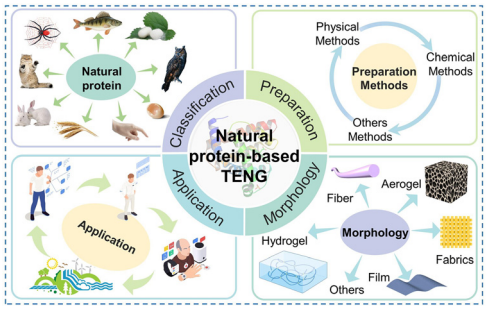
Ha Kyung Park and William Jo*



2578

Native proteins for triboelectric nanogenerators

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



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REVIEWS

2606

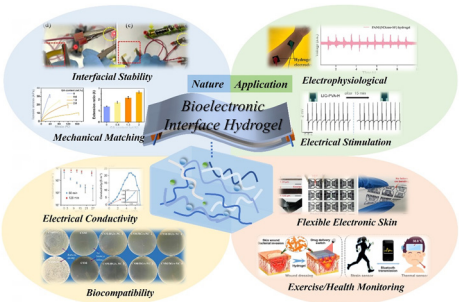
Random lasing in liquid crystals: advances, challenges, and future directions

Aneela Ahmad, Haitao Dai,* Shouzhong Feng, Zhenda Chen, Zolkefl Mohmaed, Abdul Aziz Khan, Xichen Hao, Yuhan 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*

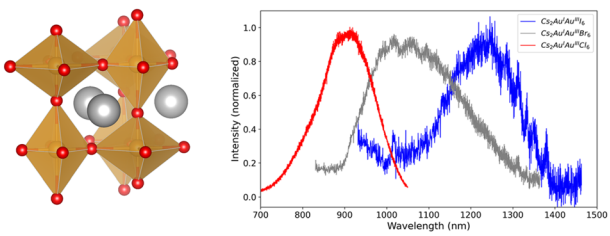


COMMUNICATION

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 Guillemoles and Philip Schulz*

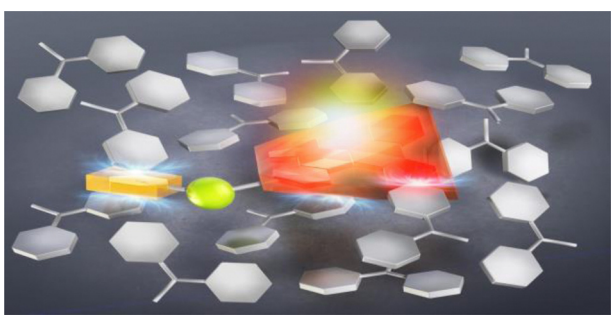


PAPERS

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*



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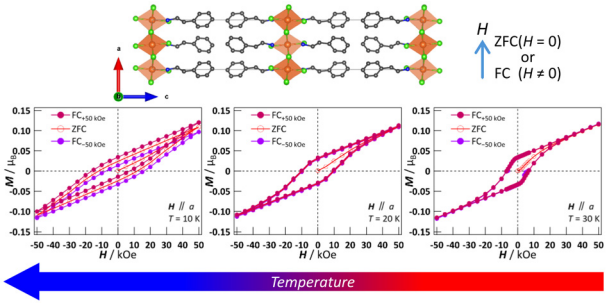
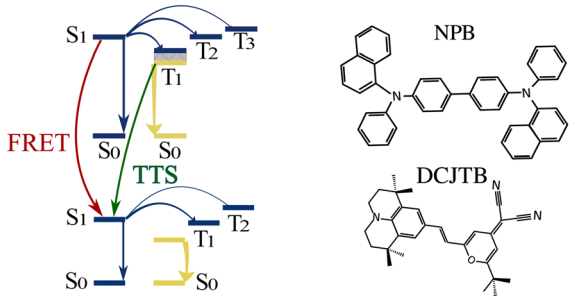
2661



Coupling between ferroelasticity and magnetization in two-dimensional organic–inorganic perovskites $(C_6H_5C_2H_4NH_3)_2MCl_4$ (M = Mn, Cu, Fe)

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

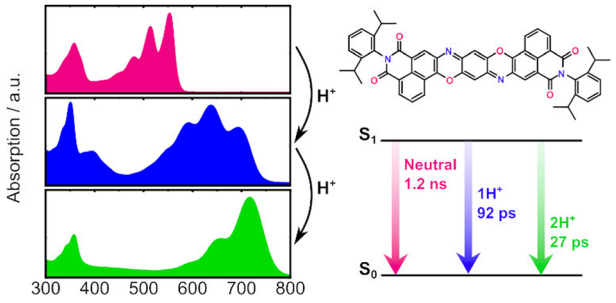
2673



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 π-extended triphenodioxazine 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*

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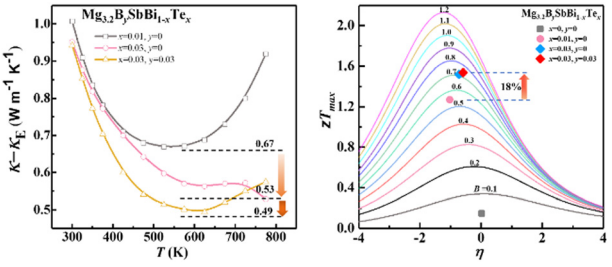

Enhanced thermoelectric performance of Mg_3Sb_2-based materials by codoping with B and Te

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

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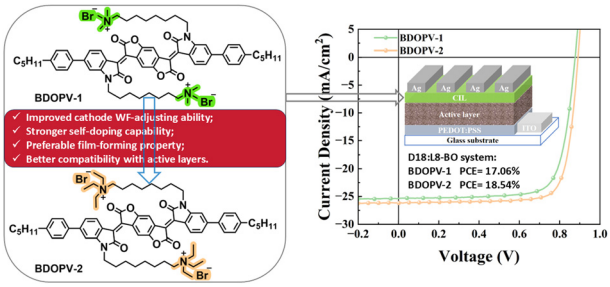
2701

Imide-free electron-deficient electrolytes with adjustable cathode-modifying capabilities achieved by side chain engineering for efficient organic solar cells

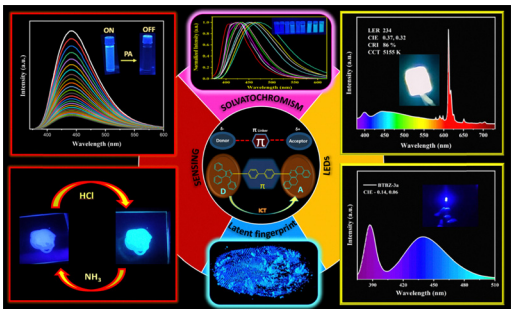
Guiting Chen,* Long Wang, Hongli Wu, Long Li, Baitian He,* Chuanbo Dai and Zhicai He*



2711

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

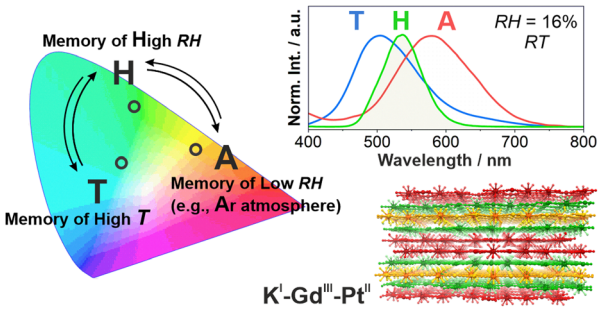
Bhabana Priyadarshini Debata, Manojkumar Dhanthala Thiyagarajan, Prathap R., Jaipal Devesing Girase, Sathiyanarayanan Kulathu Iyer, Sabita Patel* and Sivakumar Vaidyanathan*



2732

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

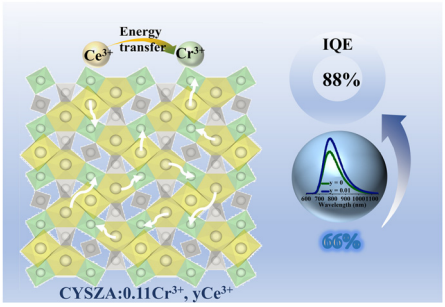
Maciej Wyczesany, Michał Heczko, Mateusz Reczyński, Barbara Sieklucka and Szymon Chorazy*



2745

Multi-site occupancy high-efficient $CaY_2ScZrAl_3O_{12}$:Cr^{3+},Ce^{3+} phosphors for application in broadband NIR pc-LEDs

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



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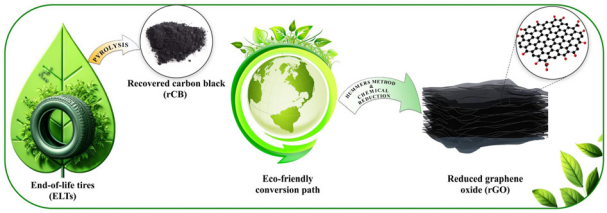

Chemical conversion of recovered carbon black (rCB) from end-of-life tires (ELTs) pyrolysis to reduced graphene oxide (rGO): from waste to advanced materials

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

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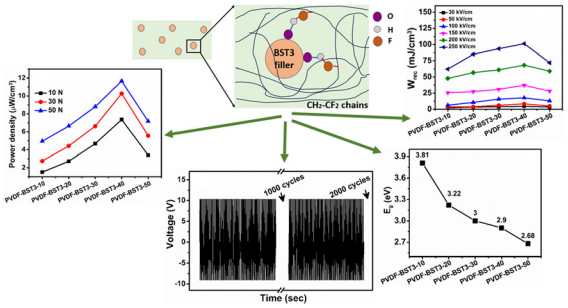
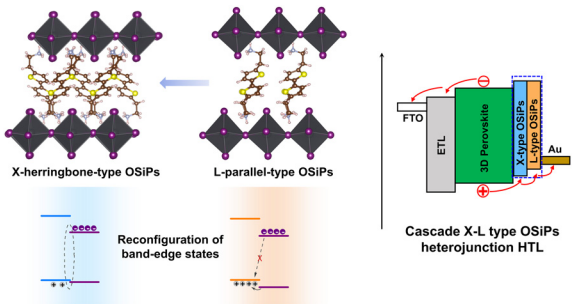


Multifunctional piezoelectric PVDF–$Ba_{0.97}Sr_{0.03}TiO_3$ composite films for electrostatic energy storage, bio/force sensing, and optical applications

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

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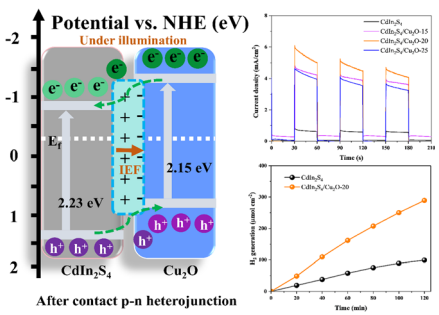

A highly efficient 3D/0D $CdIn_2S_4/Cu_2O$ photoanode with a p–n type heterojunction for boosted photoelectrochemical water splitting under visible light irradiation

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

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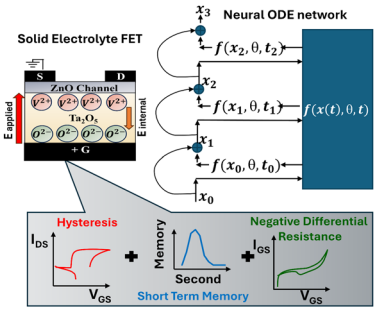
PAPERS

2804

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

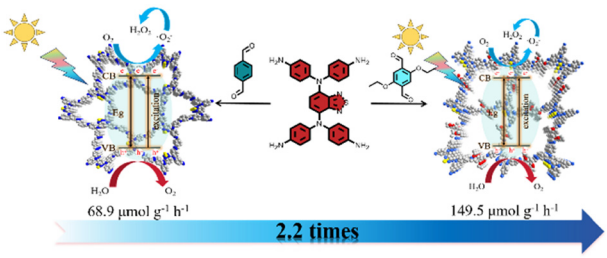
Ankit Gaurav, Xiaoyao Song, Sanjeev Kumar Manhas and Maria Merlyne De Souza*



2814

Side-chain regulated topology of 2D covalent organic frameworks and its impact on photocatalytic synthesis of H_2O_2

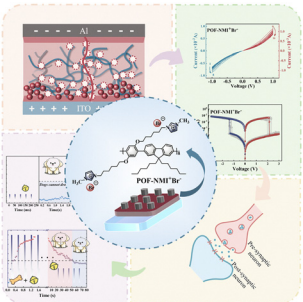
Shuai Sun, Chao-Qin Han,* Jia-Xin Guo, Lei Wang, Ze-Yang Wang, Gonghao Lu* and Xiao-Yuan Liu*



2822

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

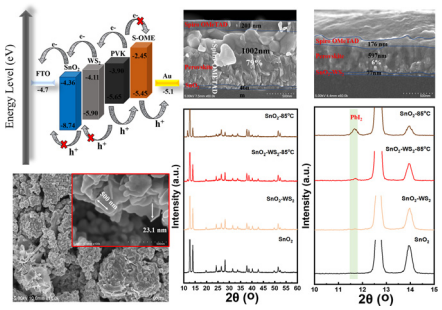
Jiaxuan Liu, Kexin Wang, Kejia Zhao, Qian Chen, Haidong He,* Xinzhu Wang* and Yu Chen*



2834

High-efficiency self-powered perovskite photodetector with an electron-enhancing SnO_2/WS_2 double electron transport layer

Vo Pham Hoang Huy and Chung Wung Bark*



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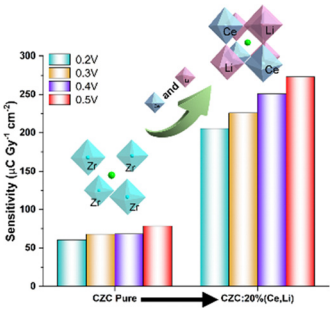
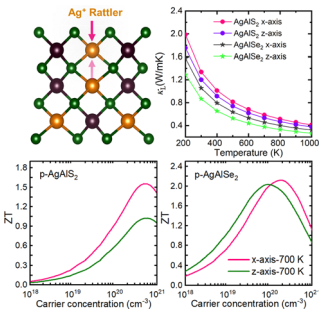


A novel co-substitution strategy for the design, growth, and optoelectronic performance optimization of Cs_2ZrCl_6:Ce,Li single crystals

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

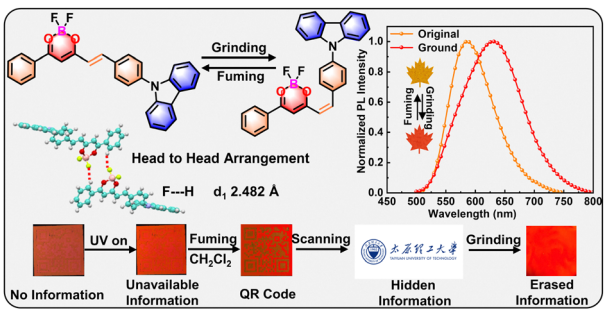
2853



Ultralow lattice thermal conductivity and superior thermoelectric performance in $AgAlS_2$ and $AgAlSe_2$

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

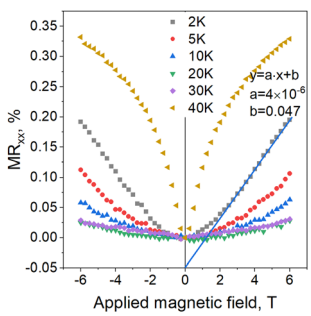
2868



C═C bond enables difluorideboron β-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

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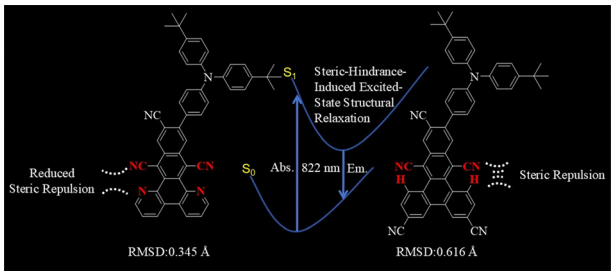
2887

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*



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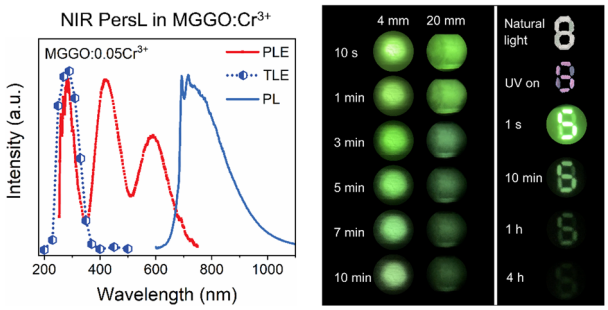
Ultralong near-infrared persistent luminescence in a Cr^{3+}-doped gallogermanate for multifunctional applications

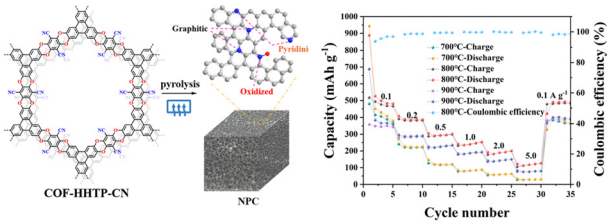
Fangyi Zhao, Yuhe Shao, Qinan Mao, Yiwen Zhu, Heyi Yang, Yang Ding, Quanlin Liu* and Jiasong Zhong*



2905

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

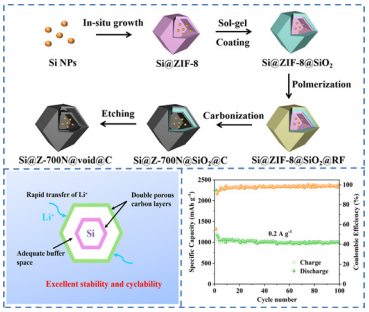
Jiahui Yuan, Zhenyu Zhang, Yajie Feng, Fuzhou Chen, Wei Ding, Yizi Zhang, Hongxing Jia* and Zhengrong Gu*



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*



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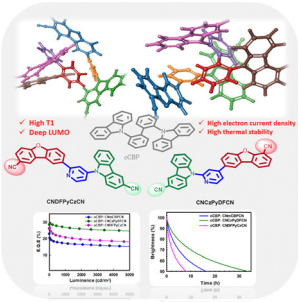
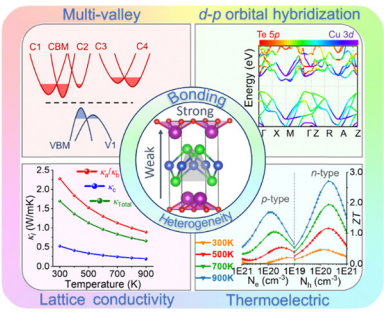


Unveiling a pyridine-based exciplex host for efficient stable blue phosphorescent organic light-emitting diodes

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*

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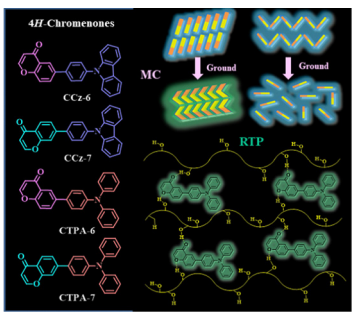
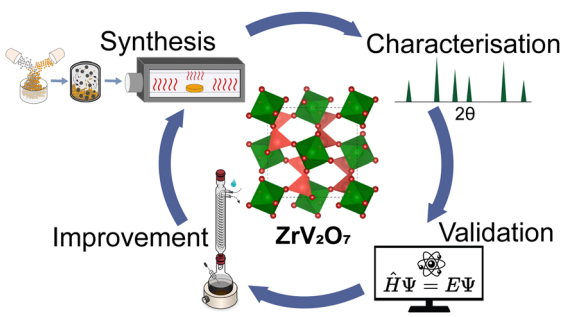


Solid-state emissions of 4*H*-chromenones with simple structures: mechanochromism and polymer-based doped ultralong room-temperature phosphorescence

Huaiying Huang, Miaochang 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_2O_7

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

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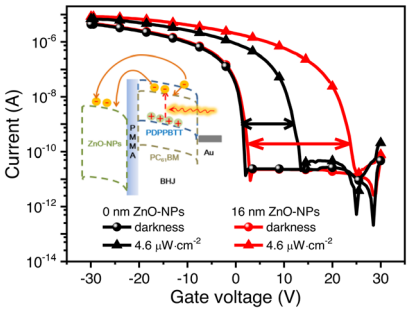
PAPERS

2969

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

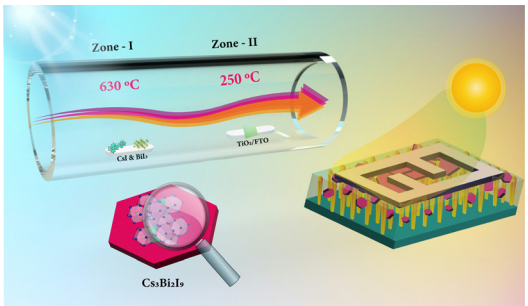
Meihua Shou,* Jiaxin Zheng, Xingpeng Liu, Jiadong Zhou, Zengqi Xie, Qing Liao,* Haiou Li* and Linlin Liu*



2978

Layered $Cs_3Bi_2I_9$ perovskite nanosheets on TiO_2 nanorods for high-performance heterostructure photodetectors

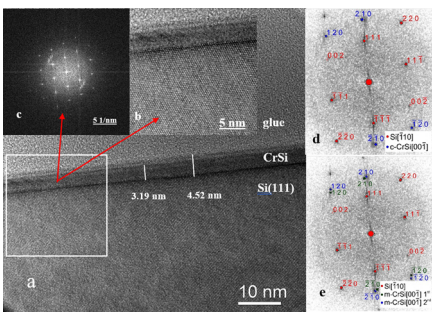
Gunasekaran Ashokan, Sadhasivam Subramani, Gowthambabu Vellingiri, Anbarasan Nallathambi and Jeganathan Kulandaivel*



2987

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

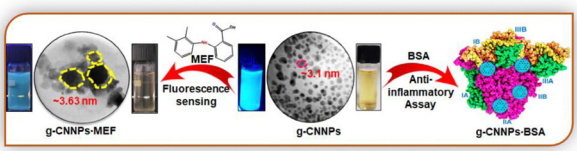
Nikolay G. Galkin,* Konstantin N. Galkin, Oleg V. Kropachev, Sergey A. Dotsenko, Dmitrii L. Goroshko, Dmitri B. Migas, Andrew B. Filonov, Natalia V. Skorodumova, Andrey V. Gerasimenko and Anton K. Gutakovskii



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



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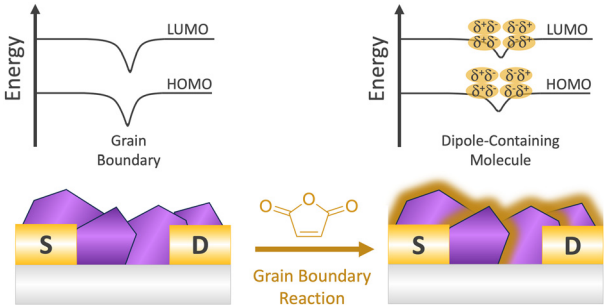
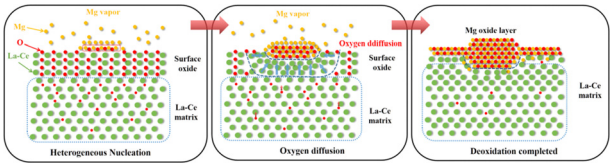
3011



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 Cimatu, Oana D. Jurchescu and Jacob W. Ciszek*

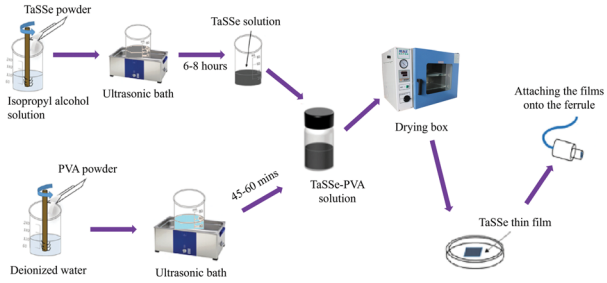
3020



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

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

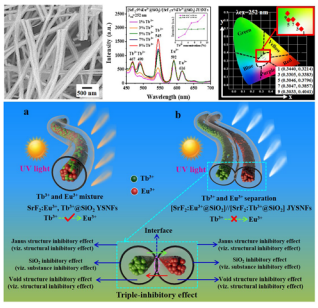
3028



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_2:Eu^{3+}@SiO_2]//[SrF_2:Tb^{3+}@SiO_2] Janus yolk–shell nanofibers with ideal white-light emission *via* triple-inhibiting energy transfer between Tb^{3+} and Eu^{3+} ions

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

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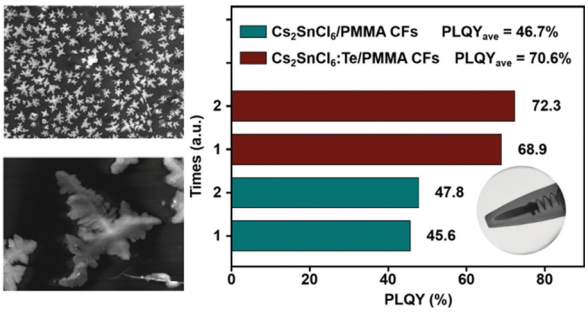
PAPERS

3047

In situ growth of Te-doped Cs_2SnCl_6 scintillator composite films for X-ray imaging

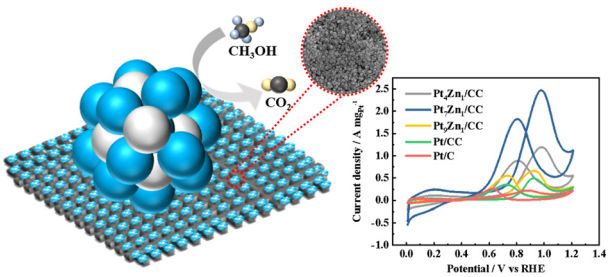
Junnan Wang, Zeyu Wang,* Nikolai V. Gaponenko, Jindou Shi, Zheyuan Da, Chen Zhang, Yongqiang Ji, Qing Yao, Youlong Xu and Minqiang Wang



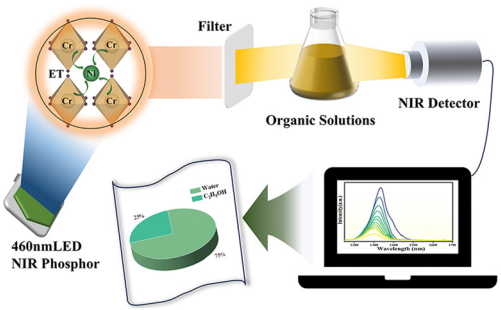
3054

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^{3+}/Ni^{2+} co-doped garnet phosphor toward next-generation spectroscopy applications

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