

Journal of Materials Chemistry C

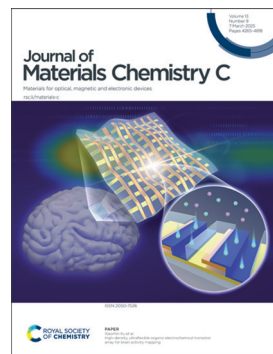
Materials for optical, magnetic and electronic devices

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(9) 4265-4818 (2025)



Cover

See Xiaomin Xu *et al.*,
pp. 4385–4397.
Image reproduced
by permission of
Xiaomin Xu from
J. Mater. Chem. C,
2025, 13, 4385.

EDITORIAL

4282

Introduction to rare earth materials

Ashlee J. Howarth,* Takao Mori* and Zhiguo Xia*

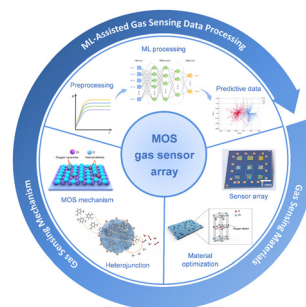


REVIEWS

4285

Advances in metal oxide semiconductor gas sensor arrays based on machine learning algorithms

Jiayue Han, Huizi Li, Jiangong Cheng,* Xiang Ma* and Yanyan Fu*



**GOLD
OPEN
ACCESS**

EES Batteries

**Exceptional research on
batteries and energy storage**

Part of the EES family



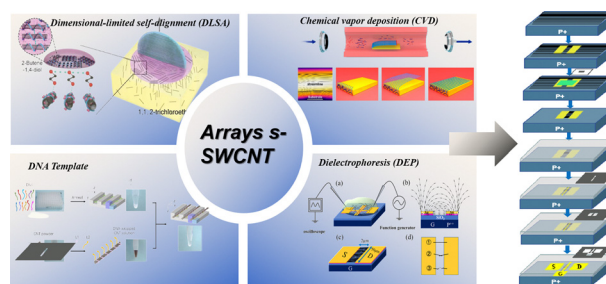
**Join
in** | Publish with us
rsc.li/EESBatteries

REVIEWS

4304

Progress in the fabrication of high-purity semiconducting carbon nanotube arrays

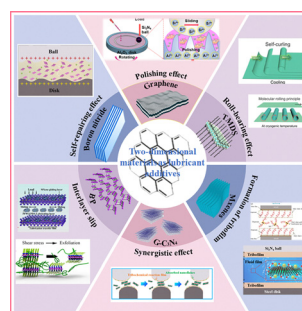
Jiaxiang Xu, Zhibo Xiao, Chunmin Jia, Yuxiang Wei, Yanan Sun, Liqian Kang, Nuanyang Cui, Peixian Li, Yimin Lei* and Xiaohua Ma*



4327

Two-dimensional nanomaterials as lubricant additives: the state-of-the-art and future prospects

Zhengquan Jiang,* Jiahao Wu, Laigui Yu, Jinglei Bi, Yadong Wang, Xiaoyi Hu, Yujuan Zhang and Weihua Li*

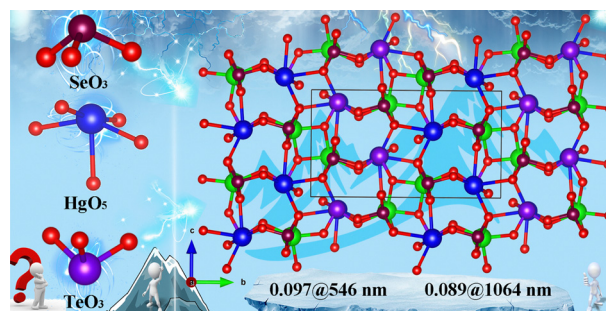


COMMUNICATIONS

4374

Hg₂(SeO₃)(TeO₃): a novel tellurite–selenite birefringent crystal achieved by assembling multiple functional groups

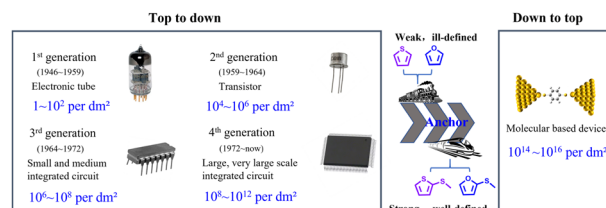
Peng-Fei Li, Chun-Li Hu, Jiang-Gao Mao and Fang Kong*



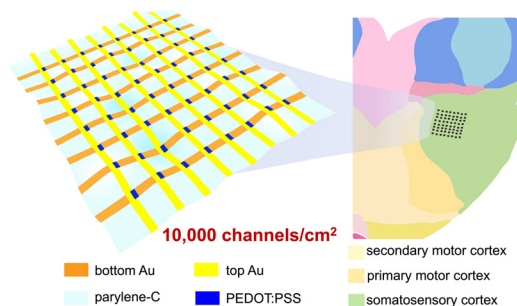
4379

The binding details of a 2-(methylthio)thiophene/furan anchor anchored to the Au electrode in the formed molecular junction

Mengxiao Li, Aoxing Sun, Mingzhen Wang, Xu Wang, Yuhua Lu, Lei Yu* and Yunchuan Li*



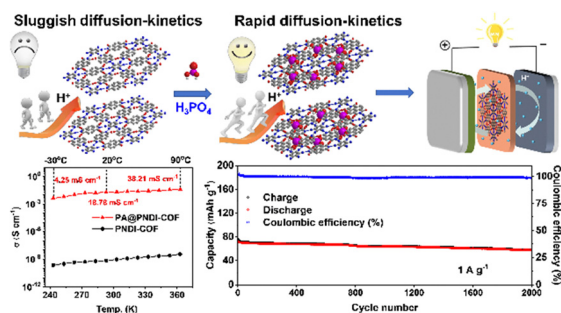
4385



High-density, ultraflexible organic electrochemical transistor array for brain activity mapping

Wei Xu, Yanlan Zhu, Xiaolin Zhou, Haoyue Guo, Jingxin Wang, Ruiqi Zhu, Zhengwei Hu, Wei Ma, Xing Ma, Xiaojian Li and Xiaomin Xu*

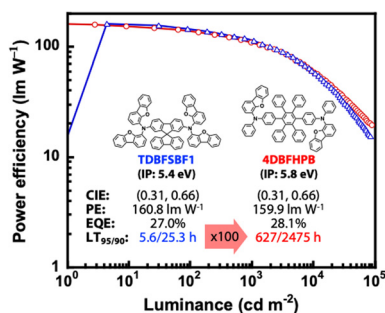
4398



Acidified naphthalene diimide covalent organic frameworks with superior proton conduction for solid-state proton batteries

Lin-Lin Wang, Xiao-Qin Ni, Ya-Juan Han, Jin Zhang, Hong-Bin Luo, Qiao Qiao,* Yu-Ping Wu and Xiao-Ming Ren*

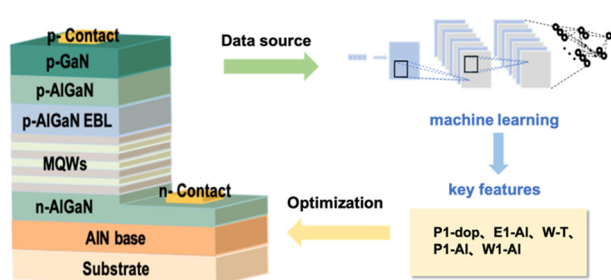
4405



Critical importance of the hole-transporter and emission layer interface for prolonging lifetime in a phosphor-sensitized hyper-OLED based on an MR-TADF emitter

Yuma Kori, Haruki Nemma, Jiang Dehao, Naoki Meguro, Ryunosuke Mimura, Junji Kido and Hisahiro Sasabe*

4413



A study on device physics of deep ultraviolet light emitting diodes leveraging machine learning

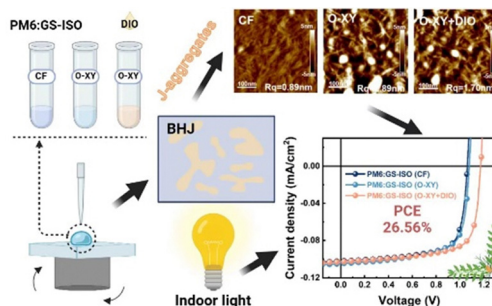
Na Lin, Zhiqiang Liu, Zhuoying Jiang, Ying Jiang, Shanshan Zhao, Jinjian Yan, Sijie Jiang, Yikai Yun, Wenjie Wei, Shaoqun Li, Ziang Wan, Jianfeng Du, Jinchai Li, Tao Tao, Kai Huang,* Lin Li,* Mengyu Chen,* Cheng Li* and Rong Zhang



4421

Enhancing efficiency in organic electronics via J-aggregation modulation with non-halogenated solvents

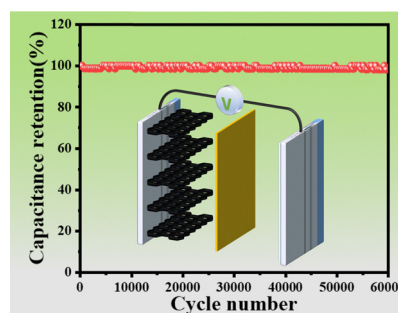
Guangting Cai, Zhenmin Zhao,* Sein Chung, Liang Bai, Lixing Tan, Xin Li, Jingjing Zhao, Yuan Liu, Kilwon Cho and Zhipeng Kan



4429

Extremely durable supercapacitor enabled by disordered porous carbon with a capacity retention up to 60 000 cycles

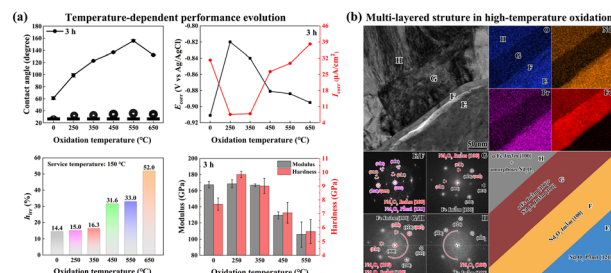
Yu Ma, Chenmiao Ma, Jingya Wang, Xiaoqing Gao, Zepeng Li* and Yingdong Han*



4435

Revealing the surface oxidation mechanism and performance evolution of Nd–Fe–B sintered magnets

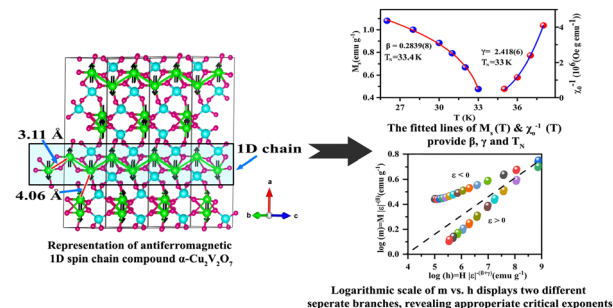
Liang Zhou, Jiaying Jin,* Wang Chen, Shaoqing Ren, Mengfan Bu, Xu Li, Bo Xin, Chen Wu and Mi Yan*



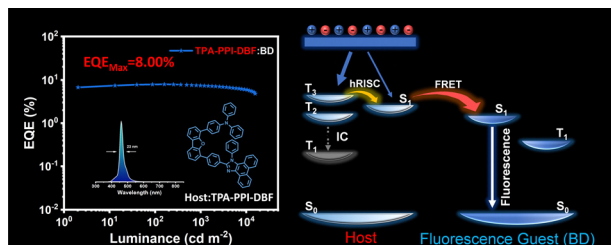
4451

Revealing the one-dimensional (1-D) Heisenberg antiferromagnetic state in pyrochlore α -Cu₂V₂O₇ from critical exponent analysis

Ajith Nix ESR, Pujalin Biswal, W. Prellier, D. Samal* and Bhaskar Chandra Behera*



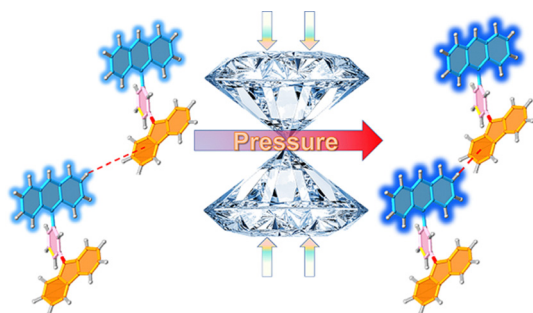
4461



Synthesis of phenanthroimidazole-based host materials with balanced hole–electron transport for highly efficient blue fluorescent OLEDs

Zhiqiang Wang, Bohua Zhang, Yi Chen, Jiangxue Pei, Qingyu Jia, Chaobo Hao, Xiping Lei* and Dongdong Wang*

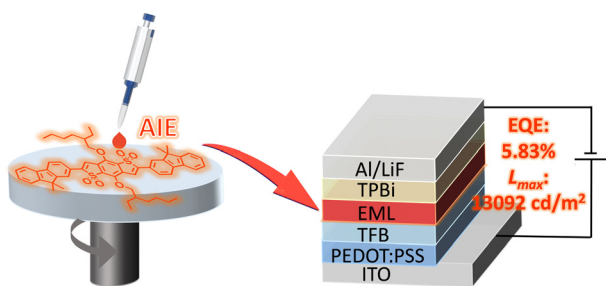
4472



Strengthening C–H... π intermolecular interactions induces emission enhancement of anthracene derivatives under high pressure

Yonghui Lv, Xinqi Yang, Wenpeng Jia, Qian Li, Wengang Liu, Ben-guo He, Yongli Liu, Kai Wang,* Haichao Liu* and Yuxiang Dai*

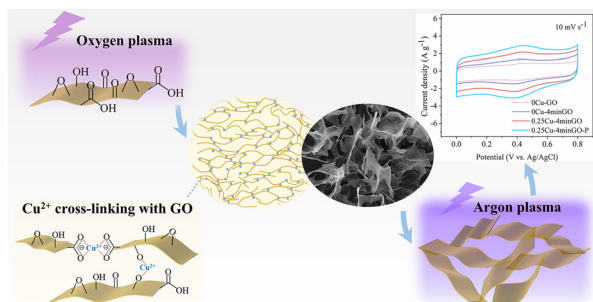
4480



Red/deep-red fluorophores based on benzo[1,2-*b*:4,5-*b'*]dithiophene 1,1,5,5-tetraoxide for high-performance solution-processed OLEDs

Zixuan Zhang, Zifan Yu, Meijing Li* and Shijie Zhen*

4488



Improved electrochemical performance of graphene oxide *via* copper ion cross-linking and plasma functionalization

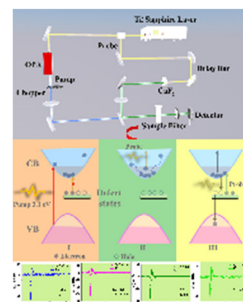
Wenqi Zhao, Minghui Cui, Yansong Zhou, Yanjing Liu, Qiongrong Ou* and Shuyu Zhang*



4499

Broadband nonlinear optical response and ultrafast carrier dynamics in defect-engineered Fe–Co₃O₄ for photonics

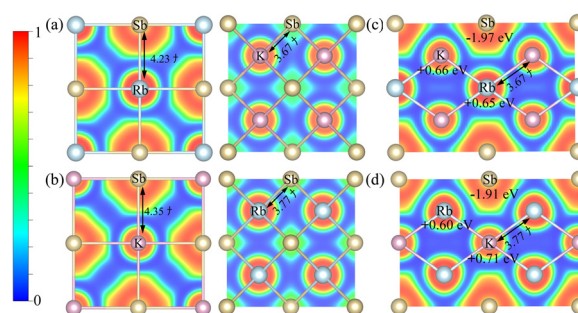
Linghao Kong, Hongwei Chu,* Zhongben Pan, Han Pan, Shengzhi Zhao and Dechun Li*



4511

Unveiling the microscopic origins and thermoelectric performance of full-Heusler compounds K₂RbSb and Rb₂KSb

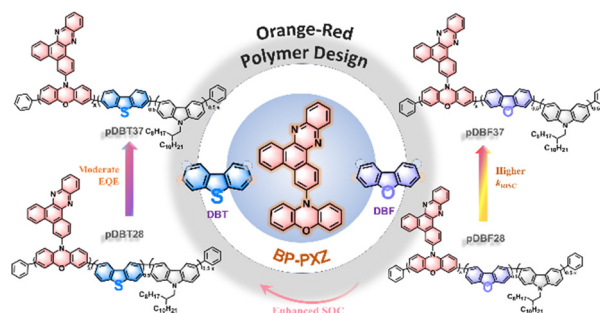
Peipei Liu, Yinchang Zhao,* Jun Ni and Zhenhong Dai*



4523

Suppressing efficiency roll-off of orange-red thermally activated delayed fluorescence polymer-based OLEDs via copolymerizing co-hosts with cascade energy levels

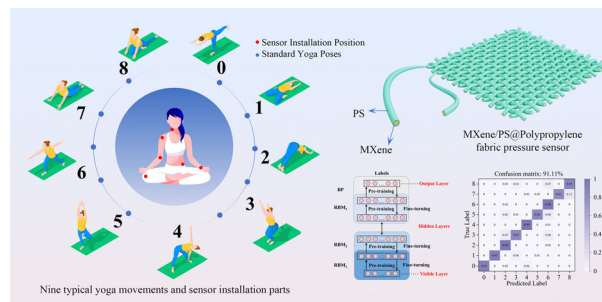
Mati Ullah Khan, Lei Hua,* Yuchao Liu, Haisong Zhao, Yumeng Guo, Yafei Wang, Shouke Yan* and Zhongjie Ren*



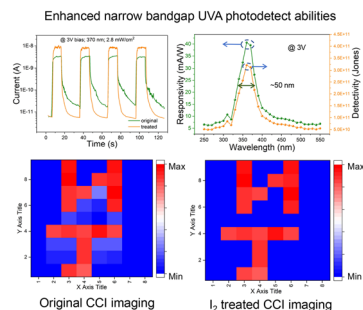
4533

Highly hydrophobic MXene/PS@polypropylene fabric for human posture recognition assisted by machine learning

Daihui Zhang, Chunqing Yang, Jun Wang, Yukun Liu, Jiahui Shao and Dongzhi Zhang*



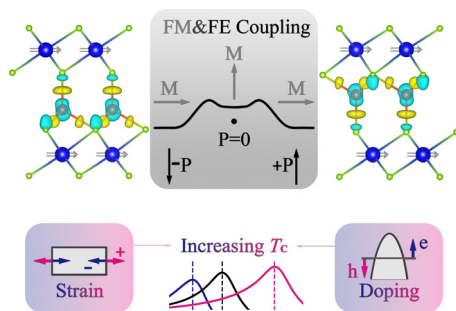
4543



Recrystallization of single crystal CsCu_2I_3 perovskites by I_2 treatment for enhanced UV detecting abilities

Fa Cao,* Guanyu Cheng, Enliu Hong, Ying Liu, Sancang Han, Pingping Yu* and Bin Sun*

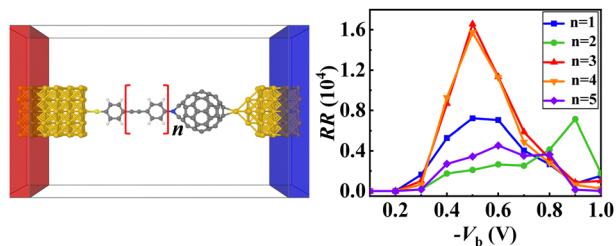
4549



Multiferroic metallic monolayer $\text{Cu}(\text{CrSe}_2)_2$

Ke Yang, Yuxuan Zhou, Yaozhenghang Ma and Hua Wu*

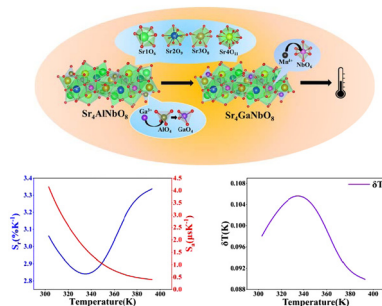
4557



Fullerene-based single molecule diodes with huge rectification ratios: a DFT-NEGf study

Minjing Zhang, Zhaodi Yang, Si-Dian Li* and Yuewen Mu*

4564



$\text{Sr}_4\text{GaNbO}_8\text{:Mn}^{4+}$: a novel perovskite-structured red-emitting phosphor for a luminescence lifetime thermometer with good relative sensitivity and repeatability

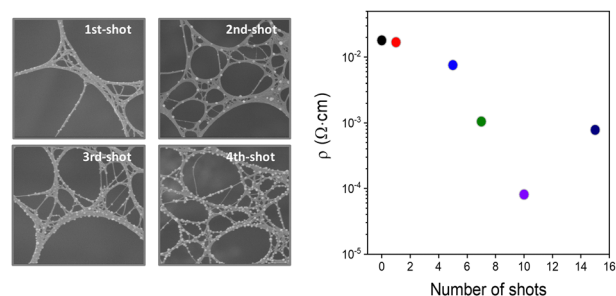
Zhenyu Huang, Kai Li,* Zhiyu Zhang, Jianing Liu and Daiman Zhu*



4576

Photo-thermally controlled Cu nanoparticles density in SWCNT/Cu nanocomposites-based flexible EMI shielding electrodes

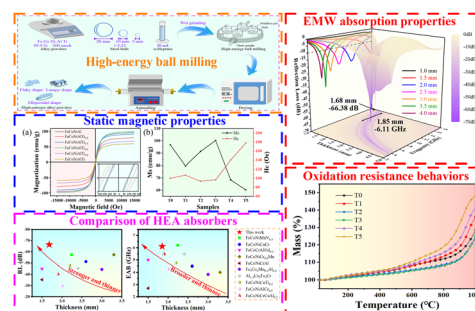
Jae-Won Lee, Juhee Kim, Min Su Kim, Kyong-Soo Hong, Imjeong H.-S. Yang* and Hee Jin Jeong*



4583

Excellent electromagnetic wave absorption performances of FeCoNiAlTi_x high-entropy alloys with superior oxidation resistance

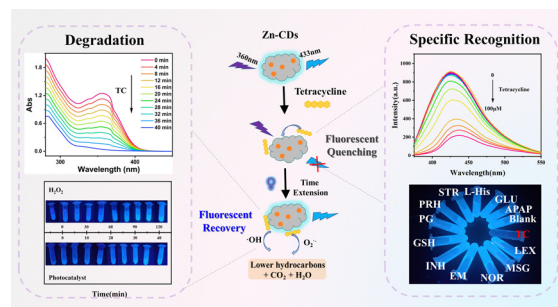
Yansi Wang, Liyang Fang, Chenran Xu, Xiaoling Chen, Zhiyou Lu, Guanglong Xu, Lingwei Yang, Yifang Ouyang and Xiaoma Tao*



4594

Multifunctional Zn-carbon dots enhanced specific recognition and *in situ* degradation of tetracycline

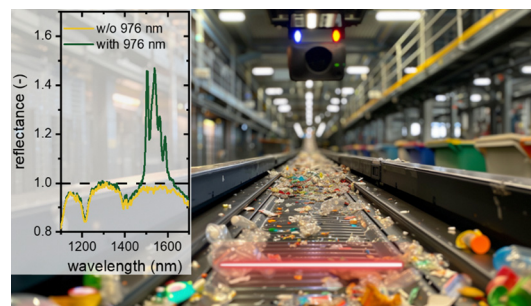
Tianbao Liu, Weixuan Zhao, Shenhua Meng, Biao Dong, Nan Shi* and Weiguang Shi*



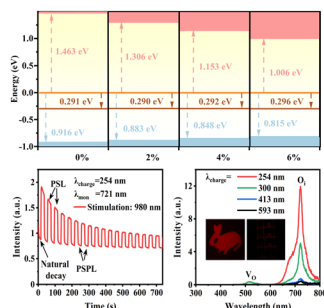
4605

Optimizing the short-wavelength infrared photoluminescence quantum yield and brightness of Er³⁺, Yb³⁺ co-doped yttrium orthophosphate phosphors for tracer-based sorting

Nisrin Mohamed Bhiri, Herman Duim, Eduard Madirov, Justine Nyarige, Bryce S. Richards* and Andrey Turshatov*



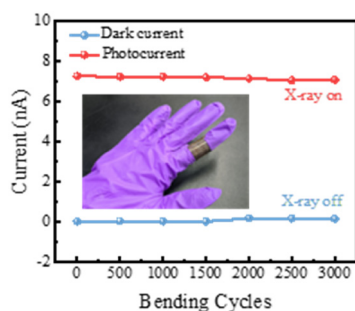
4616



The self-activated LiGa₅O₈ storage phosphor: insights into its photo/thermo/mechano-stimulated NIR luminescence

Min Jia, Xiangyu Zhang,* Xue Yang, Zehao Lin, Dingjun Jia, Yuqiang Wang, Sining Yun and Dangli Gao*

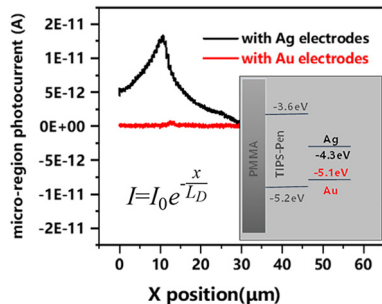
4626



Lead-free metal halides for a stable, flexible, and high-performance X-ray detector

Juan Zhao, Youkui Xu, Guoqiang Peng, Yujiang Wu, Qian Wang* and Zhiwen Jin

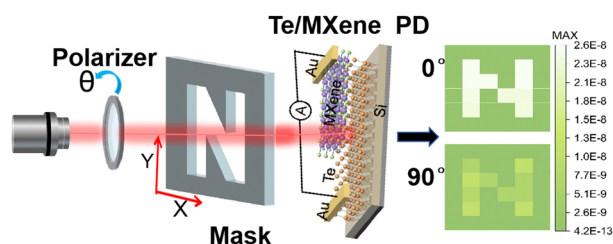
4634



How far can a minority charge carrier of an organic semiconductor walk? An *in situ* observation by scanning photocurrent microscopy

Di Sun, Xuehua Hou, Yonglin Cao, Hui Chai, Zengqi Xie and Linlin Liu*

4642



A 2D Te/Mxene Schottky junction for a self-powered broadband photodetector with high polarization-sensitive imaging

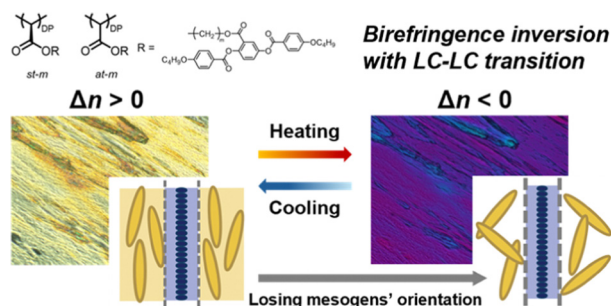
Pingping Yu, Yuqing Kong, Xiaotian Yu, Xi Wan, Fa Cao* and Yanfeng Jiang*



4651

Birefringence inversion in liquid crystalline poly(substituted methylene)s bearing side-on mesogens

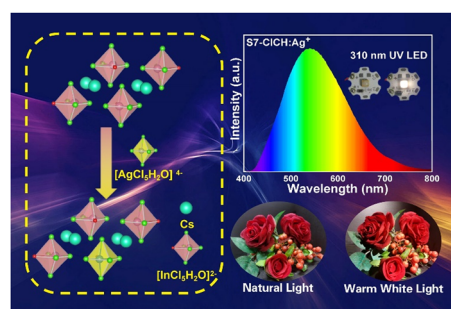
Masamichi Kiyoura, Hiroyuki Kudo, Keiki Inoue, Fumitaka Ishiwari, Takanori Fukushima, Naruki Kurokawa and Masatoshi Tokita*



4658

Broadband and warm white emission in $\text{Cs}_2\text{In}_{1-x}\text{Cl}_5 \cdot \text{H}_2\text{O} : x\text{Ag}^+$ phosphors enabled by H_3PO_2 -mediated stabilization

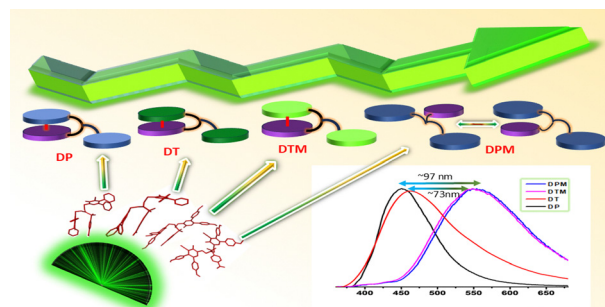
Ying Qin, Yuexiao Pan,* Haoshuai Wang, Tiantian Zhao, Weiyu Xu, Qian Miao* and Jun Zou*



4665

Designing symmetrically folded scaffolds of pyridazinone and triazinone derivatives linked via *N,N*-diethyl-4-nitro-benzenesulfonamide to explore luminescent materials

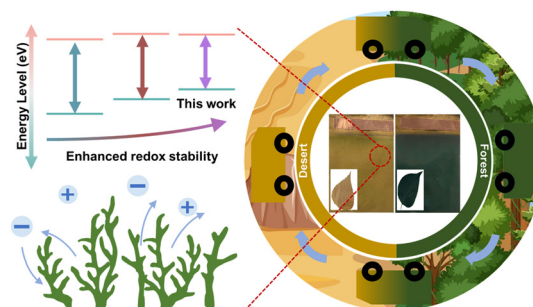
Vipin Kumar, Krishanu Bandyopadhyay, Manisha Nidhar, Vishal Prasad Sharma, Priyanka Yadav, Suman Gill, Priyanka Sonker, Abhineet Verma, Satyen Saha* and Ashish Kumar Tewari*



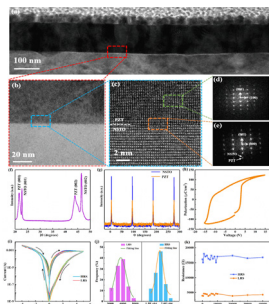
4673

Electrochromic fabrics with improved cycling stability via modified polyaniline towards environmentally adaptive camouflage

Mingyu Ding, Wanzhong Li, Ang Li, Yuhao Wang, Jingbing Liu, Qianqian Zhang* and Hao Wang*



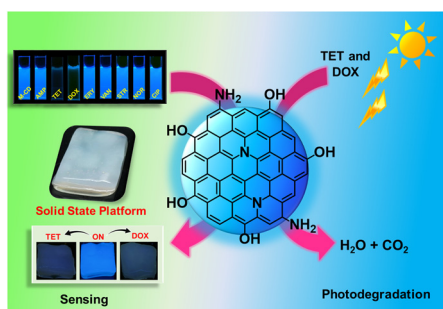
4683



Photoelectric memristor based on a PZT/NSTO heterojunction for neuromorphic computing applications

Jingjuan Wang, Zhaowen Wang, Wenze Zhao and Xiaobing Yan*

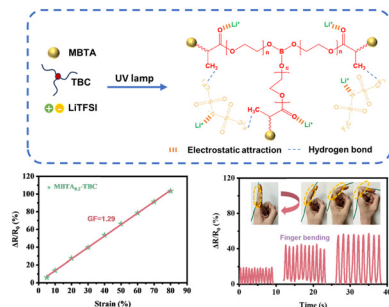
4691



A carbon dot anchored bacterial cellulose hybrid platform as a fluorescent sensor and photocatalytic remover of pharmaceuticals

Nirmiti Mate, Kallayi Nabeela and Shaikh M. Mobin*

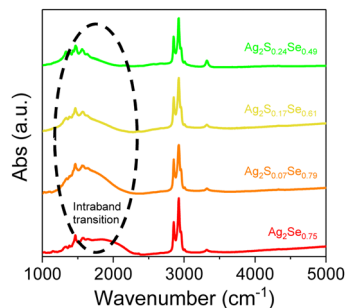
4702



Highly linear wearable ionic gel based on self-assembled discoid liquid crystal towards human motion monitoring

Jie Chen, Rui Feng,* Peng Su, Tong Zhou and Lijie Dong*

4709



Tailoring intraband transition via composition in self-doped $\text{Ag}_2\text{S}_x\text{Se}_y$ alloy nanocrystals

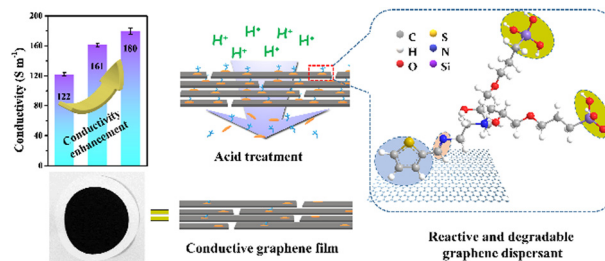
Youngjo Choi, Haemin Song, Gyu Ho Song, Hee Kwon Kim, Yoon Seo Jung, Hyeong Seok Kang, Woong Kim* and Kwang Seob Jeong*



4716

Reactive and decomposable dispersant for maximizing the properties of graphene composites

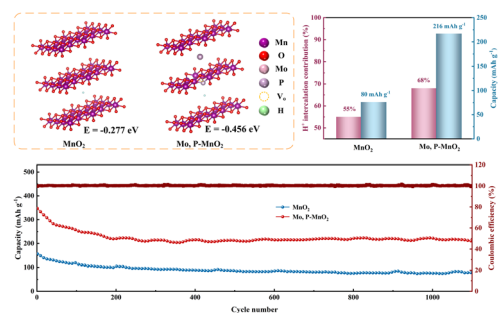
Junshuo Cui,* Xuening Du, Shiyi Liu, Liangyu Guo, Wanqi Liu and Ying Xiong*



4727

Unlocking Mo, P co-doping to boost proton intercalation in MnO₂ as a high-performance cathode material for aqueous zinc-ion batteries

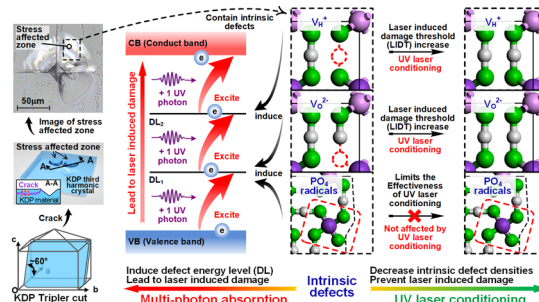
Kaixuan Ma, Guangfeng Liang, Qingze Jiao, Haibo Jin, Yuefeng Su, Ning Li, Jingbo Li, Zhiyong Xiong, Caihong Feng* and Yun Zhao*



4737

Evolution of intrinsic defect density in UV laser conditioning at the KDP crystal stress affected zone and its role in improving the laser induced damage threshold

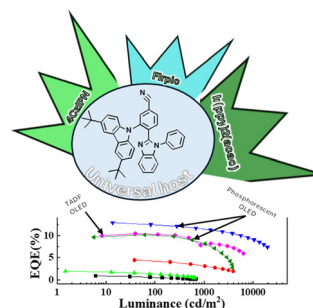
Jianrui Hu, Zhaoyang Yin, Jian Cheng,* Jixiang Chen, Linjie Zhao, Hongqin Lei, Guang Chen and Mingjun Chen



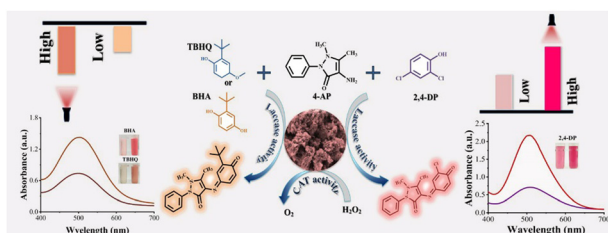
4749

The effect of bipolar charge transport of derivatives of 1-phenyl-1*H*-benzo[*d*]imidazole with horizontal molecular orientation on the performance of OLEDs based on thermally activated delayed fluorescence or phosphorescence

Simas Macionis, Ehsan Ullah Rashid, Jurate Simokaitiene, Rita Butkute, Oleksandr Bezikonnyi, Dmytro Volyniuk, Dalius Gudeika, Tien-Lung Chiu, Jiun-Haw Lee, Zi-Wen Su, Chia-Hsun Chen, Ruta Budreckiene, Mariia Stanitska, Oleksandr Navozenko and Juozas V. Grazulevicius*



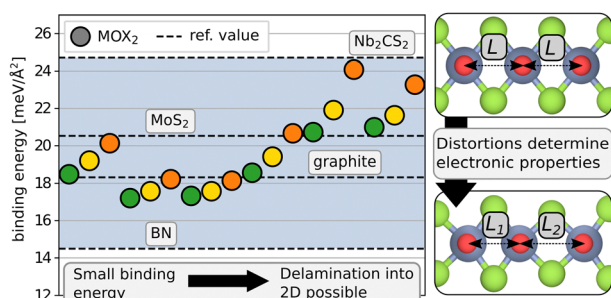
4760



Cu-MOF/C₃N₅ as a laccase-like nanozyme for colorimetric detection of antioxidants in electronic cigarettes

Ya Ruan, Zheng Chen, Xianfang Rong, Qianqian Pang, Dezhi Yang, Yaling Yang* and Zhichao Chen*

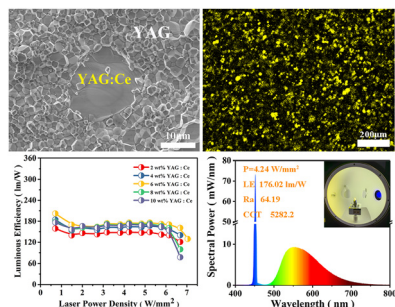
4769



Computational screening of MOX₂ transition metal oxydihalides with M = V, Nb, Ta, Mo, Ru, or Os, and X = Cl, Br, or I

Pernilla Helmer, Martin Dahlqvist and Johanna Rosen*

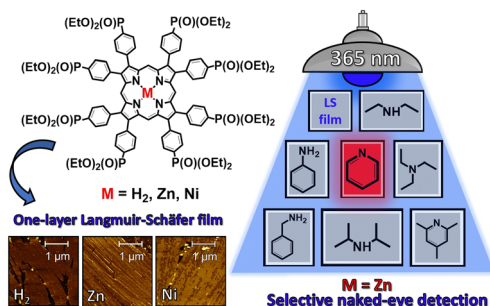
4781



Reactive spark plasma sintering of YAG–YAG:Ce composite phosphor ceramics for laser-driven lighting with high luminous efficacy

Hailiang Fang, Lei Li, Beiyong Zhou,* Weijie Li, Shijia Gu, Qi Zheng, Lianjun Wang* and Wan Jiang*

4791



Supramolecular assembly of phosphonate-substituted porphyrins in Langmuir layers and Langmuir–Schäfer films: structural studies and selective sensing of pyridine vapors

Elizaveta V. Ermakova,* Vladimir V. Arslanov, Yann Bretonnière, Carine Michel and Alla Bessmertnykh-Lemeune*

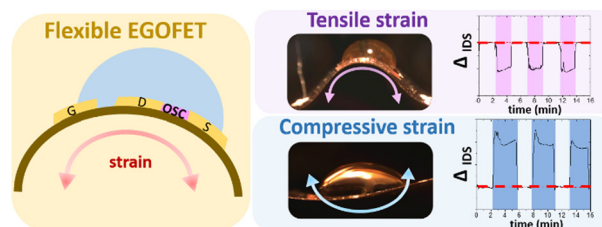


PAPERS

4807

Influence of mechanical stress on flexible electrolyte-gated organic field-effect transistors

Sara Ruiz-Molina, Simona Ricci, Carme Martínez-Domingo, María Jesús Ortiz-Aguayo, Raphael Pfattner, Guillaume Schweicher, Yves H. Geerts, Tommaso Salzillo and Marta Mas-Torrent*



CORRECTION

4816

Correction: Recent developments in emerging two-dimensional materials and their applications

Karim Khan,* Ayesha Khan Tareen,* Muhammad Aslam, Renheng Wang, Yupeng Zhang, Asif Mahmood, Zhengbiao Ouyang,* Han Zhang* and Zhongyi Guo*

