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Journal of Materials Chemistry C

Materials for optical, magnetic and electronic devices

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IN THIS ISSUE

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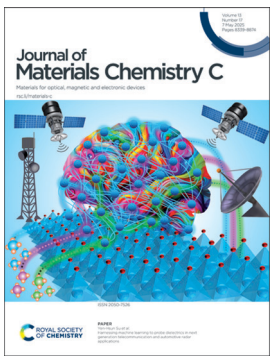


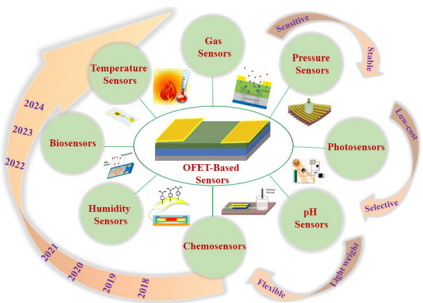
Cover
See Yen-Hsun Su *et al.*, pp. 8450–8460. Image reproduced by permission of Yen-Hsun Su from *J. Mater. Chem. C*, 2025, **13**, 8450.

REVIEWS

8354

Organic field-effect transistor-based sensors: recent progress, challenges and future outlook

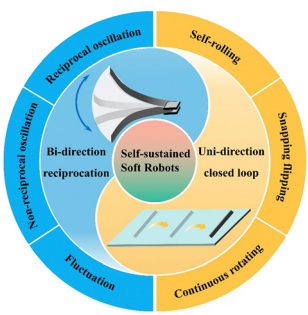
Bibi Amna* and Turan Ozturk*



8425

Self-sustained soft robots based on liquid crystal elastomers

Jingli Gao, Kai Wang, Yanzhao Yang* and Wei Feng*



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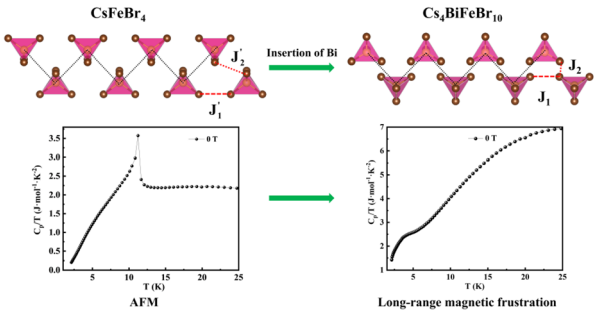
COMMUNICATION

8443

Possible gapless spin-liquid state in the Fe-based halide perovskite $Cs_4BiFeBr_{10}$ derived from the antiferromagnet $CsFeBr_4$

Jie Pan, Yaru Zhang, Yixin Liu, Xin Mi, Fuyang Liu, Yuqiang Fang, Binbin Zhou, Peizhi Yang, Gang Mu,* Peng Qin* and Fuqiang Huang*

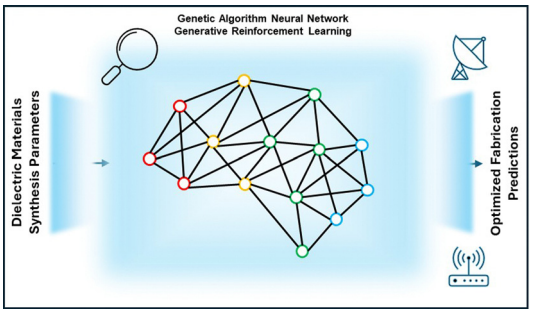


PAPERS

8450

Harnessing machine learning to probe dielectrics in next generation telecommunication and automotive radar applications

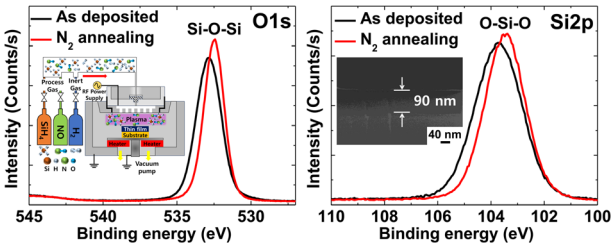
Amit Kumar Sharma, Tai-Ming Zheng, Yen-Lun Chiu, Kao-Shuo Chang, I-Ting Li, Jr-Jeng Ruan, Pin-Chao Liao, Chia-Yun Chen, Jyh-Ming Ting and Yen-Hsun Su*



8461

Enhanced dielectric properties of alternative NO-gas-based SiO_2 films *via* plasma-enhanced chemical vapor deposition for high-performance indium–gallium–zinc oxide thin-film transistors

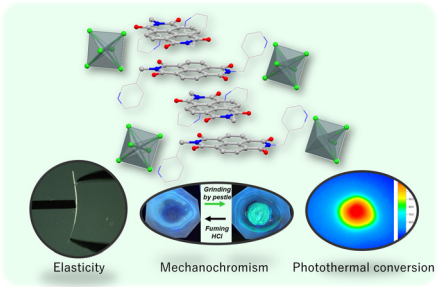
Se-Ryong Park, Eun-Ha Kim, Yunhui Jang, Youngjin Kang, Yong-Hoon Kim,* Junsin Yi* and Tae-Jun Ha*



8470

Flexible organic–inorganic hybrid crystals of tin(IV) chloride and naphthalenediimide: exploring elasticity, mechanochromism, and photothermal conversion

Sotaro Kusumoto,* Shunya Masuda, Ryo Suzuki, Masaru Tachibana, Masaya Shimabukuro, Mamiko Kobayashi, Naoki Ogiwara, Sayaka Uchida, Tomoya Fukui, Yuta Tsuji, Masaya Okamura, Shiro Hikichi, Yang Kim and Yoshihiro Koide*



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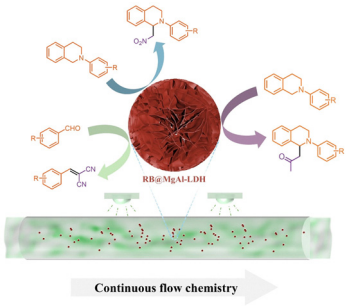
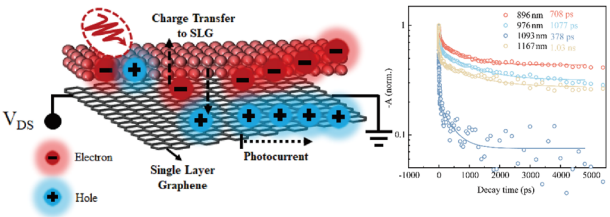


Three-dimensional flower-like organic-dye-intercalated layered double hydroxide composite for efficient photocatalysis in heterogeneous flow chemistry

Yuxing Huang,* Jinpeng Guo, Yuanfa He, Runtao Jia, Jianya Kou, Jiachao Liu, Troels Skrydstrup* and Zhuo Xin*

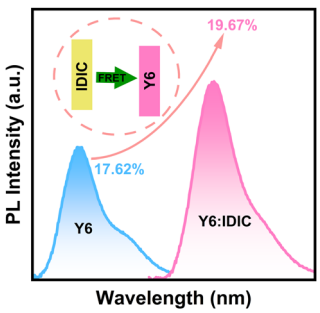
8485



Metal chalcogenide complex ligands enhance the photoresponse in hybrid graphene/PbS quantum dot photodetectors

Tian Jia, Lin Pan, Yuanze Hong, Xiaowei Gu and Xuechao Yu*

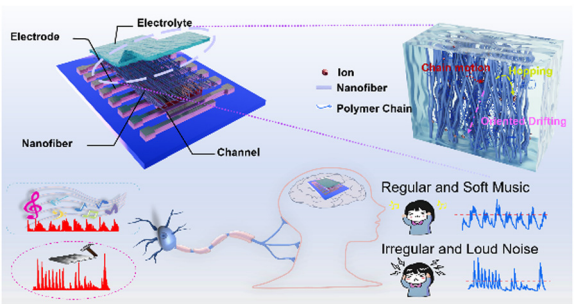
8494



Regulating Förster resonance energy transfer and cascade energy offset achieves 19.6% efficiency in ternary organic solar cells

Jinghao Zhang, Anhai Liang,* Chaofeng Zhu, Silu Huang, Sein Chung, Hojun Ji, Jiyeong Shin, Kilwon Cho, Lijun Li* and Zhipeng Kan

8503



Ordered fiber ionic pathways for wide-frequency regulation in electrolyte-gated transistors for bio-signal perception

Jun Li,* Jupeng Wu, Lian Cheng, Dong Li, Giyosiddin Khaydarovich Mavlonov, Sobirjon Isamov, Yuxing Lei and Jianhua Zhang

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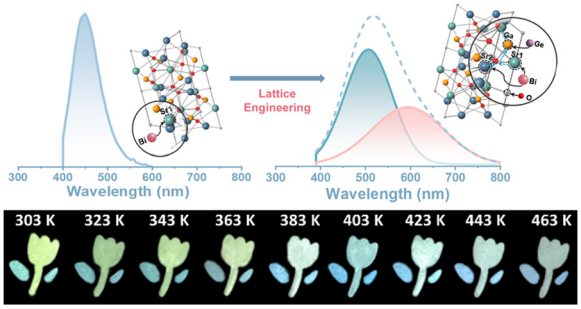
PAPERS

8514

Multi-mode tunable luminescence in Bi^{3+}-activated oxyfluoride phosphors for multi-level anti-counterfeiting applications

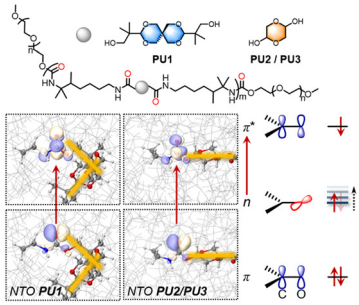
Huijuan Yuan, Pengcheng Wu, Fangyi Zhao,* Heyi Yang, Yang Ding, Qinan Mao, Meijiao Liu and Jiasong Zhong*



8523

The role of ring-type structures in nonconventional luminescent polyurethane derivatives

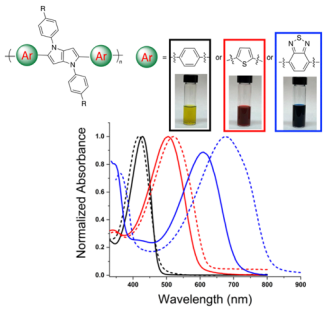
Chang-Yi Zhu, Ya-Jie Meng, Yan-Hong Xu, Chun-Qiu Xia, Nan Jiang,* Jia-Wei Xu* and Martin R. Bryce*



8531

Diversifying peripheral aromatic units of pyrrolo[3,2-*b*]pyrrole-containing conjugated polymers and the resulting optoelectronic properties

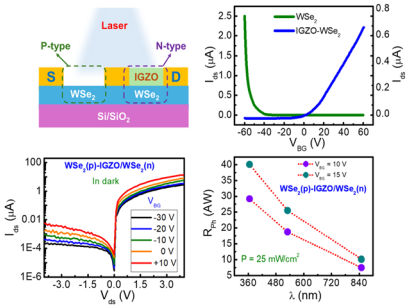
Graham S. Collier,* Julien T. Layton, Perry Skiouris, Kenneth-John J. Bell, Ethan W. Wagner, Vanessa Phan, Sarah G. Fraser and Aimée L. Tomlinson



8544

UV to NIR photodetection in lateral homojunction PN diode of WSe_2 achieved *via* IGZO sputtering

Muhammad Abubakr, Muhammad Hamza Pervez, Arslan Rehmat, Muhammad Asghar Khan, Ehsan Elahi, Muhammad Asim, Muhammad Rabeel, Muhammad Nasim, Zeesham Abbas, Malik Abdul Rehman, Aize Hao, Jonghwa Eom, Shania Rehman* and Muhammad Farooq Khan*



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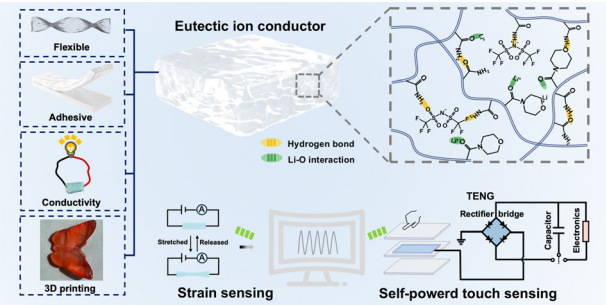
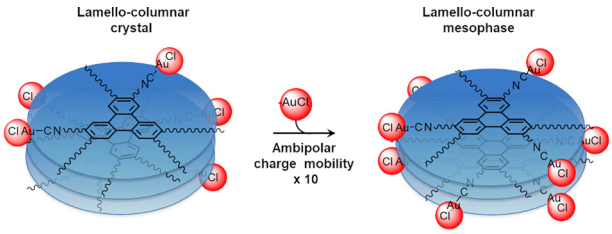


Highly stretchable, adhesive and 3D-printable eutectic ion conductor for wearable electronics and self-powered sensors

Xiaohu Li, Xuhang Zhang, Zhisen Zhu, Wenling Zhang and Yingdan Liu*

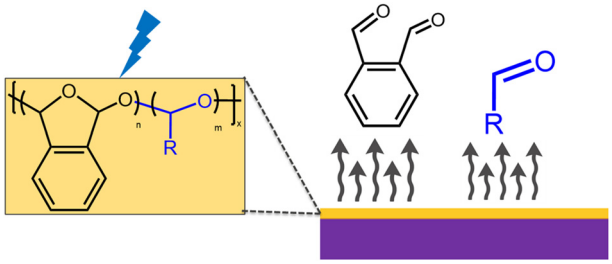
8563



Self-assembly and ambipolar charge transport in columnar phases of polynuclear gold isocyano–triphenylene complexes

Estela de Domingo, Gregorio García, Emiliano Tritto, Bertrand Donnio,* Asmita Shah, Dharmendra Pratap Singh* and Silverio Coco*

8571



Analysis of EUV induced depolymerization and side reactions of polyphthalaldehydes for dry develop EUV resist applications

Bilal A. Naqvi,* Jared Schwartz, Anthony Engler, Paul A. Kohl, Stefan De Gendt and Danilo De Simone

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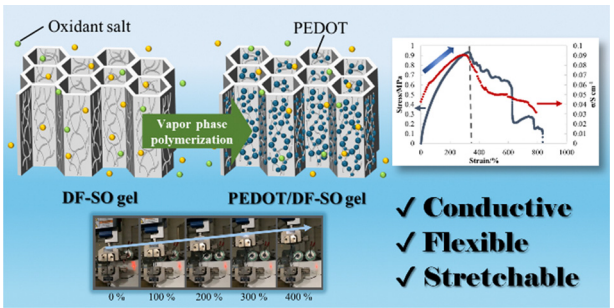

Hierarchically structured conducting polymer hydrogels with enhanced stretchability and conductivity *via* freeze-casting and salting-out with oxidant salts

Junko Shigenaga, Keisuke Shimamura, Shinji Kanehashi, Hiromu Saito and Takeshi Shimomura*

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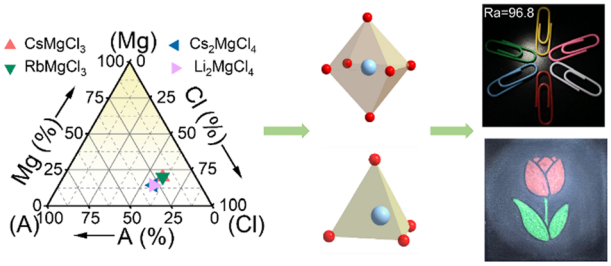
8591

Magnesium halides as a lead-free family with unique optoelectronic properties

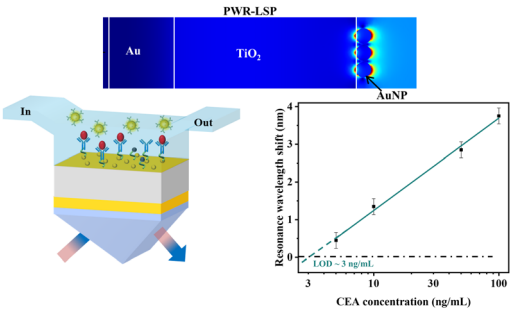
Tingting Ye, Yunluo Wang, Shihao Ge, Tianrui Zhou, Jianghua Wu, Zesen Gao, Ruifeng Liu, Zesheng Pan, Meiling Zhu, Jingshan Hou, Minghui Wang, Lianjun Wang,* Haijie Chen* and Wan Jiang



8606

Highly sensitive biosensors with resonant coupling of plasmon-waveguide resonance to localized surface plasmons

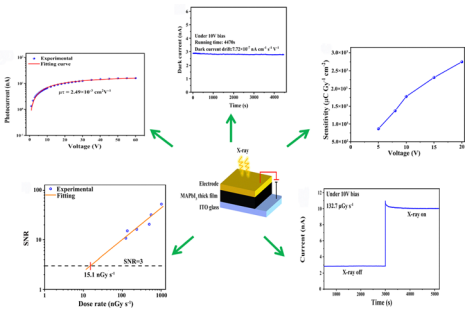
Huimin Wang, Enze Lv, Tao Wang,* Xinzhao Yue, Jinwei Zeng, Wenyu Zhao* and Jian Wang*



8615

High-quality blade-coated $CH_3NH_3PbI_3$ perovskite thick films for high-performance X-ray detection

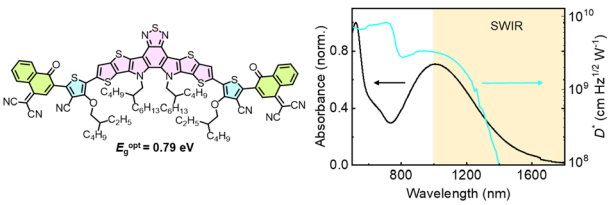
Ji Yu, Yinxian Luo, Ning Tian,* Zhou Yang,* Yufu Deng, Lin Li, Ruoning Zheng, Chengyuan Wang and Shengzhong (Frank) Liu*



8623

A molecular acceptor with absorption wavelength of >1400 nm for short-wavelength infrared organic photodetectors

Tingting Yuan, Wenliang Chen, Junhui Miao* and Jun Liu*



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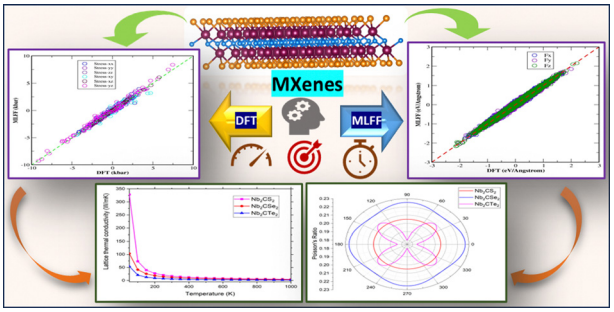
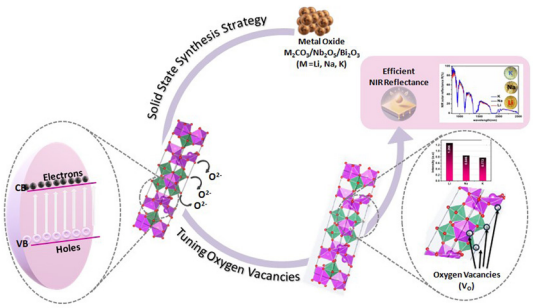


Machine learning-guided discovery of multifunctional Nb_2CX_2 MXenes (X = S, Se, Te): insights into mechanical properties and thermal conductivity

Sourav Kanti Jana, Thanasee Thanasarnsurapong and Adisak Boonchun*

8641



Tuning of oxygen vacancies to control color and electron dynamics in alkali metal substituted bismuth layered oxides for energy-efficient coatings

Omanakuttan Sreelakshmi, Saithathul Fathima Sameera, Mohammed Aysha Shafna, Vibin Lal Nayakom Mini Ancy Mini, Nadukkandi Muhemmad Muzzammil, Najiya Nasirin and Sheik Muhammadhu Aboobakar Shibli*

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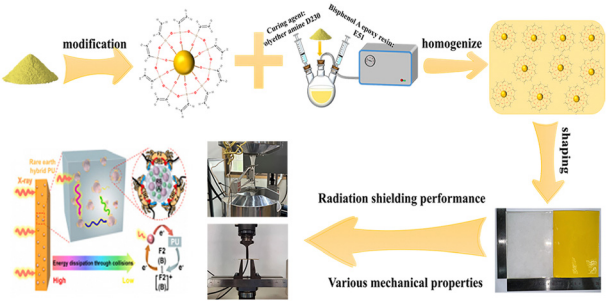
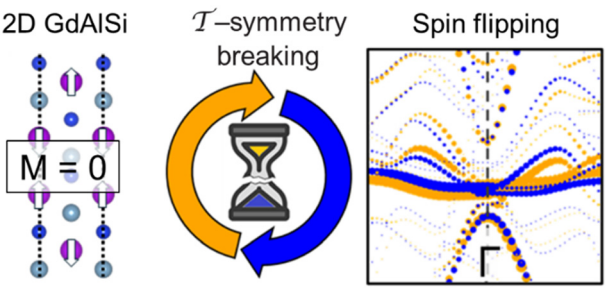


Surface modification of Bi_2O_3 and preparation of Bi_2O_3@Epoxy resin composites: structure, properties and application in γ-ray shielding

Yifan Li, Kun Liu,* Jun Li, Caiping Fu, Zi He* and Shengming Jin*

8665



Trace of altermagnetism in GdAlSi films: towards the 2D limit

Konstantin V. Larionov* and Pavel B. Sorokin

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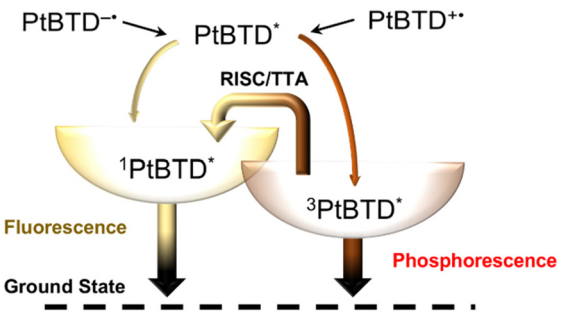
8671

Synergistic effects of triplet–triplet annihilation and reverse intersystem crossing in a platinum-based electrochemiluminescent metallopolymer emitter

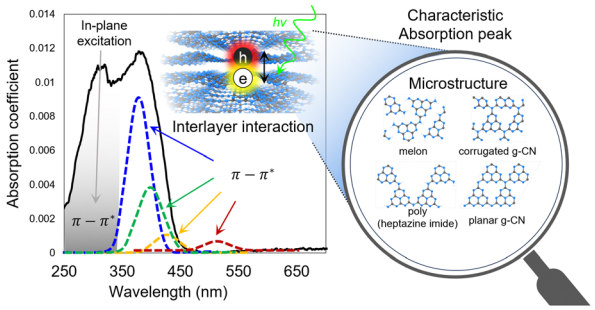
Chun Hong Mak, Yaojia Ai, Chunyan Tan, Wenxin Niu, Kuan-Chen Cheng, Chang-Wei Hsieh, Hsin-Hui Shen, Zheng Hu, Yanqing Tian, Xueqing Xu, Guizheng Zou,* Duu-Jong Lee* and Hsien-Yi Hsu*



8682

Unraveling the optical signatures of polymeric carbon nitrides: insights into stacking-induced excitonic transitions

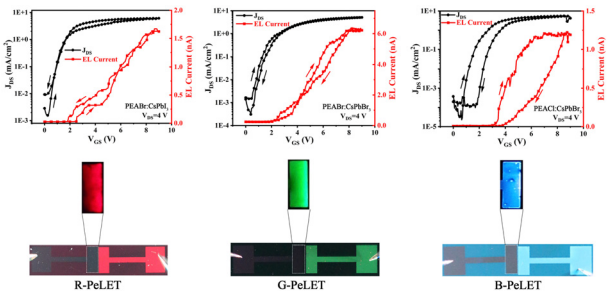
Changbin Im, Mohamed M. Elnagar, Björn Kirchhoff, Dariusz Mitoraj, Igor Krivtsov, Attila Farkas, Radim Beranek and Timo Jacob*



8694

Low-voltage perovskite light-emitting transistors: a novel approach utilizing solution-processed high-*k* inorganic dielectrics for full-color emission

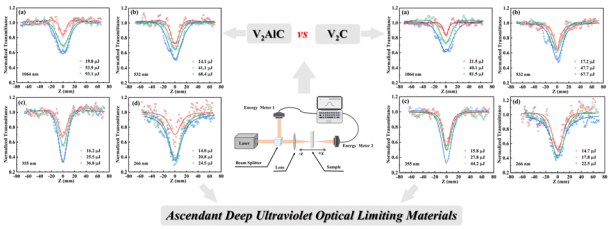
Xingyu Zhang, Min Guo, Jia Li, Tingting Dai, Zihong Yang, Zhidong Lou, Yanbing Hou, Feng Teng* and Yufeng Hu*



8702

2D V_2C and V_2AlC layers: ascendant deep ultraviolet optical limiting materials

Junjie Yuan, Houwen Yang, Zhengping Wang and Wenyong Cheng*



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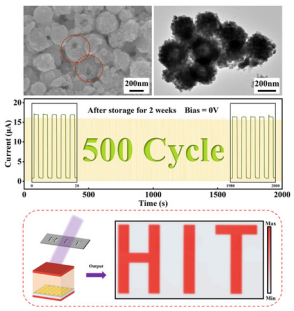
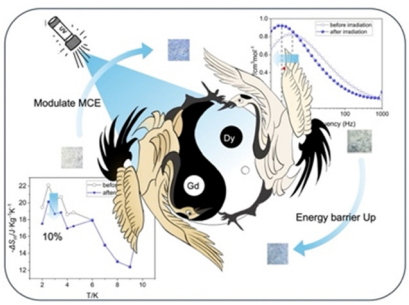


A high-performance self-powered UV imaging photodetector based on litchi-like WO_3 hollow spheres

Qicheng Zhou, Shiyong Gao,* Yu Sun, Mingyi Zhang, Qiong Gao, Jinlong Bai, Haitao Fang, Shujie Jiao, Yong Zhang and Jinzhong Wang

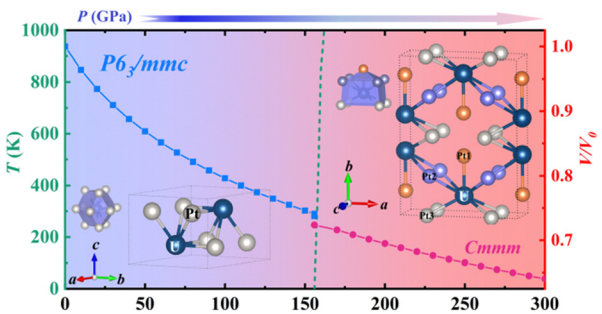
8716



Light- and radical-induced modification of magnetic and magnetocaloric effects in viologen-based lanthanide materials

Hao Wang, Tian-Tian Wang, Zhao-Bo Hu, Sui-Jun Liu* and Wen-Bin Sun*

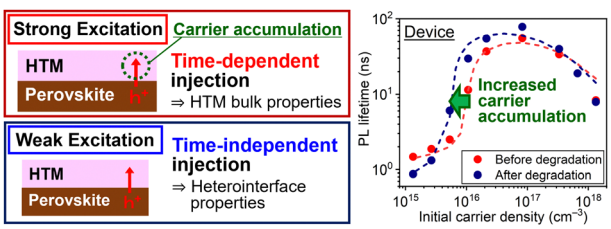
8723



Structural phase transition, mechanics, and thermodynamics of heavy fermion metal UPt_3 under pressure

Hao Quan, Li Li, Jiang-Jiang Ma, Wei-Dong Li and Bao-Tian Wang*

8734



Differentiation between bulk and interfacial properties: analysis of time-dependent carrier injection in perovskite solar cells

Naoyuki Nishimura,* Ranjan Kumar Behera, Daisuke Kubota, Hiroyuki Kanda, Kohei Yamamoto, Hiroyuki Yaguchi, Takurou N. Murakami and Hiroyuki Matsuzaki*

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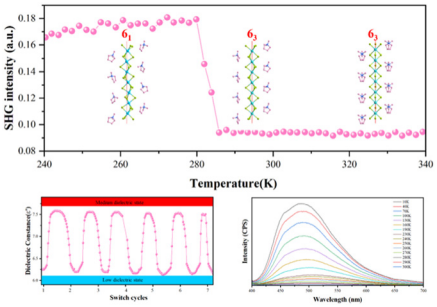
8745

Dual switching of dielectric and SHG triggered by thermal driven helical axis transformation with fluorescence characteristics

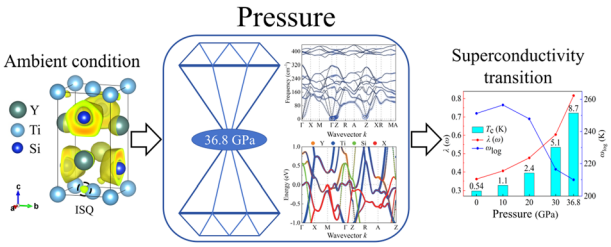
Yang Zhu, Bo-Wen Deng, Ji Jin, Yu-Hua Wu, Yu-Jun Zhao, Xin Chen, Xiu-Ni Hua* and Hai-Bao Duan*



8753

Phonon softening enhanced superconductivity in the YTiSi electride under pressure

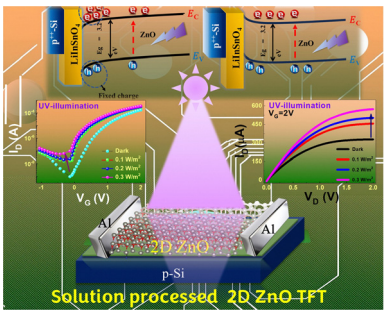
Zihao Xu, Jiaxiang Li, Peng-Fei Liu, Rui Xiong, Zhou Cui, Cuilian Wen,* Bao-Tian Wang* and Baisheng Sa*



8763

Fabrication of a solution-processed low voltage TFT by using colloid 2D ZnO nanosheets and its application as a UV photodetector

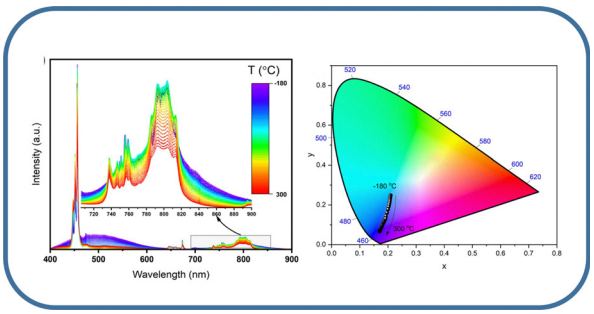
Abhik Bhuin, Akhilesh Kumar Yadav, Utkarsh Pandey, Debdyuti Mukherjee, Vivek Kumar Agrahari, Caroline Ponraj, Subha Sadhu,* Bhola Nath Pal* and Sujoy Sarkar*



8776

High-sensitivity optical thermometer based on the luminescence of divalent and trivalent thulium ions in $CaAl_4O_7$:$Tm^{2+/3+}$ operating in cryogenic and high temperature ranges

Rajashree Panda, Mitrabhanu Behera, Mahesha Hegde, R. Arun Kumar,* Gunasekaran Venugopal, Przemysław Woźny, Kevin Soler-Carracedo and Marcin Runowski



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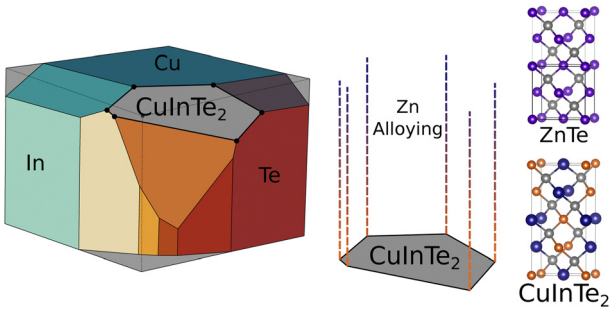
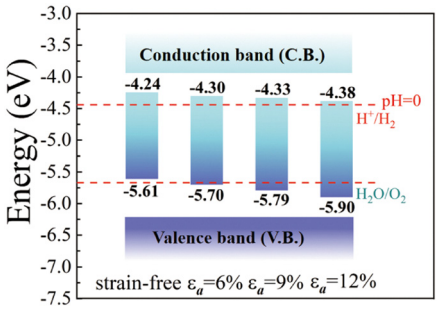


Amphoteric doping and thermoelectric transport in the $CuInTe_2$–ZnTe solid solution

Vanessa Meschke, Angela Pak, Jesse M. Adamczyk, Lìdia C. Gomes, Samantha Baumann, Grace Rome, Claire Porter, Kamil Ciesielski, Elif Ertekin and Eric Toberer*

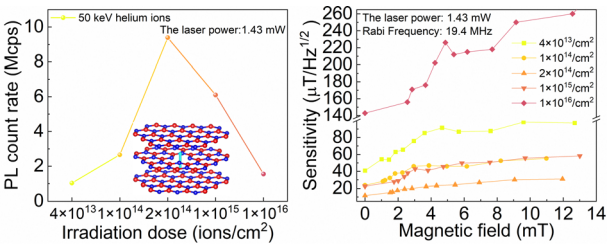
8802



Efficient photocatalytic overall water-splitting characteristics driven by strain engineering in two-dimensional β-AuTe

Xiong-Fei Zhang, Fei-Jie Huang, Yang Huang, Ju-Qi Ruan, Yi-Fen Zhao, Kai Xiong, Yao He and Qing-Yuan Chen*

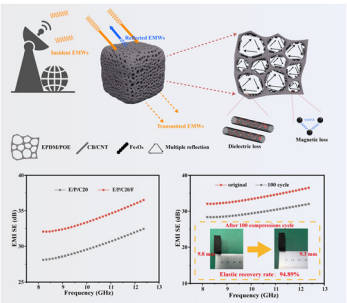
8813



Optimization of sensing sensitivity and coherence properties of spin defects in hexagonal boron nitride

Fei Ren, Yiyuan Wu,* Zongwei Xu* and Neng Wan

8823



Lightweight composite foams for electromagnetic interference shielding with high absorption and excellent mechanical properties

Yuqi Wang, Wei Zhao, Mingpu Li, Qing Zhuo, Yuanyuan Li, Yingru Li, Hangyu Dong, Shaofei Zhang and Linli Tan*

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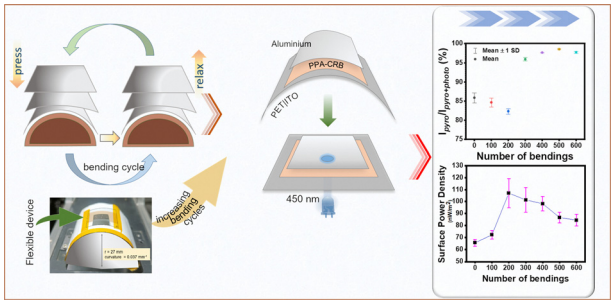
A flexible pyro-phototronic nanogenerator based on the surface-polarization effect

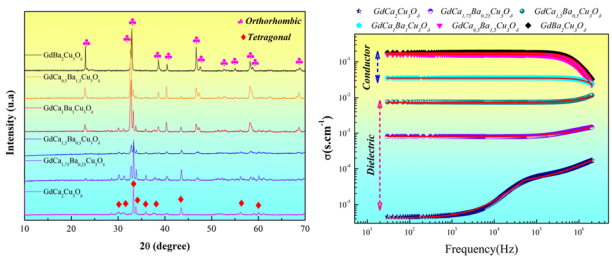
Shakya Deep Bora, Jyotisman Bora, Khomdram Bijoykumar Singh, Bablu Basumatary, Deepshikha Gogoi and Arup Ratan Pal*



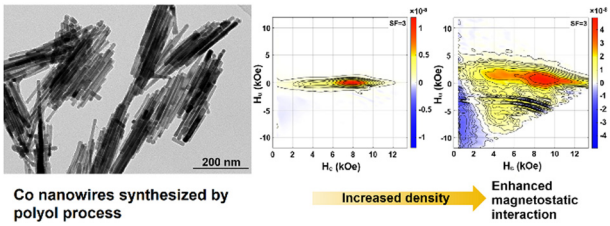
8843

Barium substitution effects induced structural transitions, negative dielectric permittivity, and electrical conductivity behaviors in the $GdCa_{2-x}Ba_xCu_3O_\delta$ ($0 \leq x \leq 2$) structure

Khouloud Moualhi* and Mouldi Zouaoui*



8860

Angular dependence and proximity effect of dense arrays of cobalt nanowires as rare-earth-free permanent magnets

Zhi Yang,* Jie Zhang, Yuanyuan Chen, Yatao Wang, Qiong Wu, Hongguo Zhang, Weiqiang Liu and Ming Yue*