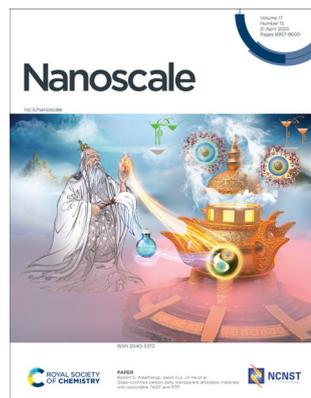


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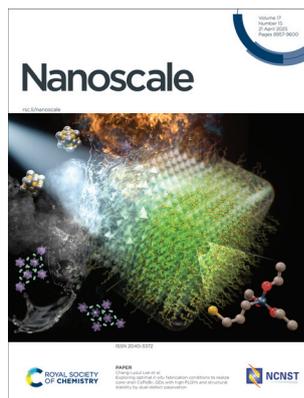
ISSN 2040-3372 CODEN NANOHL 17(15) 8957-9600 (2025)



Cover

See Robert S. Weatherup, Jiabin Cui, Jin He *et al.*, pp. 9144–9153.

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Inside cover

See Chang-Lyoul Lee *et al.*, pp. 9154–9165.

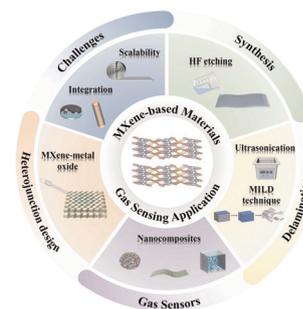
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REVIEWS

8975

Recent advances in 2D MXene-based heterostructures for gas sensing: mechanisms and applications in environmental and biomedical fields

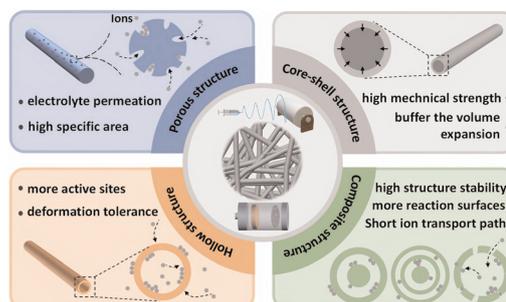
Lanting Qian,* Farnood Rahmati,* Fengchao Li, Tianzhu Zhang, Tao Wang, Haoze Zhang, Shuo Yan and Yun Zheng*



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Electrospun freestanding anodes for metal-ion batteries: structural design and application

Xinyu Li, Xunlong Zhang, Fangqin Su, Haoyue Zhao, Zhan Qu, Can Ge and Jian Fang*



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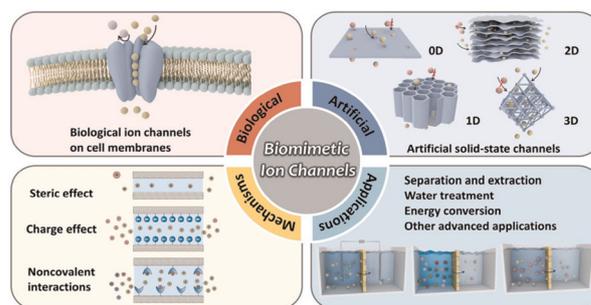
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MINIREVIEWS

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Biomimetic ion channels with subnanometer sizes for ion sieving: a mini-review

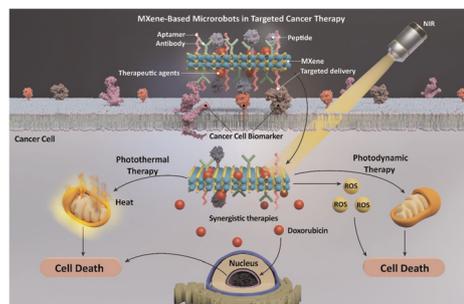
Qianqian Fu, Zhaoyu Ma* and Jun Gao*



9040

Smart MXene-based microrobots for targeted drug delivery and synergistic therapies

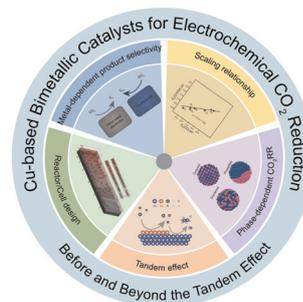
Siavash Iravani,* Atefeh Zarepour, Arezoo Khosravi, Rajender S. Varma* and Ali Zarrabi*



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Cu-based bimetallic catalysts for electrochemical CO₂ reduction: before and beyond the tandem effect

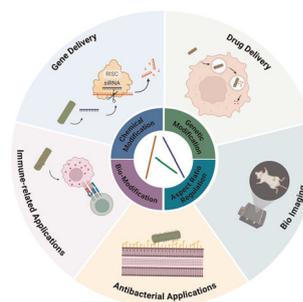
Dimiao Luo, Weidong Dai, Keying Wu, Siyuan Liu, Chiyao Tang, Yanjuan Sun, Fan Dong and Chang Long*



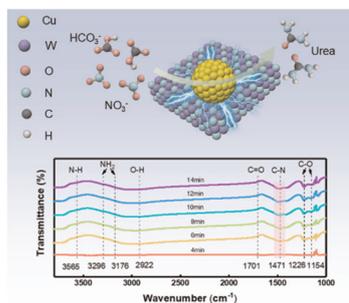
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Functionalization of rod-shaped plant viruses for biomedical applications

Wei Qian, Zhuang Li, Jingyao Han, Ye Tian* and Zhongwei Niu*



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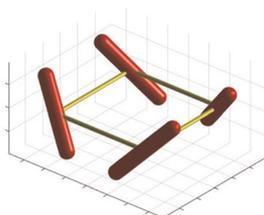
Co-reduction coupling of bicarbonate and nitrate toward efficient urea synthesis

Xue Wang, Lu-Kang Zhao, Siyao Li, Ran Wei, Xuan-Wen Gao,* Zhaomeng Liu and Wen-Bin Luo*

9094

$$\boldsymbol{\varepsilon} = \mathbf{I} + A_{mn} \mathbf{u}_m \mathbf{u}_n^T$$

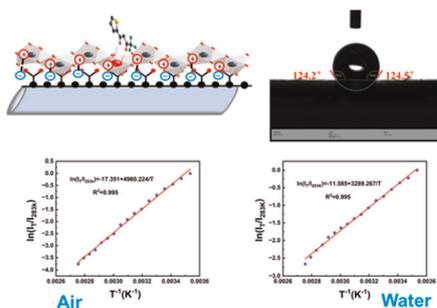
$$\mathbf{g} = c^{-1} \omega A_{mn} (\mathbf{u}_n \times \mathbf{u}_m) \mathbf{r}_n^T$$



Born–Kuhn coupled oscillator model for optical activity in ordered media

Razvigor Ossikovski* and Oriol Arteaga*

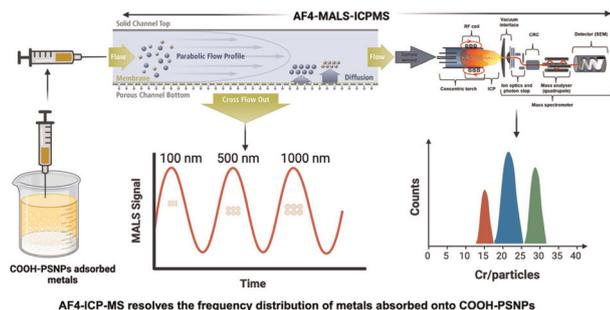
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Optical temperature-sensitive hydrophobic membrane based on Eu(III)-doped yttrium oxide nanosheets

Yue Liu, Jinfeng Xia, Danyu Jiang, Yuchen Dong, Ying Chen, Enhui Ma, Qian Wen and Qiang Li*

9122



AF4-ICP-MS resolves the frequency distribution of metals absorbed onto COOH-PSNPs

An integrated multimethod approach for size-specific assessment of potentially toxic element adsorption onto micro- and nanoplastics: implications for environmental risk

Swaroop Chakraborty,* Roland Drexel, Prathmesh Bhadane, Nathan Langford, Pankti Dhumal, Florian Meier and Iseult Lynch

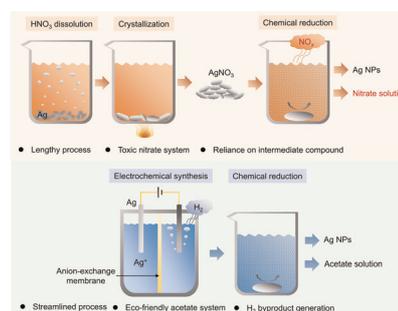


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Entirely nitrate-free synthesis of silver nanoparticles *via* electrochemical synthesis–chemical reduction

Chenyi Zheng, Xueyi Guo, Songsong Wang, Qinmeng Wang* and Qiang Wang*

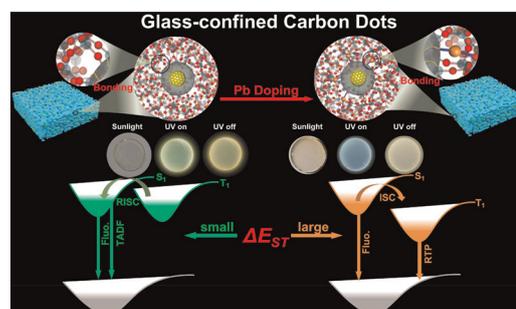


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Glass-confined carbon dots: transparent afterglow materials with switchable TADF and RTP

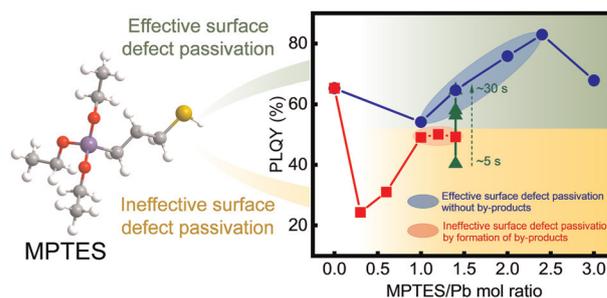
Pengwei Wang, Peixi Cong, Jiachen Chen, Huaiyuan Cao, Qi Yue, Zixiao Xue, Junji Zhang, Long Zhang, Robert S. Weatherup,* Jiabin Cui* and Jin He*



9154

Exploring optimal *in situ* fabrication conditions to realize core–shell CsPbBr₃ QDs with high PLQYs and structural stability by dual-defect passivation

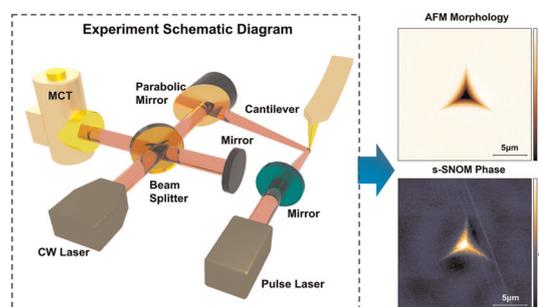
Dokyum Kim, Soogeun Kim, Sang-Youp Yim and Chang-Lyoul Lee*



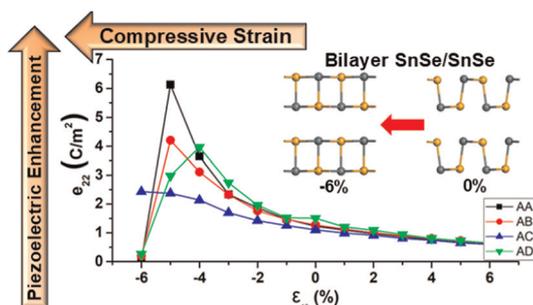
9166

Quantitative nanometer-scale characterization of densification in fused silica *via* s-SNOM

Ying Yan,* Bo Jiang, Qing Mu and Ping Zhou



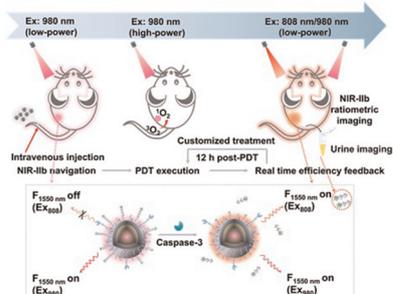
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Stacking dependent piezoelectric response of bilayer and heterobilayer group-IV monochalcogenides under applied external strain

Kevin Tran and Michelle J. S. Spencer*

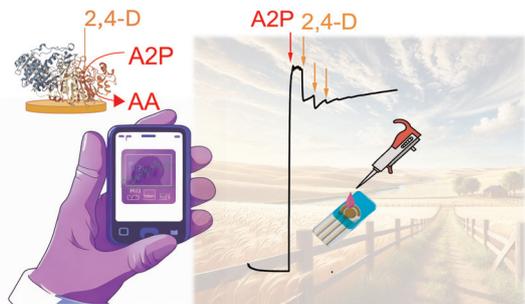
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Programming a multiplex lanthanide nanoparticle for customized cancer treatment with real-time efficiency feedback

Hongxia Zhao, Wei Chen, Yu Zhu, Zhicong Chao, Jiahui Sun, Qing Zhang, Hongqian Guo, Huangxian Ju and Ying Liu*

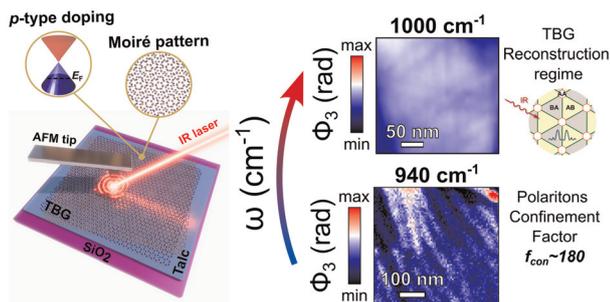
9197



Ultrasensitive detection of 2,4-dichlorophenoxyacetic acid by inhibiting alkaline phosphatase immobilized onto a highly porous gold nanocoral electrode

Angelo Tricase, Michele Catacchio, Verdiana Marchianò, Eleonora Macchia, Paolo Bollella* and Luisa Torsi

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Ultra-confined plasmons reveal moiré patterns in a twisted bilayer graphene–talc heterostructure

Tiago C. Barbosa, André J. Chaves, Raul O. Freitas, Leonardo C. Campos* and Ingrid D. Barcelos*

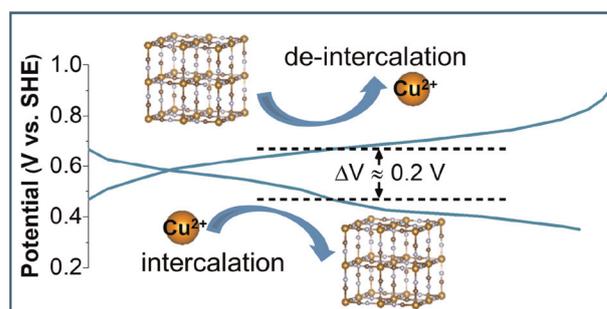


PAPERS

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High-performance aqueous copper-ion batteries based on iron hexacyanoferrate cathodes for enhanced energy storage

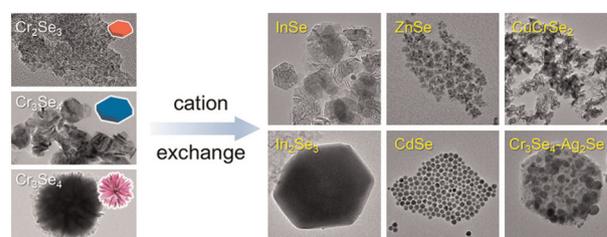
Jinshu Zhang, Lexian Liu, Yuao Wang, Yantuo Li, Yang Yang, Mingyi Ning, Jianxue Wu, Bingjie Ma and Wei Liu*



9222

Structural diversity dependent cation incorporation into magnetic Cr–Se nanocrystals

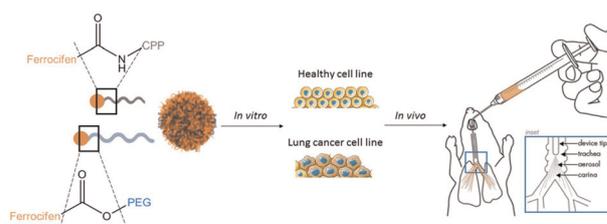
Yifen Wang, Wei Zhao, Bin Wang, Zhendong Song, Huan Yang, Fang Wang, Xiaohong Xu and Yang Liu*



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Self-assemblies of cell-penetrating peptides and ferrocenes: design and biological evaluation of an innovative platform for lung cancer treatment

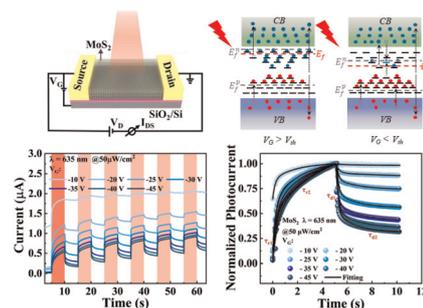
Léna Guyon, Abdallah Ladaycia, Agnese Bosio, Laurent Lemaire, Florence Franconi, Bénédicte Lelièvre, Nolwenn Lautram, Pascal Pigeon, Gérard Jaouen, Catherine Passirani and Elise Lepeltier*



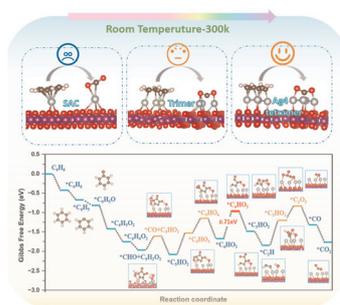
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The role of trap states in MoS₂-based photodetectors

Yuhang Xu, Yuxin Wang, Chunchi Zhang, Haijuan Wu, Chao Tan, Guohua Hu and Zegao Wang*



9253

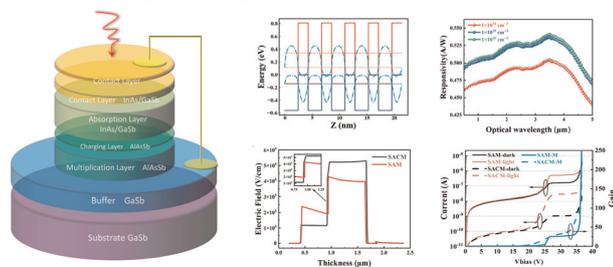


First-principles methods for unraveling the structure-catalytic activity relationship and mechanism of δ -MnO₂-supported metal cluster catalysts in ambient temperature benzene to CO₂ degradation

Jiangmei Yan, Peng Zhang, Dan Chen, Jie Cheng, Tong Mu, Mengshan Song, Shuai Li, Hui Zhao, Guo Chang, Ruqian Lian,* Chuangwei Liu,* Wangtu Huo* and Dongxiao Kan*

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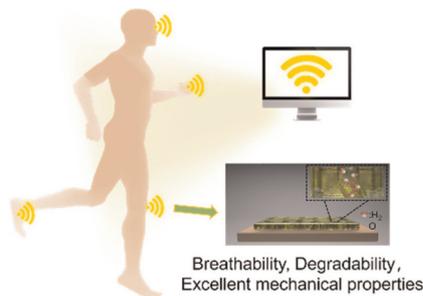
InAs/GaSb Type-II Superlattice Mid-Wave APD



Design and simulation of mid-wavelength InAs/GaSb type-II superlattice avalanche photodiodes

Xinbo Qi, Xiantong Zheng,* Yuan Liu,* Yulin Feng and Dongliang Zhang*

9270



A DMSO-modified porous organogel with breathability and degradability for wearable electronics

Zijun Ye, Hao Lei, Peixuan Zhang, Yingying Liu, Yina Liu, Jun Cao, Zhen Wen, Jiwei Jiang,* Bin Dong* and Xuhui Sun*

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Intense, self-induced sustainable microwave plasma using carbon nanotubes made from CO₂

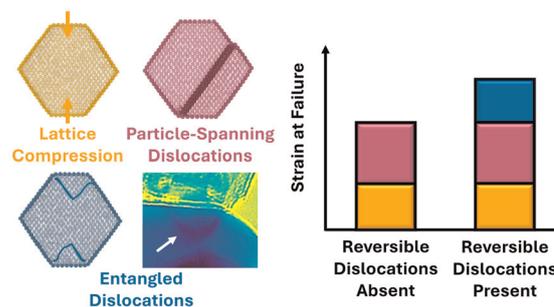
Gad Licht, Kyle Hofstetter and Stuart Licht*



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Effect of reversible dislocation-based deformation on nanoparticle strain at failure

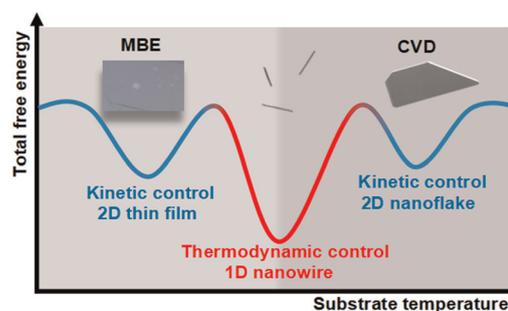
Claire Zhang, Amit Kumar Prasad, Ting Liu, Tevis D. B. Jacobs and Ashlie Martini*



9308

Thermodynamics and kinetics in van der Waals epitaxial growth of Te

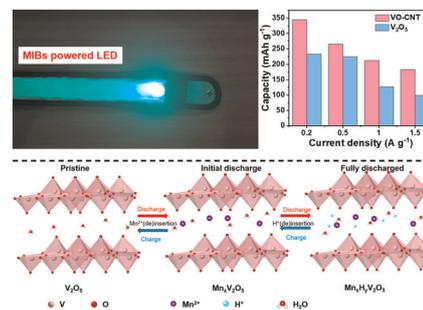
Taotao Li, Wenjin Gao, Yongsong Wang, Tianzhao Li, Guoxiang Zhi, Miao Zhou* and Tianchao Niu*



9315

Binder-free V₂O₅-carbon nanotube composite films for high-performance aqueous manganese-ion batteries

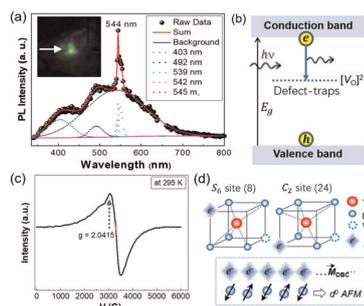
Jianan Zhao, Xinyu Wang,* Xinqi Xie and Hongmei Cao*



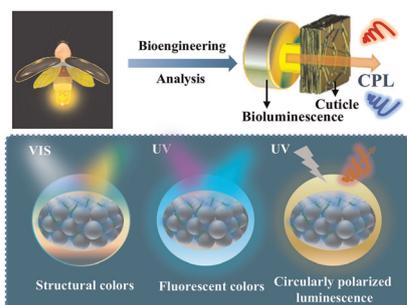
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Unexpected green-light emission and correlating room-temperature diluted magnetism in pristine non-magnetic closed-shell 4d⁰ yttria nanowires

Jian-Min Li* and Yunbing Hu



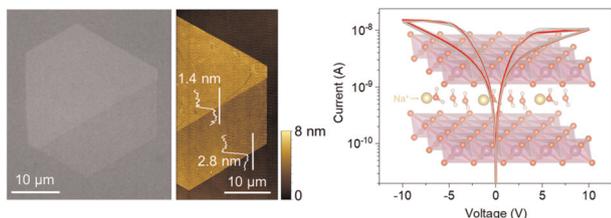
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Optically active chiral photonic crystals exhibiting enhanced fluorescence and circularly polarized luminescence

Qilin Guo, Xingye Huang, Huateng Li, Jia Guo and Changchun Wang*

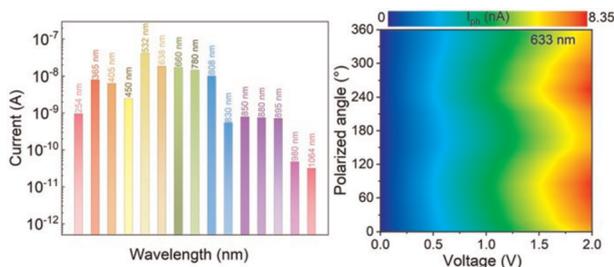
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Synthesis of intrinsically sodium intercalated ultra-thin layered MnO_2 and its ionic charge transport

Amir Parsi, Abdulsalam Aji Suleiman, Mohammadali Razeghi, Doruk Pehlivanoglu, Oğuzhan Oğuz, Uğur Başçı, Hafiz Muhammad Shakir, Emine Yegin and T. Serkan Kasirga*

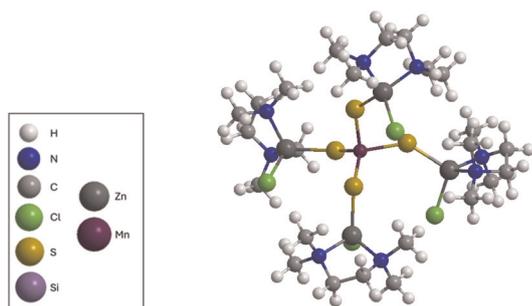
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A high-performance broadband polarization-sensitive photodetector based on BiSeS nanowires

Junda Yang, Fen Zhang, Shuo Liu, Xinyun Zhou, Jiacheng Yang, Qinglin Xia and Mianzeng Zhong*

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Enhanced spin lifetime in colloidal quantum dots by growth from singly Mn-doped molecular cluster seeds

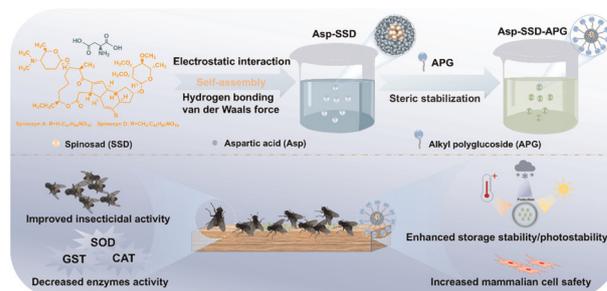
Julian Schneider, Chris Page, James Harris, Nigel L. Pickett, Nathalie C. Gresty, Christopher Waby, Charles Biddlecombe, Rachel M. Barrett, Adam Brookfield, Patrick Parkinson, Floriana Tuna, Simon M. Fairclough and David J. Binks*



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An organic solvent-free self-assembly strategy for scalable preparation of nanobiopesticides with enhanced insecticidal activity against houseflies

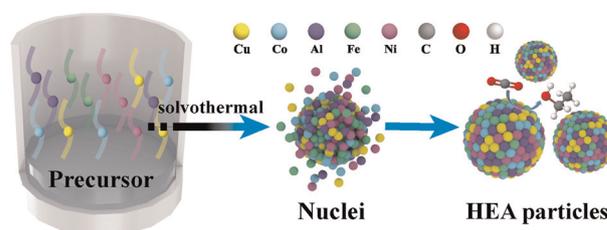
Huiping Chen, Zhifei Yang, Qing Yin, Wenjie Shangguan, Chong Cao, Qiliang Huang and Lidong Cao*



9374

Non-precious metal high-entropy alloys for CO₂ electroreduction

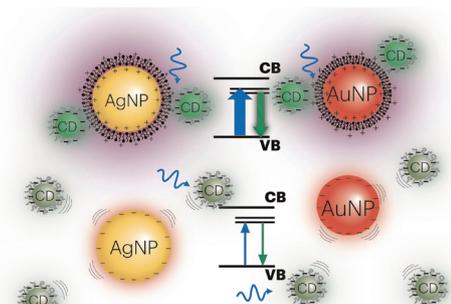
Runyu Xing, Xinyu Wang, Guanbo Wang,* Zeyi Lu, Xiang Yang, Hongqiang Wang, Yun He, Xingyuan San,* Xiaoguang Liang* and Vellaisamy A. L. Roy



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Engineering the surface of carbon dots for enhanced photoluminescence and controlled plasmonic interactions

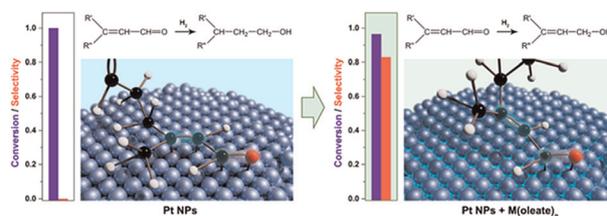
M. Reale, Z. Moussadjy, G. Buscarino, U. De Giovannini, A. Emanuele, M. Cannas, R. Cillari, N. Mauro, A. Sciortino* and F. Messina*



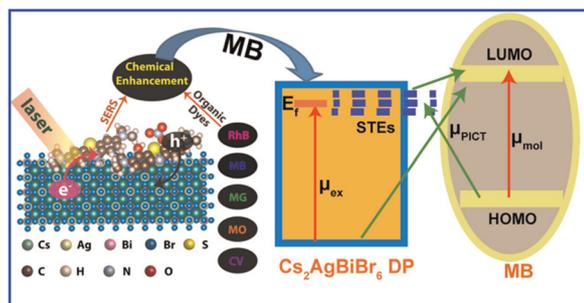
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Surface engineering of Pt nanocatalysts with transition metal oleates for selective catalysis: a case study on the hydrogenation of α,β -unsaturated aldehydes

Soon Gu Kwon, Soma Chattopadhyay, Tomohiro Shibata, Galyna Krylova, Sanjubala Sahoo, Alexander Filatov, Shiba Adhikari, Zachary David Hood, Khalil Omotosho, Diana Berman, Emilio Bunel, Julius Jellinek and Elena V. Shevchenko*



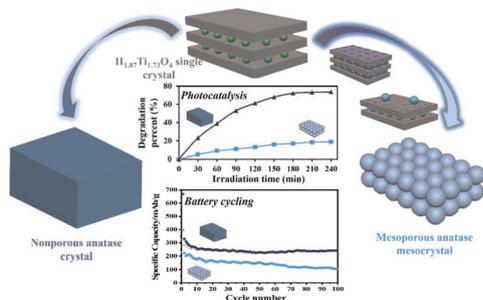
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Lead-free halide double perovskite nanoflakes as high-performance SERS substrates for detection of trace organic pollutants: chemical enhancement *versus* electromagnetic enhancement

Ravinder Chahal, Sirsendu Ghosal, Joydip Ghosh and P. K. Giri*

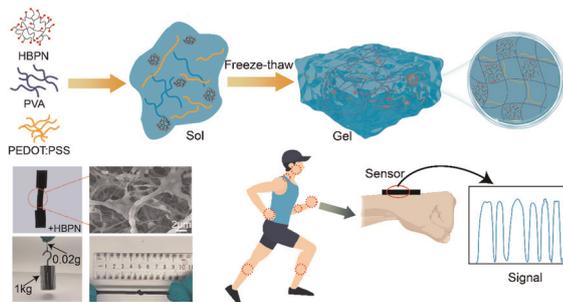
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Mesoporous anatase TiO₂ mesocrystal for high-performance photocatalysis and lithium-ion batteries

Wenxiong Zhang,* Fangyi Yao, Mustafa Al Samarai and Qi Feng*

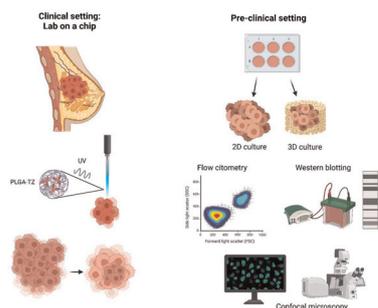
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Amino-ended hyperbranched polyamide-cross-linked conducting polymer hydrogels with enhanced performance for wearable electronics

Juan Teng, Xiaokai Jia, Ziyang Qiu, Hanjun Yang* and Hai Li*

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Engineered anti-HER2 drug delivery nanosystems for the treatment of breast cancer

Silvia Vanni, Tania Mariastella Caputo, Angela Maria Cusano, Alessandro De Vita,* Andrea Cusano,* Claudia Cocchi, Chiara Mulè, Sofia Principe, Chiara Liverani, Giorgia Celetti, Alberto Micco, Chiara Spadazzi, Giacomo Misericocchi, Toni Ibrahim, Laura Mercatali and Anna Aliberti

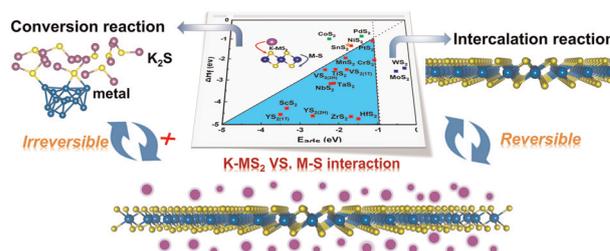


PAPERS

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Highly stable rare earth YS_2 and ScS_2 monolayers for potassium-ion batteries: first-principles calculations

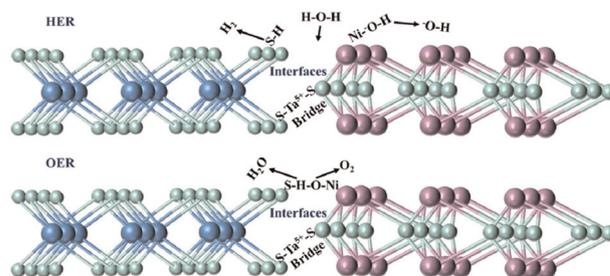
Han-Yu Zhang, Jia-Qi Zhang, Bo Zhao, Yan-Lei Guo, Hao-Peng Liang and Zhong-Ling Lang*



9469

Catalytic synergism in heterostructural Ta-doped Mo–Ni–S nanospheres: an efficient bifunctional catalyst for water splitting

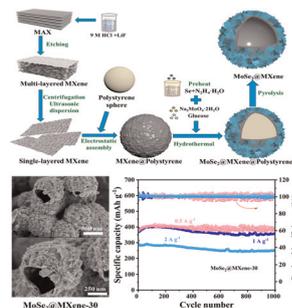
Kaichun Gao, Yuhang Yuan, Hongbang Zheng, Yiyou Wu, Mingxin Ye and Jianfeng Shen*



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Synthesis of a hollow MoSe_2 @MXene anode material for sodium-ion batteries

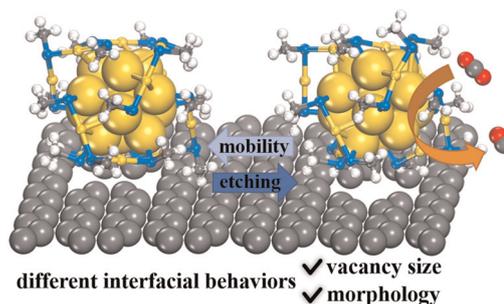
Hanbo Zou,* Shaohao Li, Wei Yang, Quanbing Liu and Shengzhou Chen*



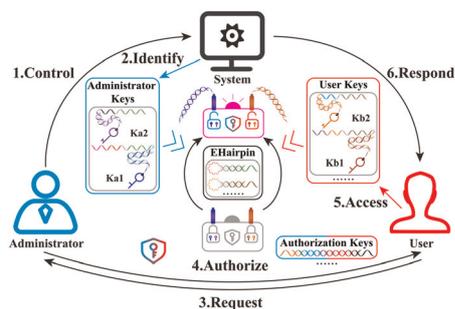
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Vacancy-induced modulation of the interfacial properties of $\text{Au}_{25}(\text{SCH}_3)_{18}$ nanoclusters supported on defective graphene

Pan Zhu, Yuping Chen and Qing Tang*



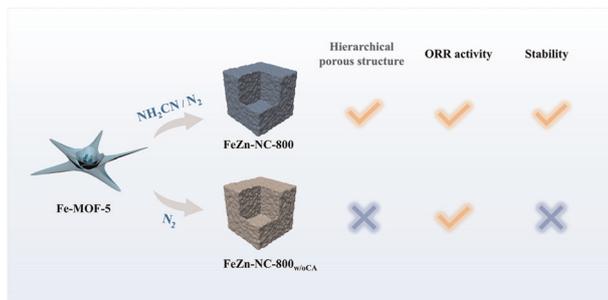
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An EHairpin-driven double-stem-loop programmable allosteric strategy for molecular security access control

Yufeng Wang, Xiaokang Zhang, Peijun Shi, Wei Zhao, Bin Wang and Qiang Zhang*

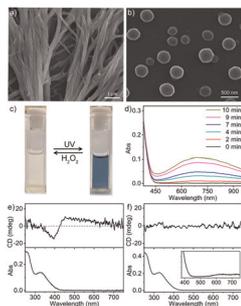
9515



Atomically dispersed iron–zinc dual-metal sites to boost catalytic oxygen reduction activities for efficient zinc–air batteries

Zi-Han Zhao, Dakai Ma, Zewen Zhuang, Kaili Wang, Chenhui Xu, Kaian Sun, Shu-Qi Deng,* Wei Yan* and Jiuju Zhang*

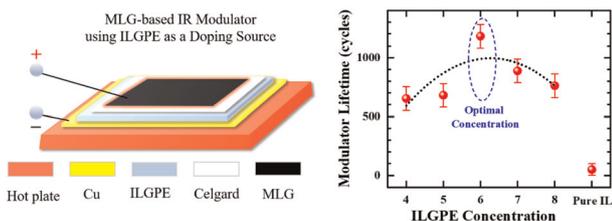
9525



Chiral co-assembly of a polyoxometalate complex with an achiral pyrene derivative enables redox-modulated circularly polarized luminescence

Chengyan Niu, Jiaqi Liu, Qiulan Wu, Shuzhen Liu, Jingjing Tan and Jing Zhang*

9534



Tuning infrared emissivity of multilayer graphene using ionic liquid gel electrolytes

Ying Cao, Kaiyu Yang, Haibo Ke, Lishi Fu, Xitong Yan, Jinghuan Xian, Mingyuan Lin, Weiwei Cai, Xue-ao Zhang, Rui Mu* and Yufeng Zhang*

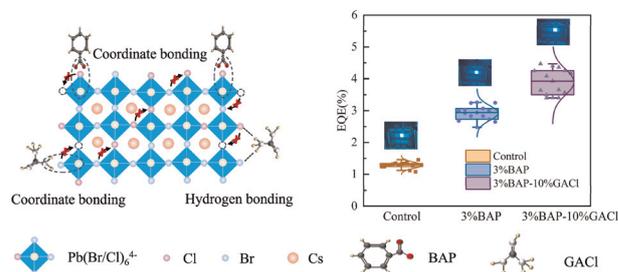


PAPERS

9541

Efficient and stable blue perovskite light-emitting diodes enabled by the synergistic incorporation of dual additives

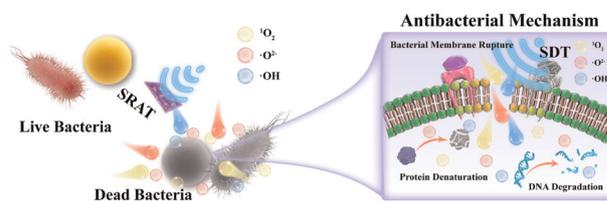
Dandan Li, Yan Bao, Run Wang, Jinjiang Wang, Yu Liu, Lei Cao, Yanhong Deng* and Hengyang Xiang*



9552

A nanocatalytic membrane with sono-responsive antibacterial therapy (SRAT) for rapid sterilization and enhanced chronic wound healing

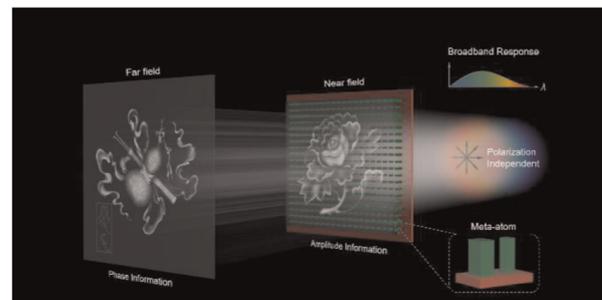
Shuai He, Lu Xie, Daiquan Zhang, Shihao Han, Hongxing Shi, Sheng Yu, Yi Deng,* Song Wang* and Chao Wu*



9562

Broadband and polarization-independent complex amplitude modulation using a single layer dielectric metasurface

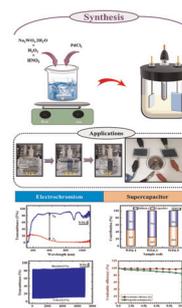
Na Zhang, Fei Wang, Qixuan Min, Xin Liu, Haiming Yuan, Jinying Guo* and Guohai Situ*

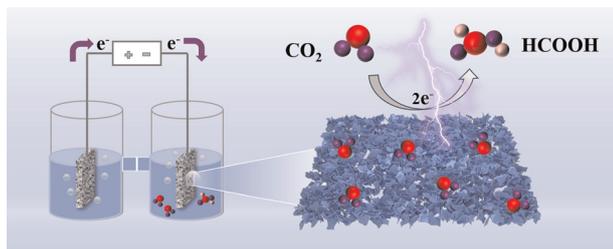


9569

Catalytic synergy in palladium-enriched tungsten oxide nanogranules: redefining electrochromic dynamics and energy storage capabilities

Pritam J. Morankar, Rutuja U. Amate, Aviraj M. Teli, Iftikhar Hussain, Sonali A. Beknalkar and Chan-Wook Jeon*





Bismuth oxycarbonates loaded on nitrogen-doped carbon: an efficient nanocomposite catalyst for electrochemical reduction of CO₂ to formate

Qingqing Xu, Kaixuan Su, Jiayong Chen,
Yuanhong Zhong,* Yingxia Zhao, Ming Sun and Lin Yu

