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IN THIS ISSUE

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Cover
See Byeonghwa Goh and Joonmyung Choi, pp. 15175–15186.

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PROFILE

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***Nanoscale* profiles: contributors to the 2025 Emerging Investigators collection**

Nanoscale
2025 Emerging Investigators

REVIEWS

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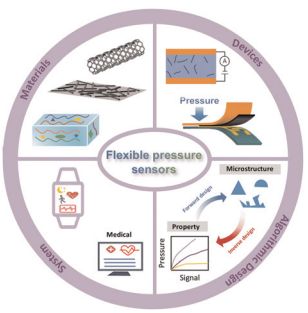
Bibliometric review on flexible pressure sensor design strategies

Xin Li, Qisheng Yang, Zetian Zhao, Mingyuan Li, Yuhan Zhao, Jiarong Fan, Qi Mao, Xudong Fang,* Daixuan Wu,* Jingbo Liu,* Hao Guo* and He Tian*



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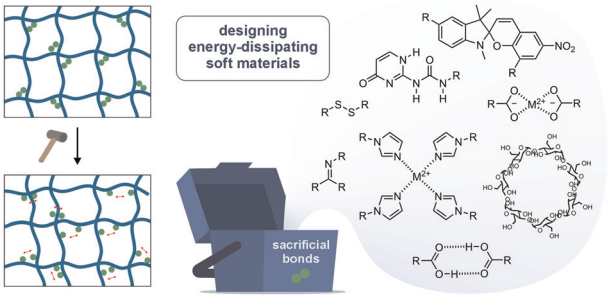
REVIEWS

15029

Engineering tough, energy-dissipating soft materials *via* sacrificial chemical bonds

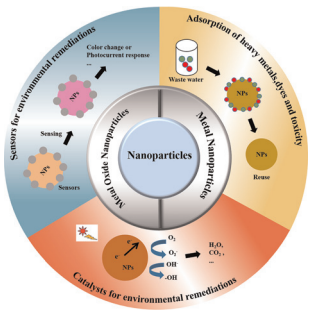
Parbhat Kumar, Abhishek Roy and Benjamin E. Partridge*



15068

A review: metal and metal oxide nanoparticles for environmental applications

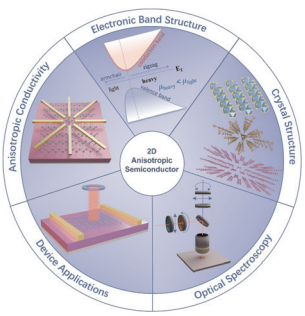
Zhihua Yang and Jiawei Shen*



15086

Two-dimensional anisotropic semiconductors: from structure and properties to device applications

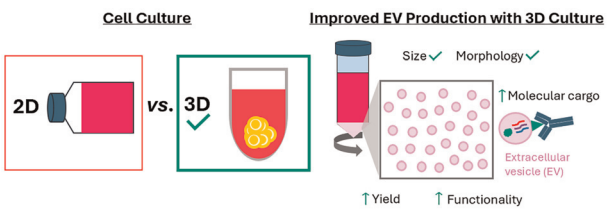
Jie Cheng, Kailong Yu, Jiyuan Xu, Gangqiang Zhou, Zailan Zhang,* Hengyang Xiang* and Zhesheng Chen*



15110

Advancing extracellular vesicle production: improving physiological relevance and yield with 3D cell culture

Kara Cook and Huiyan Li*



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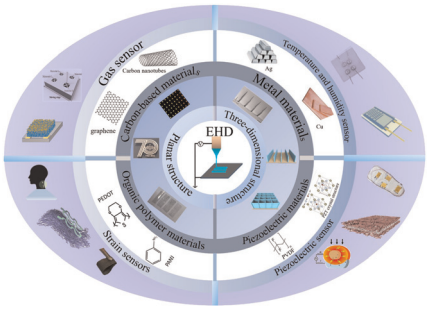
15132



Advances in multimodal electrohydrodynamic printing for high-resolution sensor fabrication: mechanisms, materials, and applications

Boxuan Zhang, Jinzhe Li, Xue Yang* and Zhifu Yin*

COMMUNICATIONS

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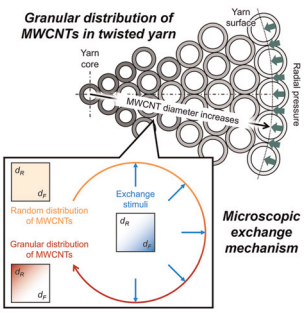
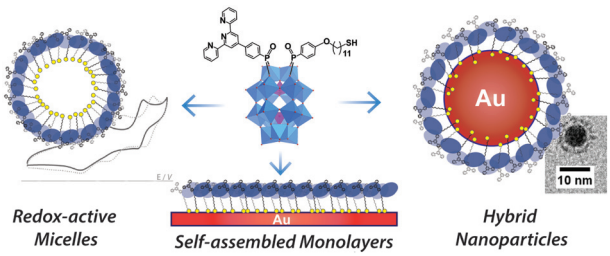


Mechanics of granular distribution of aligned carbon nanotube bundles

Byeonghwa Goh and Joonmyung Choi*

15187



Asymmetric thiol-modified hybrid polyoxometalates: building blocks for hierarchical nanostructured redox materials

Elizabeth Hampson, Alexander J. Kibler, Jamie M. Cameron, Julie A. Watts, Abigail Bellamy-Carter, Alex Saywell, Lee R. Johnson, Darren A. Walsh* and Graham N. Newton*

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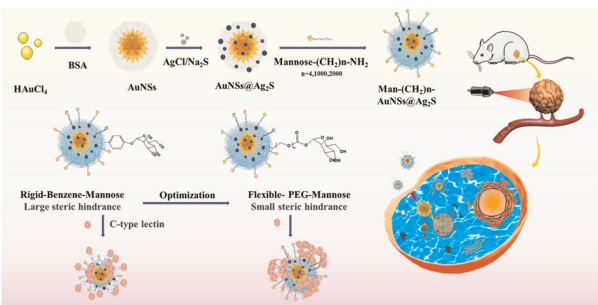

Mannose-modified AuNSs@Ag_2S for visualized and synergistic photothermal/photodynamic tumor therapy

Yingying Zhong, Jiajing Lin, Yuanyuan Liu and Xin Liu*

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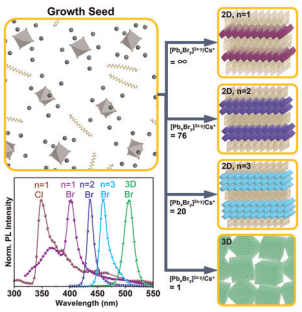
PAPERS

15204

Pioneering nucleation for stable ultraviolet-to-deep-blue illuminating two-dimensional perovskite nanoplates by using saturated salt solution

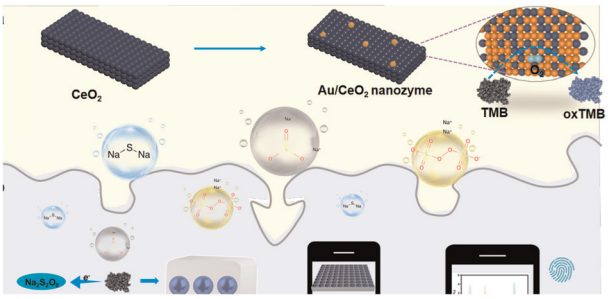
Anupriya Singh, Yi-Chia Chen,* Kuan-Chang Wu, Yu-Ying Shih, Tzu-Chi Huang, Wei-Lon Wei, Yu-Dian Chen, Priyadarshini H. Nagaraju, Jou-Chun Lin, Bi-Hsuan Lin, Mau-Tsu Tang and Di-Yan Wang*



15214

Nanozyme colorimetric sensor array-based Au as an electron bank facilitated surface charge redistribution of CeO_2 for on-site detection and discrimination of sulfur-containing metal salts

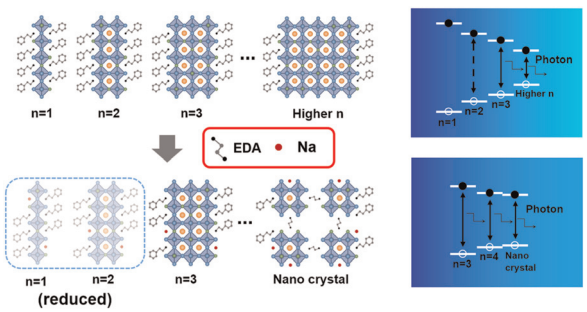
Yang Song, Zhongyuan Gu, Hao Wang, Xinxin Shi, Changchun He, Tongxiang Li, Yan Chen,* Zhao Li* and Lin Tian*



15223

Efficient and color stable blue perovskite light-emitting diodes achieved *via* dual-additive phase modulation

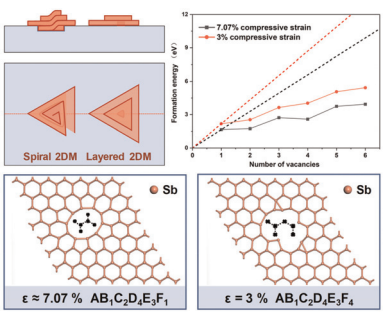
Peiyuan Pang, Zhipeng Zhang, Bingzhe Wang, Tao Sheng and Guichuan Xing*



15231

Mechanism for spiral growth of β-antimonene on a pitted substrate: vacancy line aggregation triggered by nanoscale step-loops

Wenmin Li, Hao Hu* and Yi Pan*



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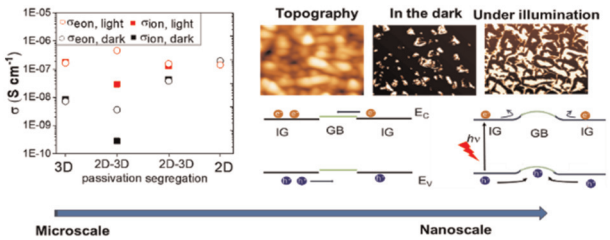
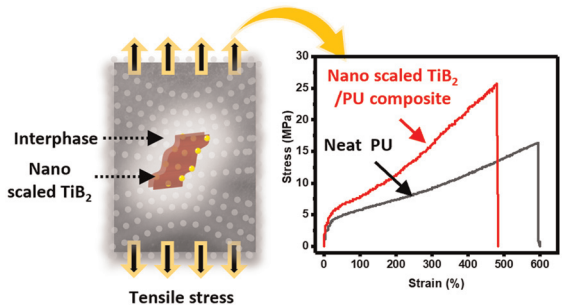


Unveiling of free carrier transport and ion migration in a 2D–3D perovskite mixture for stable optoelectronic devices

Bich Phuong Nguyen, Sarah Su-O Youn, Yeon Soo Kim, Thuy Thi Nguyen, Ha Kyung Park, Gee Yeong Kim and William Jo*

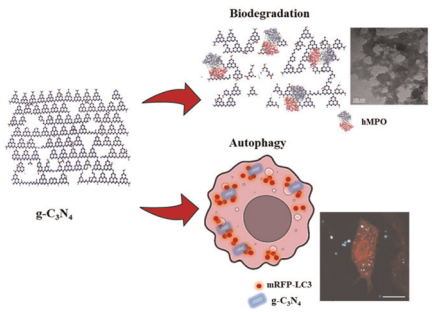
15252



Titanium diboride-derived nanosheets enhance the mechanical properties of polyurethane: experiments and simulation

Bhagyashri Gaykwad, Sree Harsha Bharadwaj H, Archit Bahirat, Raghavan Ranganathan and Kabeer Jasuja*

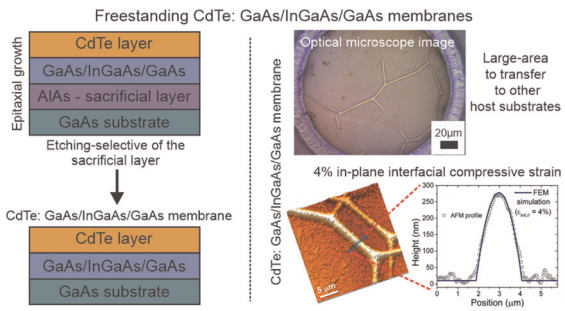
15267



Biological degradation of graphitic carbon nitride sheets and autophagy induction in macrophages

K. Swetha, Anushree Bhatnagar, Manikrishna Lakavathu, Penta Poornima, Pratiksha Ganesh, Adithi Kamath, Srinivasa Reddy Bonam, Srinivasa M. Srinivasula and Rajendra Kurapati*

15279



Lattice stability and elastic evolution of CdTe membranes fabrication using III–V heterostructures as a substrate

Wesley F. Inoch, Eduarda P. M. Campos, Misael C. I. Muniz, Ângelo Malachias, Gilberto Rodrigues-, Junior, Sukarno O. Ferreira, Christoph Deneke, Bráulio S. Archanjo, Erika P. Pimenta, Luciano G. Moura, E. N. D. Araujo and Leonarde N. Rodrigues*

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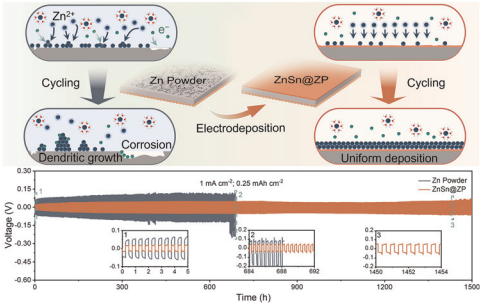
15289

Zn–Sn interface layer design strategy towards high-stability Zn powder anode

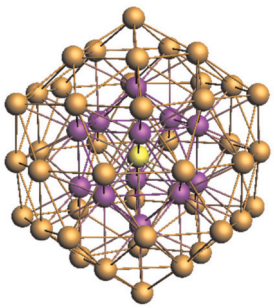
Yan Xin, Yunnian Ge, Ming Lei, Shen Cai, Chen Zhao, Huai Zhang* and Huajun Tian*



15301

How many electrons to stabilize the icosahedral Cu_{55} core in ligated nanoclusters? The example of $[Cu_{55}(NHC)_6]$

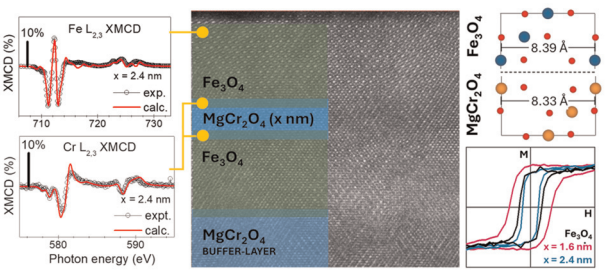
Mohamed Amine Zerizer, Christian Kleeberg, Bachir Zouchoune* and Jean-Yves Saillard*



15308

Exploring interfacial magnetism in all-spinel $Fe_3O_4/MgCr_2O_4/Fe_3O_4$ epitaxial heterostructures

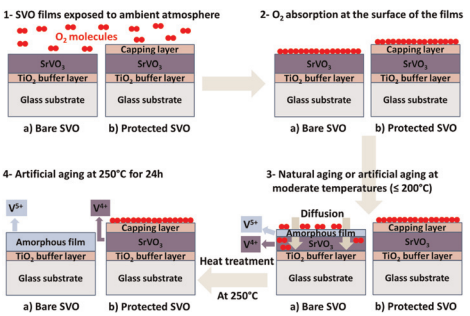
Francesco Offi, Francesco Borgatti,* Pasquale Orgiani, Vincent Polewczyk, Sandeep Kumar Chaluvadi, Shyni Punathum Chalil, Aleksandr Petrov, Federico Motti, Gian Marco Pierantozzi, Giancarlo Panaccione, Bogdan Rutkowski, Paolo Mengucci, Gianni Barucca, Deepnarayan Biswas, Tien-Lin Lee, Emiliano Marchetti, Alberto Martinelli, Davide Peddis and Gaspare Varvaro



15319

Improving the long-term stability of new-generation perovskite-based TCOs using binary and ternary oxides capping layers

Moussa Mezhoud,* Martando Rath, Stéphanie Gascoin, Sylvain Duprey, Philippe Marie, Julien Cardin, Christophe Labbé, Wilfrid Prellier and Ulrike Lüders*



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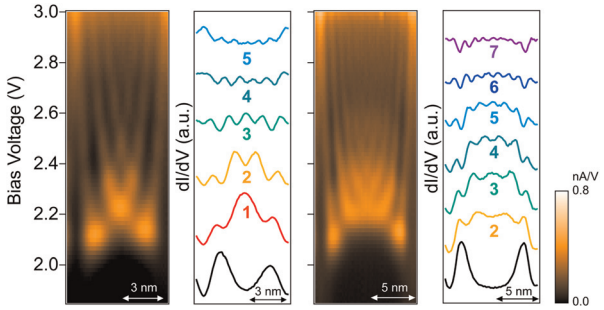
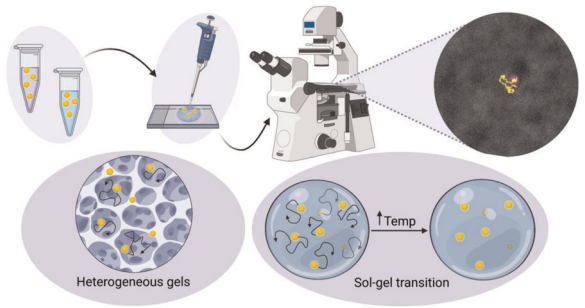


A one-dimensional edge state induced by strain in a copper nitride monolayer on Cu(001)

Toshio Miyamachi,* Yusuke Konishi, Takushi Iimori, Yoshihide Yoshimoto and Fumio Komori*

15338



Passive nanorheological tool to characterise hydrogels

Moira Lorenzo Lopez,* Victoria R. Kearns, Eann A. Patterson and Judith M. Curran

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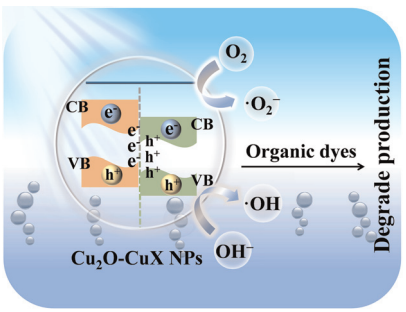

Cu_2O-CuX NPs rich in oxygen vacancies modulated by halogen ions and their application in photocatalytic degradation

Pan Wu, Yu-Ling Wang, Xiao-Chu Zhang, Jia-Yi Bai, Xiao-Long Fu, Jun-Tao Cao* and Yan-Ming Liu

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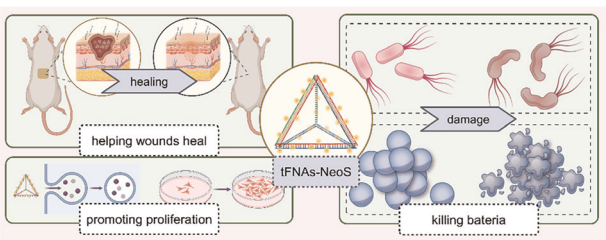

Neomycin loaded by tetrahedral framework nucleic acids enhances antimicrobial sensitivity against bacteria

Yibo Li, Yangxue Yao, Yun Wang, Yunfeng Lin, Yao He, Shaojingya Gao* and Xiaoxiao Cai*

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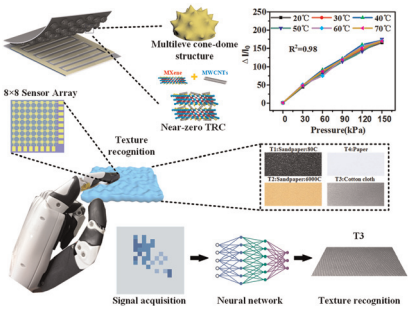
PAPERS

15366

Temperature-insensitive and wide-range linear tactile electronic skins for reliable shape and texture recognition

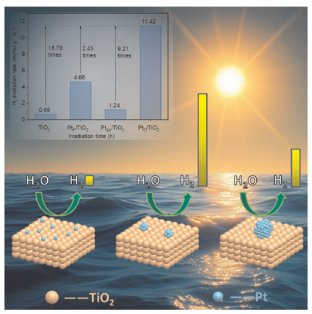
Longwei Xue, Li Yuan, Jixing Zhou, Junshuai Dai, Xudong Zhang, Hong Hu, Hai Liu and Tingting Zhao*



15375

Loading Pt clusters is more conducive to photocatalytic hydrogen evolution compared to single atoms and nanoparticles

Bo Li, Lipan Luo, Yujia Liu, Xiaohan Zhou, Yuyu Zhang, Lishuai Song, Nan Liu, Qing Tang* and Zequan Li*



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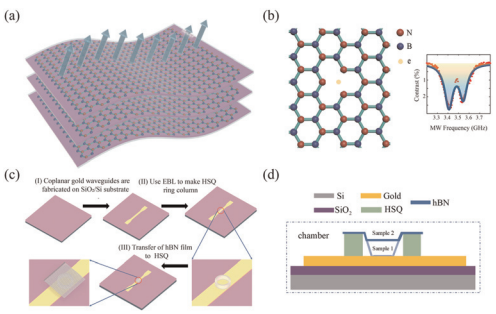
Ambient pressure response of spin defects in two-dimensional materials

Xiao-Dong Zeng, Wei Liu, Yuan-Ze Yang, Nai-Jie Guo, Lin-Ke Xie, Jun-You Liu, Yu-Hang Ma, Yi-Tao Wang, Zhi-Peng Li, Zhao-An Wang, Jia-Ming Ren, Jin-Shi Xu, Jian-Shun Tang,* Chuan-Feng Li* and Guang-Can Guo



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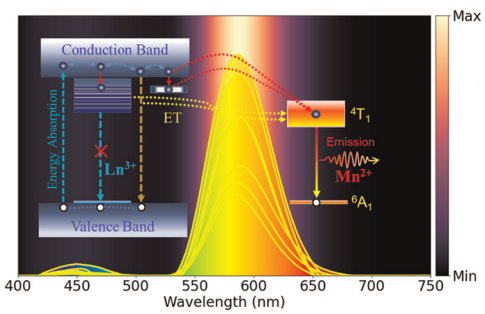
Ln^{3+}-ion-mediated enhancement in UV/X-ray-induced optical emission from Mn^{2+}-doped ZnSe nanocrystals

Iram Gul, Zahid U. Khan,* Muhammad Abdullah Khan, Gabriel A. Cabrera-Pasca, Ruba I. AlZubi, Santiago J. A. Figueroa, Hermi F. Brito and Latif U. Khan*



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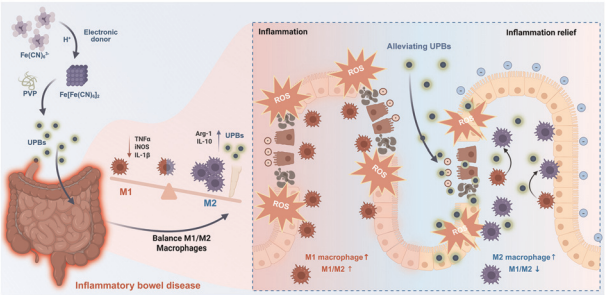
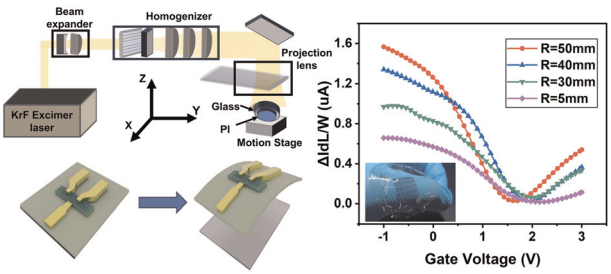


Ultra-small Prussian blue nanodots scavenge reactive oxidative species and balance M1/M2 macrophages to mitigate colitis inflammation

Guangwen Yang, Qiang Li, Jiayi Meng, Heng Dong,* Zhiguo Qin* and Yongbin Mou*

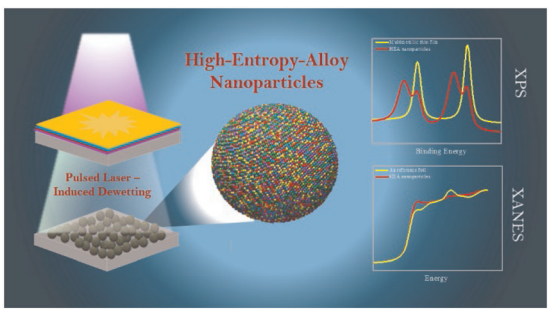
15413



Ultra-thin flexible solid-gated graphene field-effect transistors fabricated using laser lift-off

Wenchao Luo, Hu Guo, Xinshuo Zhu, Jinpeng Tian, Zijin Wei, Minhan Liu, Cheng Wang,* Hao Sun* and Yuan Jia*

15423



Pulsed laser-induced dewetting for the production of noble-metal high-entropy-alloy nanoparticles

Sye Ghebretnsae, Tyler Joe Ziehl, Sarah Purdy, Peng Zhang, Tsun-Kong Sham and Yujun Shi*

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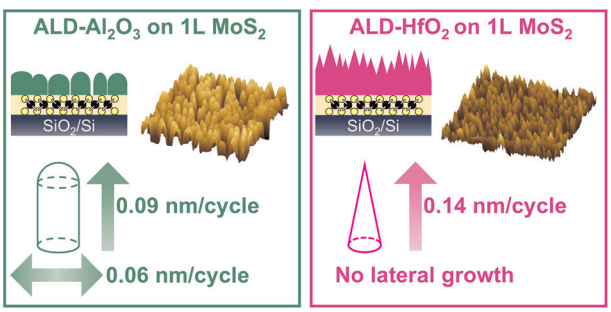

Direct thermal atomic layer deposition of high-κ dielectrics on monolayer MoS_2: nucleation and growth

Brendan F. M. Healy,* Sophie L. Pain, Nicholas E. Grant and John D. Murphy

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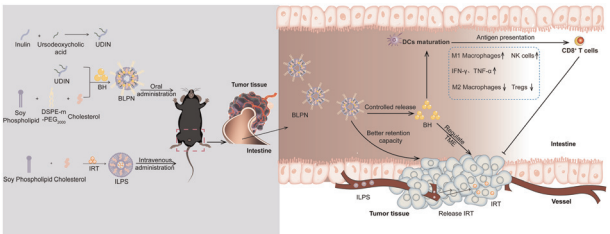
A prebiotic inulin derivative-containing liposome for oral berberine delivery improves the orthotopic colorectal cancer chemotherapy

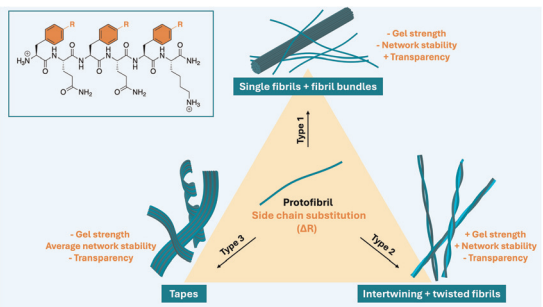
Anqi Xia, Wenhui Yuan, Shanshan Xu, Ting Wu, Wenlu Yan, Ying Cao, Yaping Li* and Qi Yin*



15464

Influence of substituted aromatics on the formation and stability of β-sheet-based peptide hydrogels

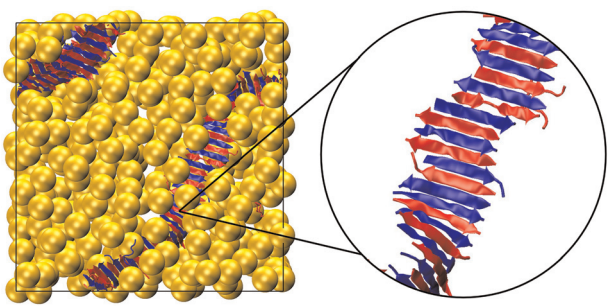
Jolien Bertouille, Jacinta F. White, Malisja de Vries, Kaat De Smet, Jizhen Zhang, James Gardiner, Niko Van den Brande, Wouter Herrebout, Ronnie G. Willaert, Charlotte Martin, Ulrich Hennecke and Steven Ballet*



15478

Modulating peptide co-assembly *via* macromolecular crowding: Recipes for co-assembled structures

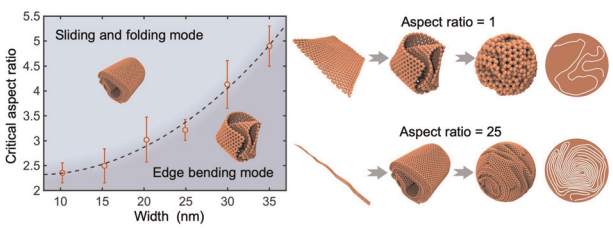
Xin Y. Dong,* Madisen Domayer, Gregory A. Hudalla and Carol K. Hall



15493

Insights into the structural features of crumpling graphene nanoribbons

Yangchao Liao, Long Chen and Wenjie Xia*



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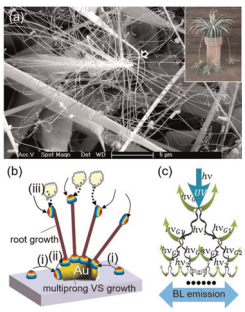
PAPERS

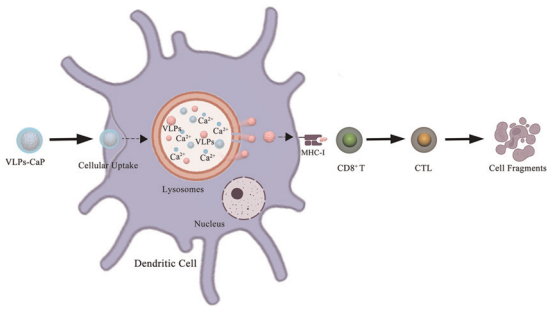
15505



Strong blue-light emission in flexible branched nanowire-on-nanowire pristine ZnO nanoarchitectures constructed *via* tandem multiprong growth

Jian-Min Li

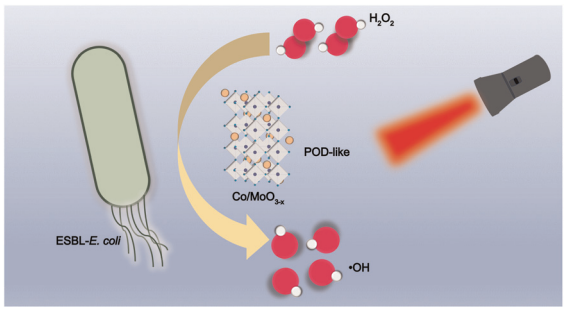
15512



Mechanistic investigation of calcium phosphate mineralization potentiating the cellular immune response of foot-and-mouth disease virus-like particle vaccines

Zhidong Teng, Jiajun Li, Mei Ren, Qianqian Xie, Hu Dong, Jingjing Zhou, Suyu Mu, Manyuan Bai, Shiqi Sun* and Huichen Guo*

15523



Cobalt-intercalated α-MoO_3 nanoribbons enhance peroxidase mimetic activity and photothermal effects for sterilization

Jiamin Zhang, Hu Liu, Yuhui Zuo, Shiyang Lv, Yan Liu, Wenfei Lan, Tong Li, Xinyi Li and Xinsheng Wang*

CORRECTIONS

15535

Correction: Mitigating substrate effects of van der Waals semiconductors using perfluoropolyether self-assembled monolayers

Dae Young Park, Hyeong Chan Suh, Seungho Bang, Ju Chan Lee, Jaekak Yoo, Hayoung Ko, Soo Ho Choi, Ki Kang Kim, Seung Mi Lee, Seong Chu Lim, Tschang-Uh Nahm and Mun Seok Jeong*

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CORRECTIONS

15536

Correction: Investigation of the phase transition to the Ruddlesden–Popper phase in La- or Nb-doped $Sr_2Fe_{1.5}Mo_{0.5}O_{6-\delta}$ double perovskites and the impact of lanthanum or niobium doping

Agata Ducka,* Patryk Błaszczak, Marcin Zając, Alexey Maximenko, Maria Gazda and Beata Bochentyn

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