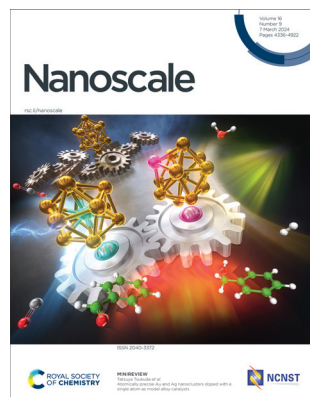


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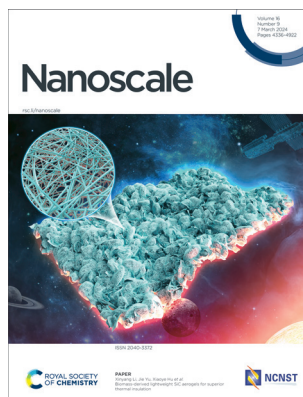
ISSN 2040-3372 CODEN NANOHL 16(9) 4336–4922 (2024)



Cover

See Tatsuya Tsukuda *et al.*, pp. 4514–4528.

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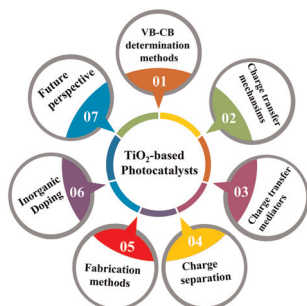
Inside cover

See Xinyang Li, Jie Yu, Xiaoye Hu *et al.*, pp. 4600–4608.

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REVIEWS

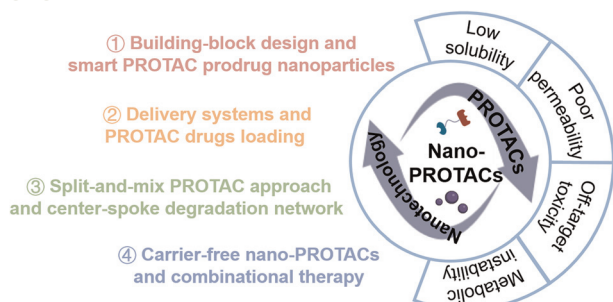
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Charge transfer in TiO₂-based photocatalysis: fundamental mechanisms to material strategies

Sharafat Ali, Pir Muhammad Ismail, Muhammad Khan, Alei Dang, Sajjad Ali, Amir Zada,* Fazal Raziq,* Imran Khan, Muhammad Shakeel Khan, Muhammad Ateeq, Waliullah Khan, Syedul Hasnain Bakhtiar, Haider Ali, Xiaoqiang Wu, Muhammad Ishaq Ali Shah, Ajayan Vinu, Jiabao Yi, Pengfei Xia* and Liang Qiao*

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Nano-PROTACs: state of the art and perspectives

Jie Zhong, Ruiqi Zhao, Yuji Wang, Yu-xiong Su* and Xinmiao Lan*



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**Fundamental questions
Elemental answers**

Zhengkao Tao, Haitao Zhang,* Shang Wu,
Jiaheng Zhang, Yao Cheng, Longtianshang Lei, Yang Qin,
Hua Wei* and Cui-Yun Yu*

Zhengkao Tao, Haitao Zhang,* Shang Wu,
Jiaheng Zhang, Yao Cheng, Longtianshang Lei, Yang Qin,
Hua Wei* and Cui-Yun Yu*

Bing Liu* and Siguang Ma*

Bing Liu* and Siguang Ma*

Fei Xing, Jiawei Xu, Yuxi Zhou, Peiyun Yu, Man Zhe,
Zhou Xiang, Xin Duan* and Ulrike Ritz*

Fei Xing, Jiawei Xu, Yuxi Zhou, Peiyun Yu, Man Zhe,
Zhou Xiang, Xin Duan* and Ulrike Ritz*

Synthesis Approaches	Mode of application	Benefits of Nanofertilizers
Physical (top-down) Chemical (bottom-up) Biological (green synthesis)	 • Foliar spray • Root dip • Seed treatment • Soil treatment • Irrigation	Increase nutrient uptake Abiotic stress alleviation Induce cell elongation, germination Soil health improvement Crop yield growth Stress tolerance

Badr-Eddine Channab,* Ayoub EL Idrissi,*
Ayyoub Ammar,* Othmane Dardari,
Salah Eddine Marrane, Abdelouahed el Gharrak,
Adil Akil, Youness Essemlali and Mohamed Zahouily*

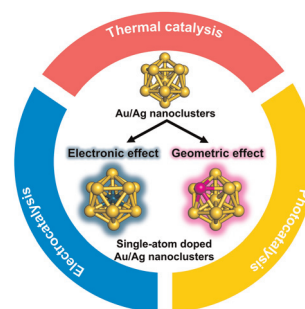
Badr-Eddine Channab,* Ayoub EL Idrissi,*
Ayyoub Ammar,* Othmane Dardari,
Salah Eddine Marrane, Abdelouahed el Gharrak,
Adil Akil, Youness Essemlali and Mohamed Zahouily*

MINIREVIEWS

4514

Atomically precise Au and Ag nanoclusters doped with a single atom as model alloy catalysts

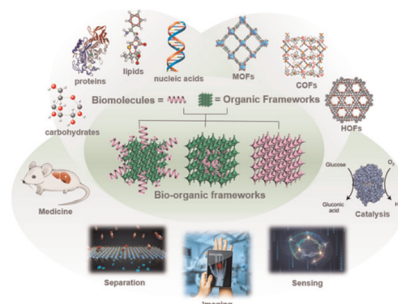
Shinya Masuda, Kosuke Sakamoto and Tatsuya Tsukuda*



4529

Biomolecules meet organic frameworks: from synthesis strategies to diverse applications

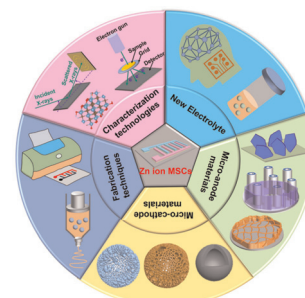
Jing Li, Chunyan Li, Zelong Zhao, Yuxue Guo, Hongli Chen, Pai Liu, Meiting Zhao* and Jun Guo*



4542

Recent progress of high-performance in-plane zinc ion hybrid micro-supercapacitors: design, achievements, and challenges

Wenwen Liu,* Hongling Li and Roland Yingjie Tay*

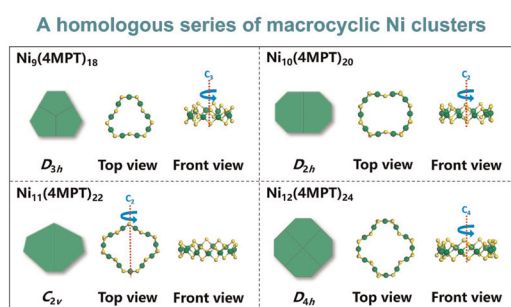


COMMUNICATIONS

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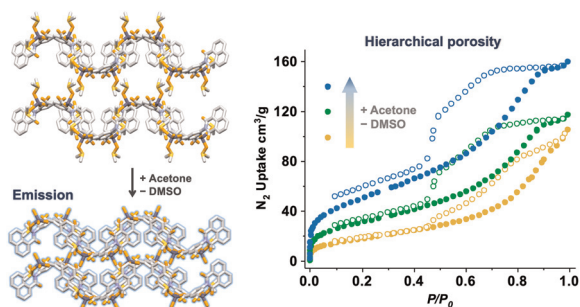
A homologous series of macrocyclic Ni clusters: synthesis, structures, and catalytic properties

Huixin Xiang, Ranran Cheng, Chenhao Ruan, Changqing Meng, Yuzheng Gan, Wanyu Cheng, Yue Zhao, Cong-Qiao Xu,* Jun Li and Chuanhao Yao*



COMMUNICATIONS

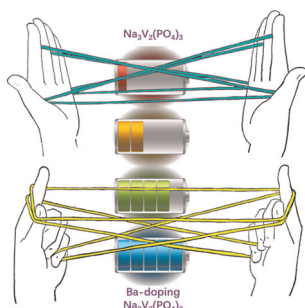
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Solvent-induced structural transformation in a one-dimensional coordination polymer

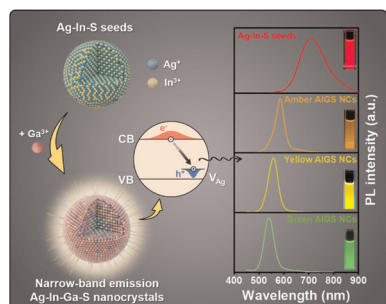
Kangwoo Jin, Nohyeon Park, Yongdeok Ahn, Daeha Seo, Dohyun Moon,* Jooyoung Sung* and Jinhee Park*

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Trace topological doping strategy and deep learning to reveal high-rate sodium storage regulation of barium-doped $\text{Na}_3\text{V}_2(\text{PO}_4)_3$

Ji Yan,* Chaoyu Zhang, Zhen Li, Fujun Liu,* Heng Wang, Xiaolei Wang* and Lizhen Wang

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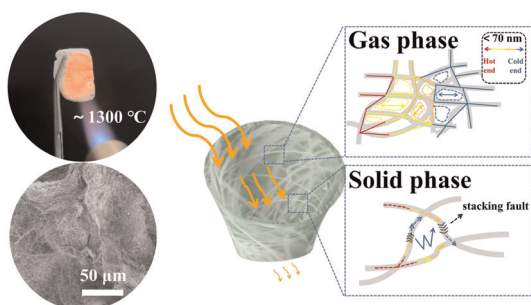


Seed-mediated growth synthesis and tunable narrow-band luminescence of quaternary Ag-In-Ga-S alloyed nanocrystals

Ouyang Lin, Lijin Wang, Xiulin Xie, Shuaibing Wang, Yibo Feng, Jiawen Xiao, Yu Zhang* and Aiwei Tang*

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4600



Biomass-derived lightweight SiC aerogels for superior thermal insulation

Chunxue Zheng, Xinyang Li,* Jie Yu,* Zhulin Huang, Ming Li, Xiaoye Hu* and Yue Li

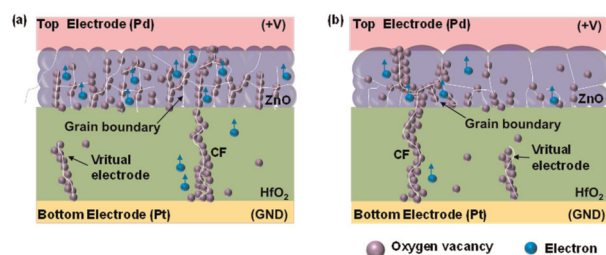


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Effects of thermal annealing on analog resistive switching behavior in bilayer HfO_2/ZnO synaptic devices: the role of ZnO grain boundaries

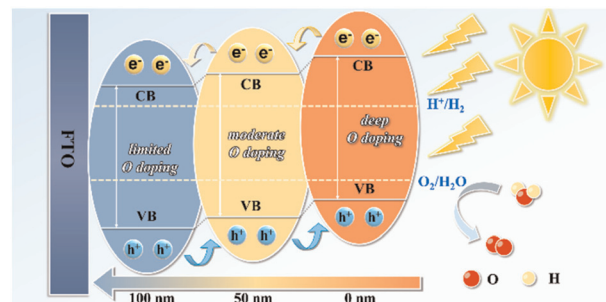
Yeong-Jin An, Han Yan, Chae-min Yeom, Jun-kyo Jeong, Sunil Babu Eadi, Hi-Deok Lee* and Hyuk-Min Kwon*



4620

Gradient oxygen doping triggered a microscale built-in electric field in CdIn_2S_4 for photoelectrochemical water splitting

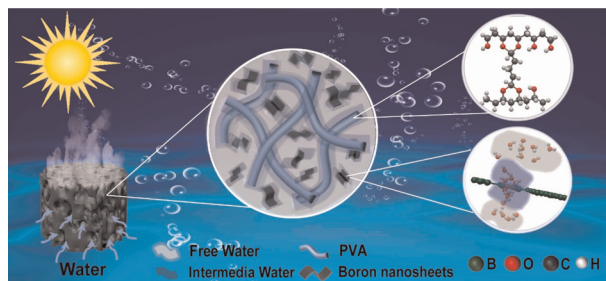
Jingwen Sun,* Shangling Han, Fanglei Yao, Ruixin Li, Chenchen Fang, Xiaoyuan Zhang, Yaya Wang, Xuefeng Xu, Di Wu, Kai Liu, Pan Xiong and Junwu Zhu



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Boron nanosheets boosting solar thermal water evaporation

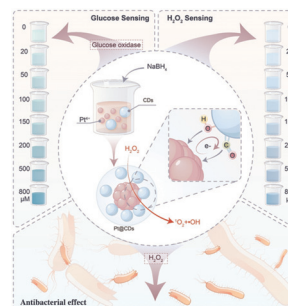
Xin Stella Zhang, Shudi Mao, Jiashu Wang, Casey Onggowarsito, An Feng, Rui Han, Hanwen Liu, Guojin Zhang, Zhimei Xu, Limei Yang, Qiang Fu* and Zhenguo Huang*



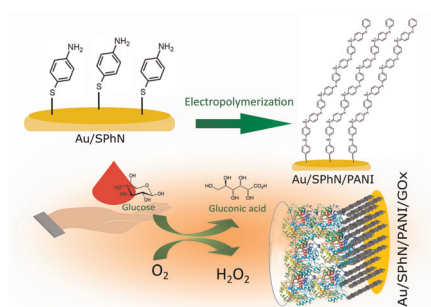
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Carbon dot enhanced peroxidase-like activity of platinum nanozymes

Cui Liu, Jiao Hu, Wenwen Yang, Jinyu Shi, Yiming Chen, Xing Fan, Wenhui Gao, Liangliang Cheng, Qing-Ying Luo* and Mingzhen Zhang*



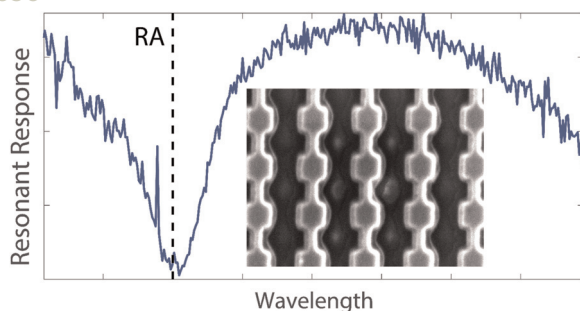
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An electrografted monolayer of polyaniline as a tuneable platform for a glucose biosensor

Elžbieta Ragauskaitė, Samuelis Marčiukaitis, Ingrida Radveikienė and Gintautas Bagdžiūnas*

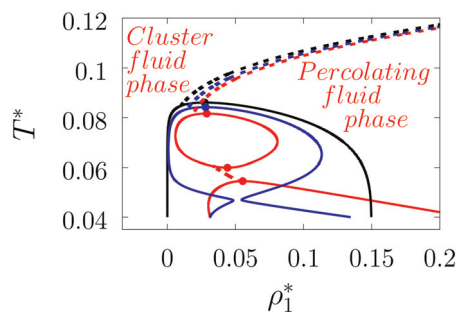
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MXene-antenna electrode with collective multipole resonances

Vahid Karimi and Viktoriia E. Babicheva*

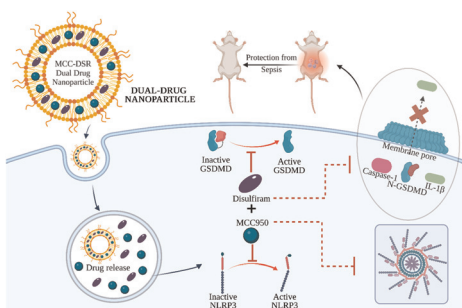
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Phase behavior of patchy colloids confined in patchy porous media

Yurij V. Kalyuzhnyi,* Taras Patsahan, Myroslav Holovko and Peter T. Cummings

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Nanoparticle-mediated co-delivery of inflammasome inhibitors provides protection against sepsis

Dipika Nandi, Maharshi Debnath, James Forster, III, Ankit Pandey, Hariharan Bharadwaj, Ruchi Patel and Ashish Kulkarni*

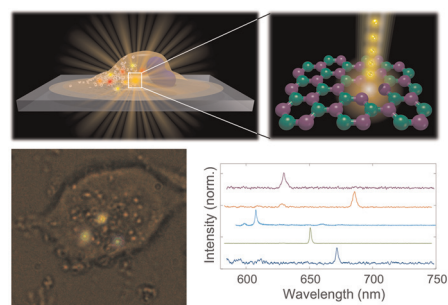


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Intracellular biocompatible hexagonal boron nitride quantum emitters as single-photon sources and barcodes

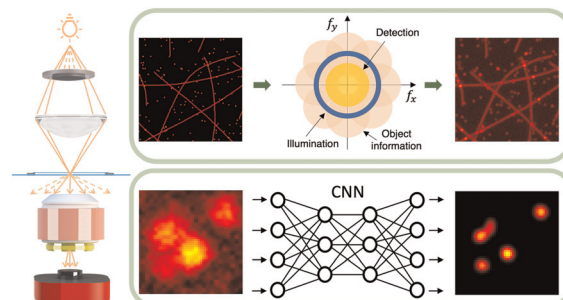
Aljaž Kavčič, Rok Podlipec, Ana Krišelj, Andreja Jelen, Daniele Vella and Matjaž Humar*



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Super resolution label-free dark-field microscopy by deep learning

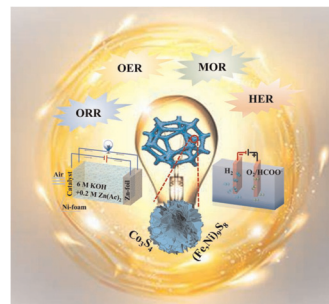
Ming Lei, Junxiang Zhao, Junxiao Zhou, Hongki Lee, Qianyi Wu, Zachary Burns, Guanghao Chen and Zhaowei Liu*



4710

Promoting the four electrocatalytic reactions of OER/ORR/HER/MOR using a multi-component metal sulfide heterostructure for zinc-air batteries and water-splitting

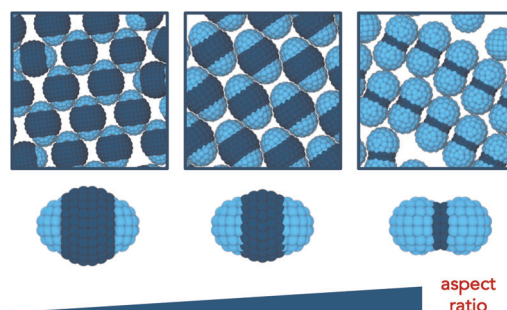
Jiaxin Dang, Genman Chen, Bingen Yuan, Fuyue Liu, Qin Wang, Fu Wang, He Miao* and Jinliang Yuan



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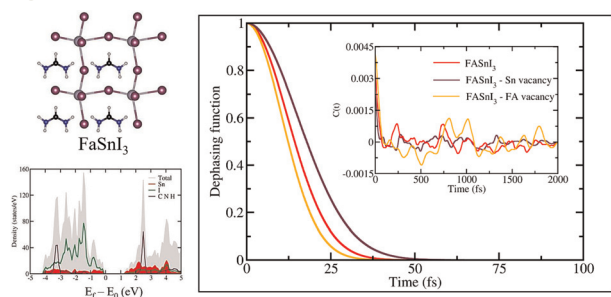
Depletion-induced crystallization of anisotropic triblock colloids

Fabrizio Camerin,* Susana Marín-Aguilar* and Marjolein Dijkstra



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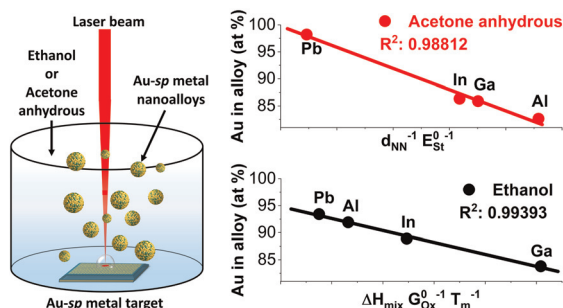
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Point defect-mediated hot carrier relaxation dynamics of lead-free FASnI₃ perovskites

Atish Ghosh, Subhash Kumar and Pranab Sarkar*

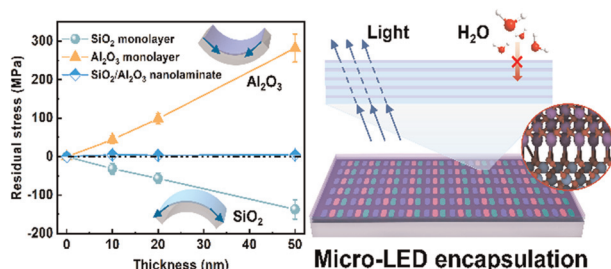
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Physical and chemical parameters determining the formation of gold–sp metal (Al, Ga, In, and Pb) nanoalloys

Vito Coviello, Daniel Forrer, Patrizia Canton and Vincenzo Amendola*

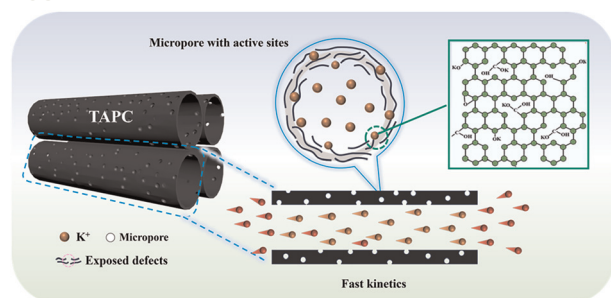
4760



Atomic-scale stress modulation of nanolaminate for micro-LED encapsulation

Di Wen, Jiacheng Hu, Ruige Yuan, Wang Li, Kun Cao* and Rong Chen*

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An oriented tube array porous carbon anode prepared using a self-blowing mold of salt templates for high-rate potassium storage

Chenchen Shao, Yusheng Luo, Hongguang Fan, Yanpeng Wang, Tao Li, Qingping Li and Wei Liu*

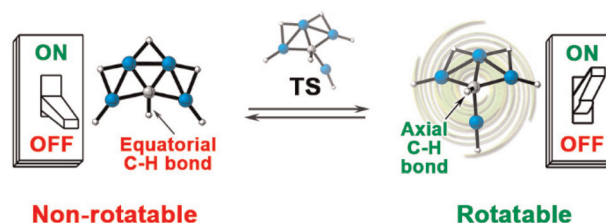


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CBe₄H₆: a molecular rotor with a built-in on–off switch

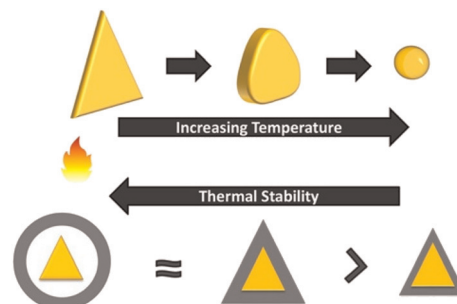
Bo Jin, Caixia Yuan, Jin-Chang Guo and Yan-Bo Wu*



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Unexpectedly high thermal stability of Au nanotriangle@mSiO₂ yolk–shell nanoparticles

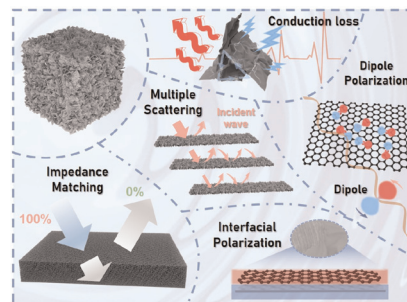
Xiaobin Xie,* Wiebke Albrecht, Marijn A. van Huis* and Alfons van Blaaderen*



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Thermally assisted layer–layer crosslinking towards programmable evolution of pore structures for tunable electromagnetic response capability

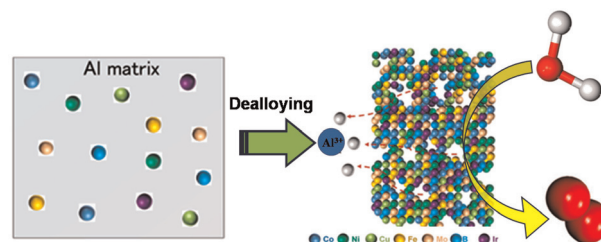
Bin Quan, Yu Chen, Litao Lin, Xunyi Zhou, Xiaochi Lu, Mingji Zhang and Xiaogu Huang*



4803

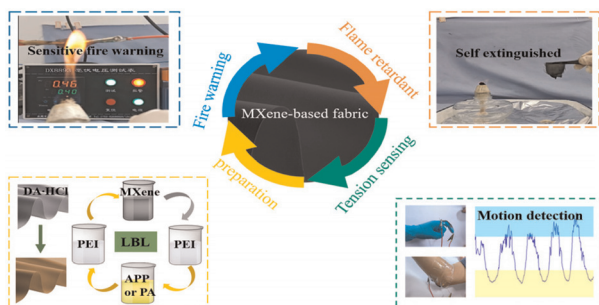
Enhancing oxygen evolution reactions in nanoporous high-entropy catalysts using boron and phosphorus additives

Ze-Xing Cai, Saikat Bolar, Yoshikazu Ito and Takeshi Fujita*



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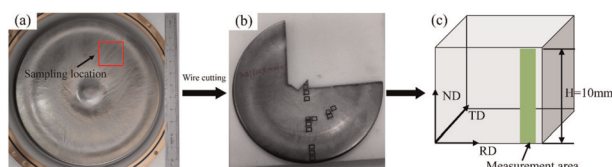
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Ti₃C₂T_x MXene-based hybrid nanocoating for flame retardant, early fire-warning and piezoresistive tension sensing smart polyester fabrics

Menghan Guo, Wenqing Wang,* Bin Zhai, Jingtao Li, Liran Zhang, Jingchun Li, Kexin Luo and Rui Wang

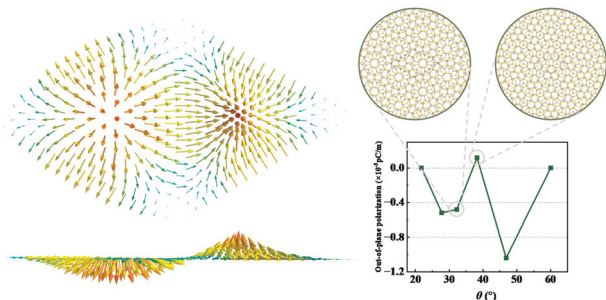
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Microstructure evolution and the deformation mechanism in nanocrystalline superior-deformed tantalum

Pengtao Li, Aijuan Wang,* Meng Qi, Chenxi Zhao, Zhaobo Li, Wang Zhanhong, Vladimir Koval and Haixue Yan

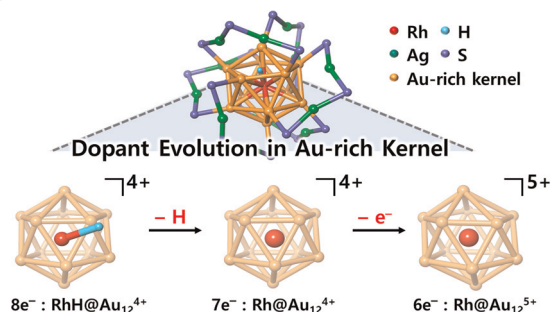
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Sliding ferroelectricity and the moiré effect in Janus bilayer MoSse

Liyan Lin, Xueqin Hu, Ruijie Meng, Xu Li, Yandong Guo,* Haixia Da, Yue Jiang, Dongdong Wang, Yurong Yang* and Xiaohong Yan*

4851



Synthesis of RhH-doped Au–Ag alloy nanoclusters and dopant evolution

Sang Myeong Han, Suhwan Song, Hanseok Yi, Eunji Sim* and Dongil Lee*

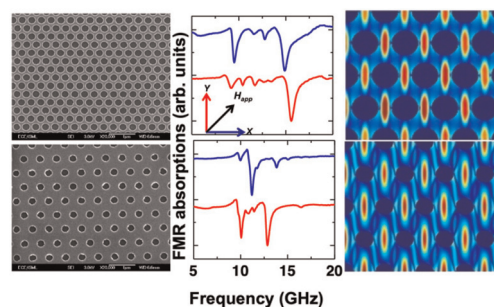


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Tunable 2-D magnonic crystals: effect of packing density

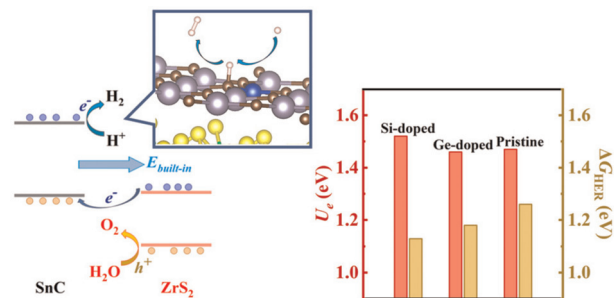
C. Tian and A. O. Adeyeye*



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Achieving highly efficient 2D SnC monolayer-based photocatalyst for water splitting via a synergistic strategy of S-scheme heterostructure construction and silicon doping

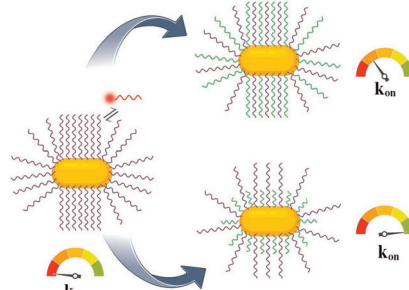
Dinghua Yang, Xi Zhang, Ya Nie, Hongyu Zhu and Gang Xiang*



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Biomolecular interactions on densely coated nanoparticles: a single-molecule perspective

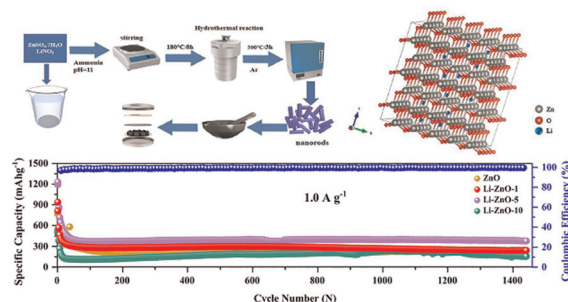
Swayandipta Dey,* Rodrigo Rivas-Barbosa, Francesco Sciortino, Emanuela Zaccarelli and Peter Zijlstra*



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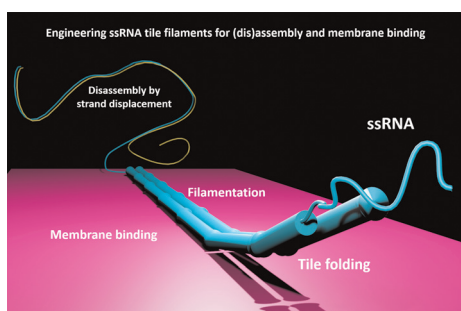
Pre-lithiation strategy to design a high-performance zinc oxide anode for lithium-ion batteries

Wei Sun, Zeyang Li, Dazhi Li, Kesheng Gao, Zeqing Miao, Ying Han, Shengjing Guan, Zhenjiang Li* and Changlong Sun*



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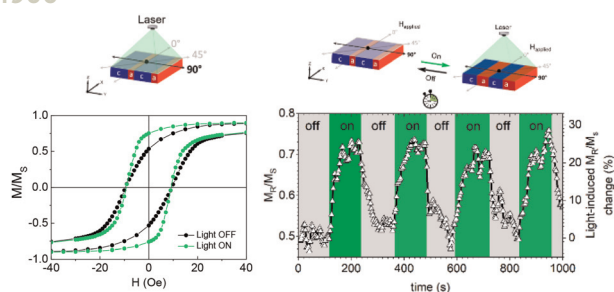
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Engineering ssRNA tile filaments for (dis)assembly and membrane binding

Nicola De Franceschi, Baukje Hoogenberg, Allard Katan and Cees Dekker*

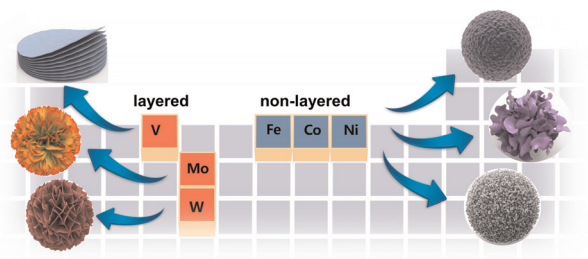
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Reversible optical control of magnetism in engineered artificial multiferroics

Diego A. Ochoa, Enric Menéndez, Jesús López-Sánchez, Adolfo Del Campo, Zheng Ma, Irena Spasojević, Ignasi Fina, José F. Fernández, Fernando Rubio-Marcos,* Jordi Sort* and José E. García*

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Insight into the intrinsic activity of various transition metal sulfides for efficient hydrogen evolution reaction

Xinran Hu, Yang Gao,* Xinying Luo, Junjie Xiong, Ping Chen* and Bin Wang*

EXPRESSION OF CONCERN

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Expression of concern: Microchip-based structure determination of low-molecular weight proteins using cryo-electron microscopy

Michael A. Casasanta, G. M. Jonaid, Liam Kaylor, William Y. Luqiu, Maria J. Solares, Mariah L. Schroen, William J. Dearnaley, Jarad Wilson, Madeline J. Dukes and Deborah F. Kelly*



CORRECTION

4920

Correction: Recent advances in nano-fertilizers: synthesis, crop yield impact, and economic analysis

Badr-Eddine Channab,* Ayoub EL Idrissi,* Ayyoub Ammar,* Othmane Dardari, Salah Eddine Marrane, Abdelouahed el Ghararak, Adil Akil, Younes Essemlali and Mohamed Zahouily*

