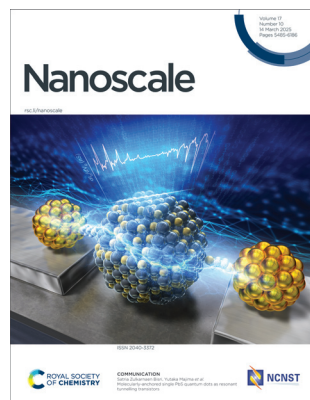


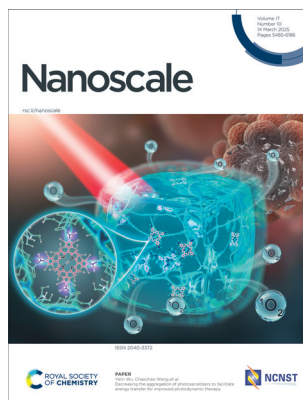
IN THIS ISSUE

ISSN 2040-3372 CODEN NANOHL 17(10) 5485-6186 (2025)



Cover
See Satria Zulkarnaen Bisri,
Yutaka Majima *et al.*,
pp. 5672–5680.

Image reproduced
by permission of
Takashi Tsujino
from *Nanoscale*,
2025, **17**, 5672.



Inside cover
See Yelin Wu,
Chaochao Wang *et al.*,
pp. 5707–5714.

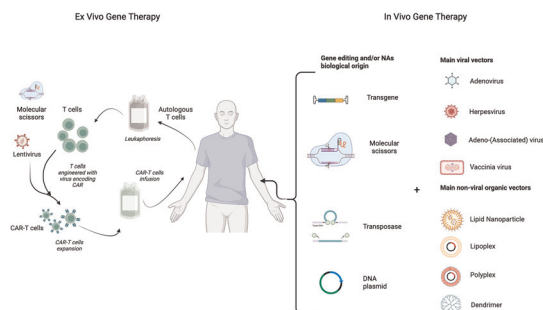
Image reproduced
by permission of
Chaochao Wang
from *Nanoscale*,
2025, **17**, 5707.

REVIEWS

5501

In vivo vectorization and delivery systems for gene therapies and RNA-based therapeutics in oncology

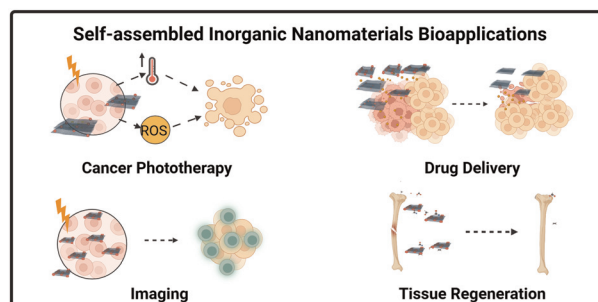
Julie Schock Vaiani, Mans Broekgaarden, Jean-Luc Coll, Lucie Sancey and Benoit Busser*



5526

Self-assembled inorganic nanomaterials for biomedical applications

Miguel T. Campos, Laura S. Pires, Fernão D. Magalhães, Maria J. Oliveira and Artur M. Pinto*



RSC Applied Polymers

GOLD
OPEN
ACCESS

The application of polymers,
both natural and synthetic

Interdisciplinary and open access

rsc.li/RSCApplPolym

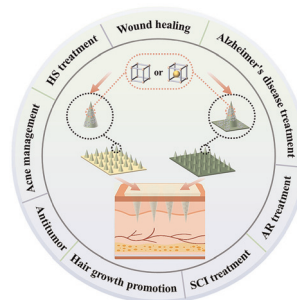
Fundamental questions
Elemental answers

REVIEWS

5571

Metal–organic framework microneedles for precision transdermal drug delivery: design strategy and therapeutic potential

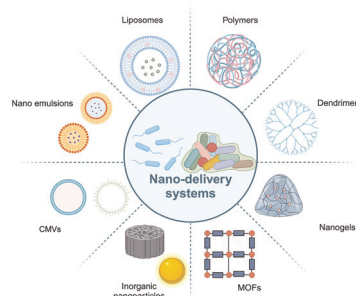
Yutong Jing, Xueting Liu, Yajing Zhu, Lichuan Wu* and Wenqian Nong*



5605

Nanomaterial-enabled anti-biofilm strategies: new opportunities for treatment of bacterial infections

Yijia Xie, Huanhuan Liu, Zihao Teng, Jiabin Ma* and Gang Liu*



5629

Advanced metal oxide catalysts for propane dehydrogenation: from design strategy to dehydrogenation performance

Qian Li, Jie Zhang,* Tong Yu, Jinwei Chen, Gang Wang, Zongbo Shi, Runsheng Zhuo and Ruilin Wang*



5654

Research advances of acoustic particle manipulation techniques in field-assisted manufacturing

Jiaqi Wang, Xiaopeng Shang, Xinzhao Zhou and Huawei Chen*

Research Advances of Acoustic Particle Manipulation Techniques in Field-Assisted Manufacturing

Manufacturing of Microparticles

- Microdroplets, microcapsules and microclusters
- Microrobots

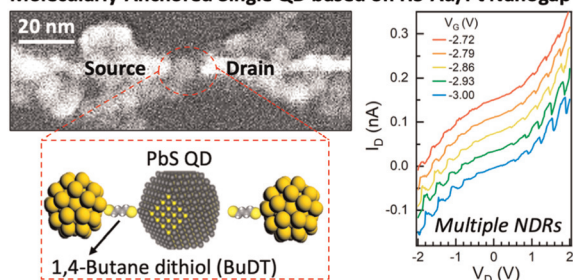
Patterned Manufacturing of Microparticle Clusters

- Surface Patterning: Microstructure
- Internal Patterning: Composite materials, responsive materials and biomedical materials



5672

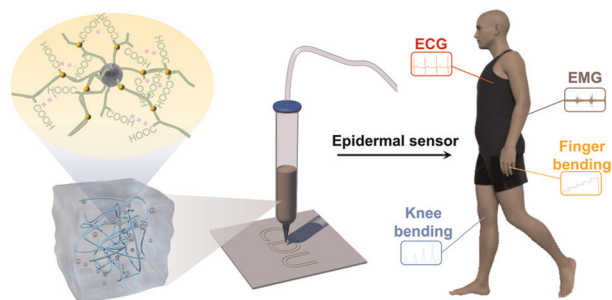
Molecularly-Anchored Single QD based on HS-Au/Pt Nanogap



Molecularly-anchored single PbS quantum dots as resonant tunnelling transistors

Retno Dwi Wulandari, Dongbao Yin, Ricky Dwi Septianto, Seiichiro Izawa, Yoshihiro Iwasa, Satria Zulkarnaen Bisri* and Yutaka Majima*

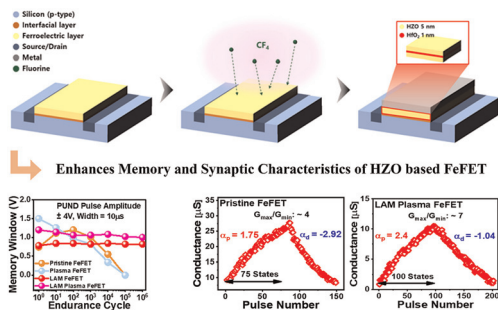
5681



3D-printable liquid metal-based hydrogel for use as a multifunctional epidermal sensor

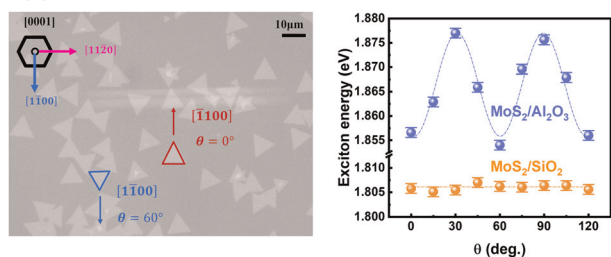
Jingjiang Wei, Hao Chen, Fei Pan, Hongming Zhang, Tianyu Yuan, Yuanlai Fang, Zhongxiang Bai, Kun Yang, Yidi Li, Hang Ping, Yanqing Wang,* Qingyuan Wang* and Zhengyi Fu*

5689

Hf_{0.5}Zr_{0.5}O₂/HfO₂/Hf_{0.5}Zr_{0.5}O₂ laminated thin films and CF₄ plasma passivation for improved memory and synaptic characteristics of ferroelectric field-effect transistors

Kyungsoo Park, Chulwon Chung, Boncheol Ku, Seunghyeon Yun, Junhyeok Park and Changhwan Choi*

5700

Intrinsic setting of the exciton state in MoS₂ monolayers via tailoring the Moiré correlation with a sapphire substrate

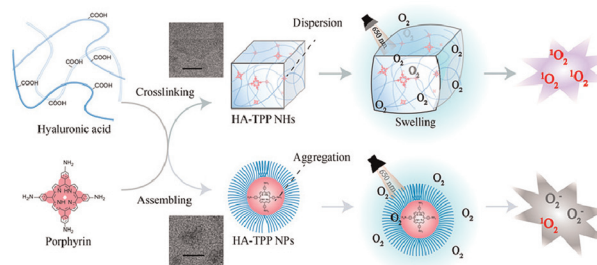
Chun-Wen Chan, Fang-Mei Chan, Sheng-Kuei Chiu, Lu-Chih Chen, Wun-Jhen Yu, Chia-Yun Hsieh and Chao-Yao Yang*



5707

Decreasing the aggregation of photosensitizers to facilitate energy transfer for improved photodynamic therapy

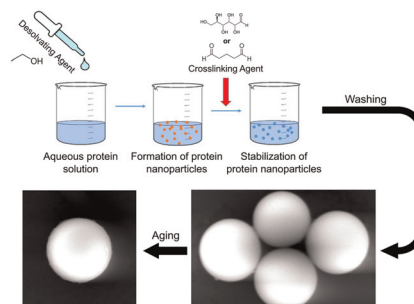
Zhenhua Wang, Jianyang Ao, Xiaoran Lai, Gang Liu, Yun Meng, Yurong Zhang, Jieyun Shi, Yelin Wu* and Chaochao Wang*



5715

Preparation of bovine serum albumin nanospheres *via* desolvation: a study of synthesis, characterization, and aging

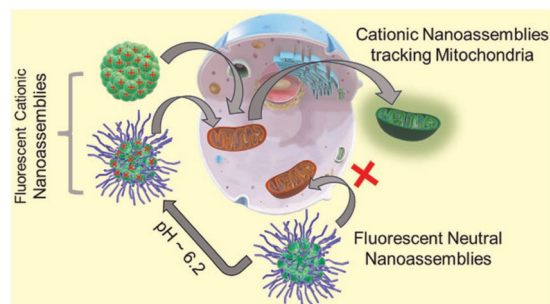
Blake A. Bartlett, John Klier* and Sepideh Razavi*



5732

Mitochondria-targeting nanostructures from enzymatically degradable fluorescent amphiphilic polyesters

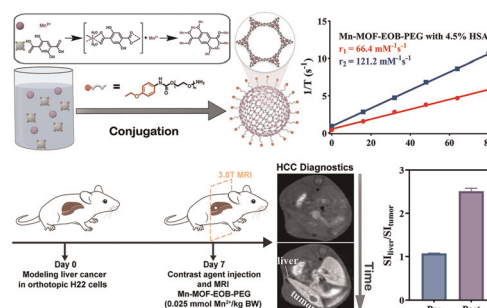
Subhendu Biswas, Priya Rajdev, Ankita Banerjee and Anindita Das*



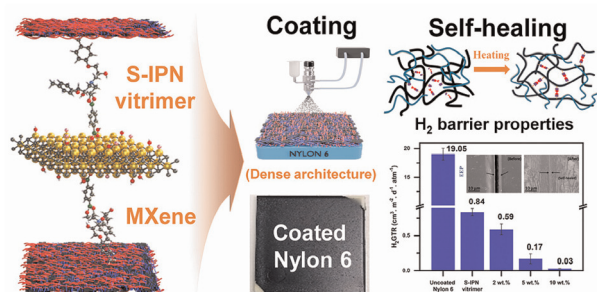
5743

Mn(II)-MOF nanoparticles conjugated with EOB-PEG as high-performance hepatobiliary-specific MRI contrast agents

Gengshen Mo, Xingjiang Li, Yong Jian, Weiyuan Xu, Xinhui Xiao, Aiyi Chen, Yinghui Ding, Xin Jiang, Jianliang Shen, Lihai Fan,* Zhiqiang Wang* and Lixiong Dai*



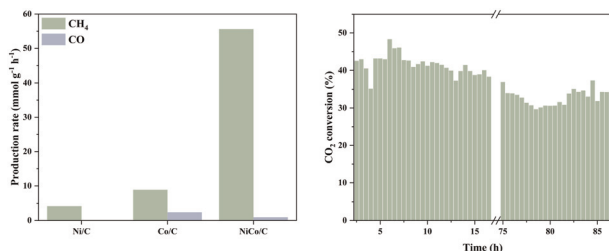
5755



Epoxy-based vitrimeric semi-interpenetrating network/MXene nanocomposites for hydrogen gas barrier applications

Anandarup Bhattacharyya, Subhabrata Saha, Sambadan Jena, Hoang Tuan Nguyen, Duy Thanh Tran, Nam Hoon Kim* and Joong Hee Lee*

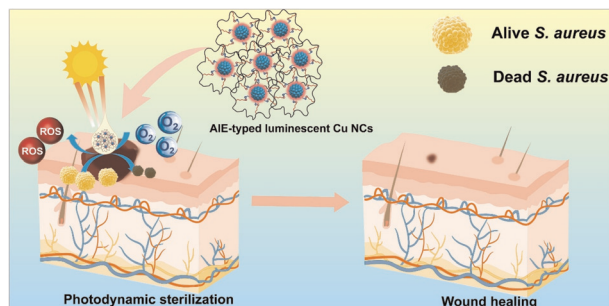
5770



Unique NiCo bimetal boosting 98% CH₄ selectivity and high catalysis stability for photothermal CO₂ hydrogenation

Yubin Zheng, Zhe Lu, Zhisheng Shi,* Lu Wang, Shuyuan Yang, Runzhi Cao, Gao Wa,* Xin Zhou,* Yong Yang, Chong Sheng, Yong Zhou* and Zhigang Zou

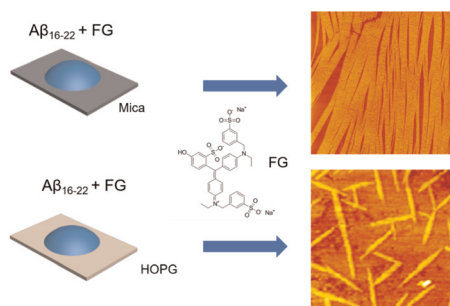
5778



Copper nanoclusters with aggregation-induced emission: an effective photodynamic antibacterial agent for treating bacteria-infected wounds

Zhen Jiang, Yongqi Wei, Yun Wang, Songjie Han, Ze Li, Sihang Liu, Zihao Wang, Zhijun Li, Ting Feng, Haiguang Zhu* and Xun Yuan*

5788



Changing the amyloid nucleation process using small molecules and substrates: a way to build two-dimensional materials

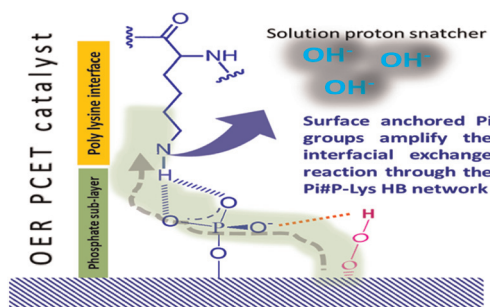
Chao Chen, Chenyang Wu, Tiantian Yang, Wenhui Zhao, Jiangtao Lei* and Dongdong Lin*



5798

Water oxidation on a sustainable polymeric proton relay: the role of post-phosphating of an oxide sub-layer on PCET

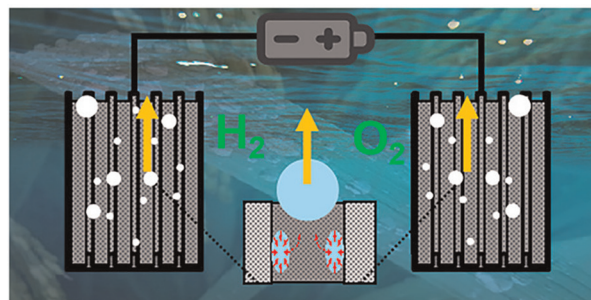
Kimia Ahanjan, Mojtaba Shamsipur* and Afshin Pashabadi*



5812

Rice leaves microstructure-inspired high-efficiency electrodes for green hydrogen production

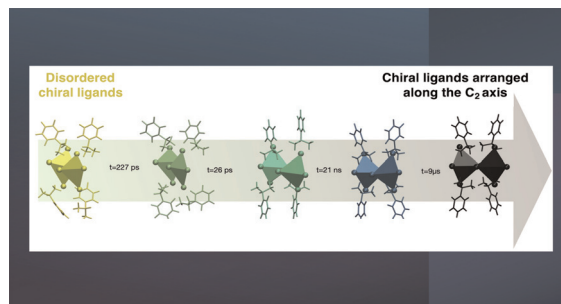
Yuliang Li, Jinxin Gao, Zhaoyang Wang, Honghao Li, Lu Li, Xiaofang Zhang,* Xiaoyang Fan, Longyun Lin, Yan Li, Ke Li, Chunyu Zhang, Linyang Li, Ran Wang, Yunting Su and Dongliang Tian*



5823

Stepwise kinetics of the early-stage nucleation in chiral perovskites via *ab initio* molecular dynamics and free-energy calculations

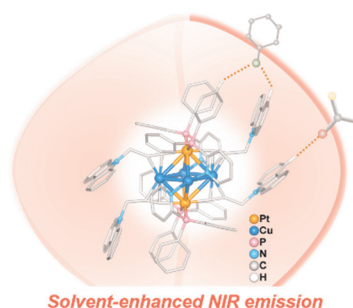
Mariagrazia Fortino, Gioacchino Schifino, Matteo Salvalaglio and Adriana Pietropaolo*



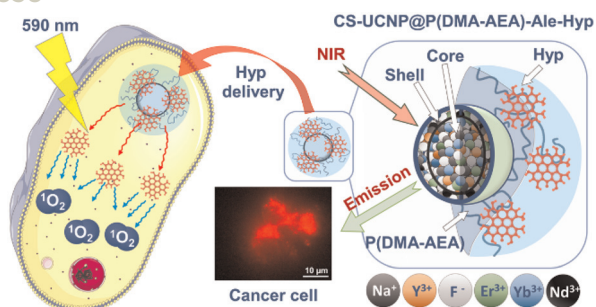
5829

Significantly enhanced NIR emission of solid-state clusters based on Cu₄Pt₂ triggered with volatile organic compounds

Xue-Ning Hu, Xu-Hang Zhong, Rui-Ru Zhong, Lin-Mei Zhang, De-Bo Hao, Qian Xu, Hui-Zhi Wei, Rui Zhou, Jianyu Wei, Kuan-Guan Liu, Shang-Fu Yuan,* Dong-Sheng Li and Tao Wu*



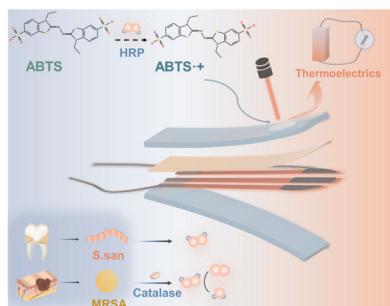
5838



Surface-engineered core–shell upconversion nanoparticles for effective hypericin delivery and multimodal imaging

Taras Vasylyshyn, Veronika Huntošová,* Vitalii Patsula, Sona Olejárová, Cyril Slabý, Zuzana Jurašková, Gregor Bánó, Jana Kubacková, Miroslav Šlouf, Oleksandr Shapoval and Daniel Horák*

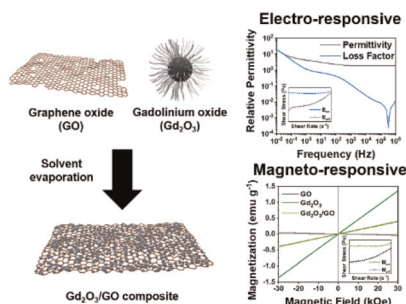
5858



Laser-assisted thermoelectric-enhanced hydrogen peroxide biosensors based on Ag_2Se nanofilms for sensitive detection of bacterial pathogens

Huangshui Ma, Shiyu Pu, Shiyu Jia, Shengduo Xu, Qiwei Yu, Lei Yang,* Hao Wu* and Qiang Sun*

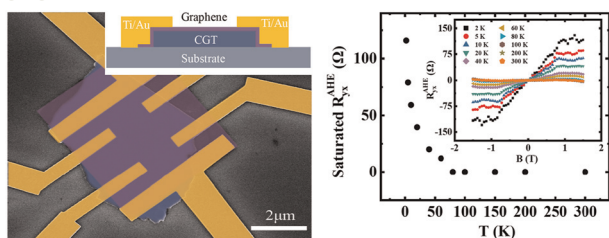
5869



Gadolinium oxide-decorated graphene oxide-based dual-stimuli-responsive smart fluids

Hyukjoon Gwon, Hamin Kim and Seungae Lee*

5878



Observation of the anomalous Hall effect in proximity coupled $\text{Cr}_2\text{Ge}_2\text{Te}_6$ /graphene heterostructures

S. Yao, L. H. Ye, C. Liu, Z. Liu, N. Kang, H. Q. Xu* and J. H. Liao*

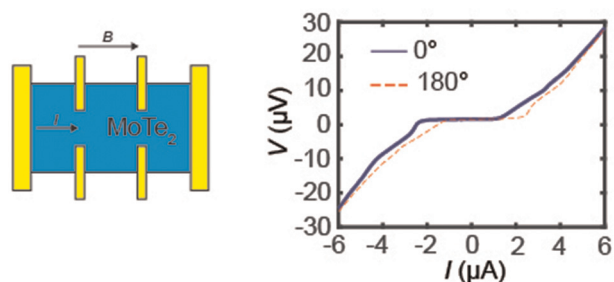


PAPERS

5888

Superconducting diode effect in the Weyl semimetal T_d - MoTe_2 that has a surface modulated by Al nanoparticles

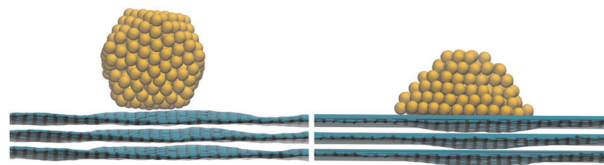
Tengfei Zhou, Wan-Shun Du, Wen-Hao Wang, Qiang Yang, Hai-Dong Miao, Yangbo Zhou, Zongteng Zhang, Yue Zhao, Hao Jia, Song Liu, Zhensheng Zhang, Tingyong Chen, Wen Huang, Jing-Jing Chen,* Zhen-Bing Tan* and Da-Peng Yu*



5895

Atomistic modelling of electron beam induced structural transformations in deposited metal clusters

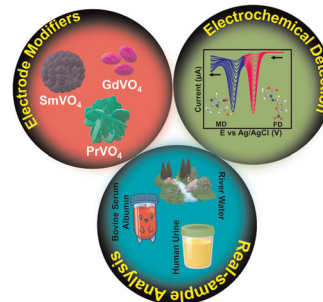
Ioannis Bounas, Alexey V. Verkhovtsev, Theodoros Pavloudis, Gennady B. Sushko, Joseph Kioseoglou, Richard E. Palmer* and Andrey V. Solov'yov



5907

Rare earth orthovanadate (REM-VO_4 ; $\text{REM} = \text{Pr, Gd, and Sm}$)-based sensors for selective and simultaneous detection of furazolidone and metronidazole

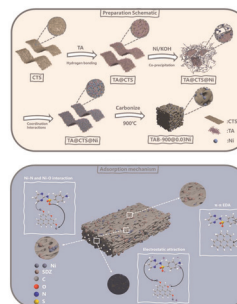
Pandiyan Bharathi and Sea-Fue Wang*



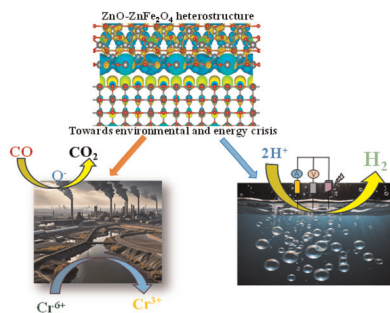
5925

Improvement of adsorption of sulfadiazine on tannic acid–chitosan biochar by nickel doping through a polyphenol metal network

Zhuo Xu, Gaosong Shao,* Zhi Liang, Dingding Jiang, Xianwei Wang, Yuhao Wen and Peiyuan Lu



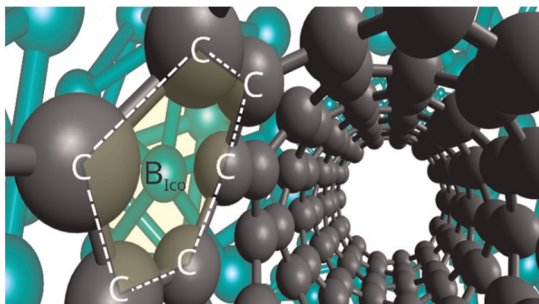
5941



Synergistic effect of ZnO–ZnFe₂O₄ heterostructures for enhanced surface catalytic activity in Cr(vi) reduction, green H₂ generation and CO sensing: an experimental study supported by DFT

Subhajit Mojumder, Tanushri Das, Sanchi Monga, Prantik Bhattacharya, Sourabh Pal, Srabanti Ghosh,* Saswata Bhattacharya* and Mrinal Pal*

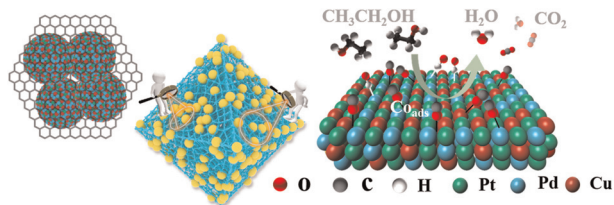
5961



Conformal chemical vapor deposition of B₄C thin films onto carbon nanotubes

Arun Haridas Choolakkal, Ingemar Persson, Jarkko Etula, Emma Salmi, Taneli Juntunen, Per O. Å. Persson, Jens Birch and Henrik Pedersen*

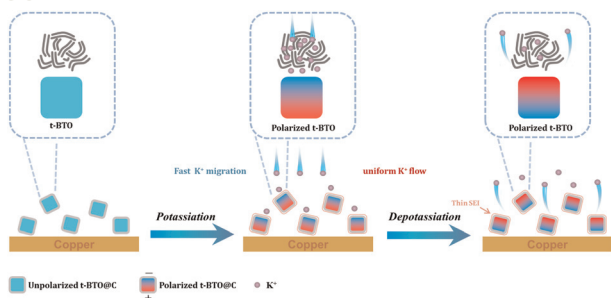
5972



Porous carbon-supported PtPdCu alloy heterostructures with a three-dimensional spatial network for efficient ethanol electro-oxidation

Guanjun Chen,* Yichu Lei, Zheming Huang, Tong Wang, Tingwei Hu,* Lan Sun* and Yongpeng Qiao

5981



Ferroelectricity enhances ion migration in hard carbon anodes for high-performance potassium ion batteries

Li Rui, An Keyu, Ouyang Hao, Li Heng,* Zhang Yanyan, Tang Yuxin, Liu Jilei and Chen Shi*

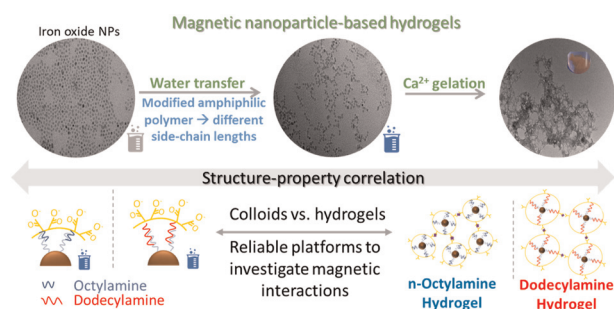


PAPERS

5993

Magnetic nanoparticle-based hydrogels as reliable platforms to investigate magnetic interactions

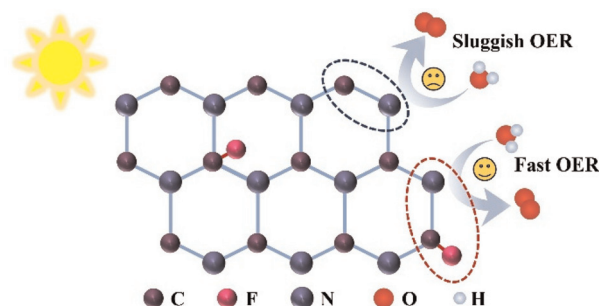
I. Morales,* A. Koch, C. Wesemann, R. T. Graf and N. C. Bigall*



6004

Enhanced directional transfer of charge carriers and optimized electronic structure in fluorine doped polymeric carbon nitride nanosheets for efficient photocatalytic water splitting

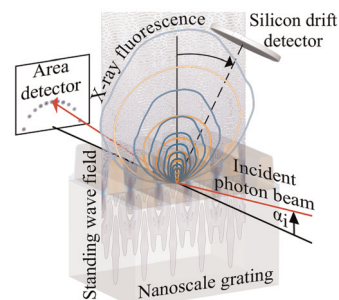
Changxue Dong, Jin Zhang, Qiuyan Chen, Hongrong Luo, Jinwei Chen* and Ruilin Wang*



6017

Hybrid approach to reconstruct nanoscale grating dimensions using scattering and fluorescence with soft X-rays

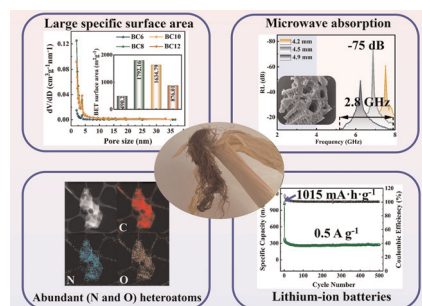
Leonhard M. Lohr,* Richard Ciesielski, Vinh-Binh Truong and Victor Soltwisch



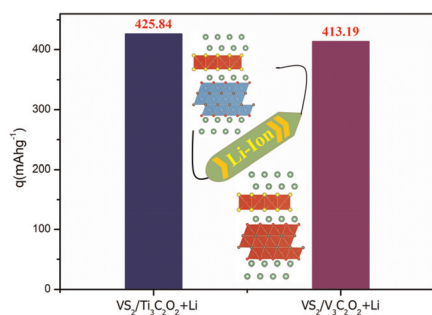
6030

Corn silk-derived biomass carbon materials for low-frequency microwave absorption and energy storage

Juan Shi, Xi Zhang,* Hongyu Zhu, Deren Li, Ya Nie, Bo Gao and Gang Xiang*



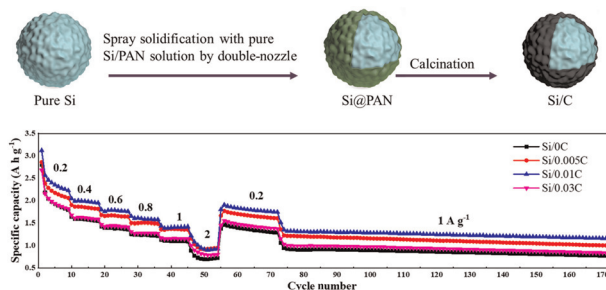
6039



Layered ion dynamics and enhanced energy storage: VS₂/MXene heterostructure anodes revolutionizing Li-ion batteries

Mahendiraprabu Ganesan and Jin Yong Lee*

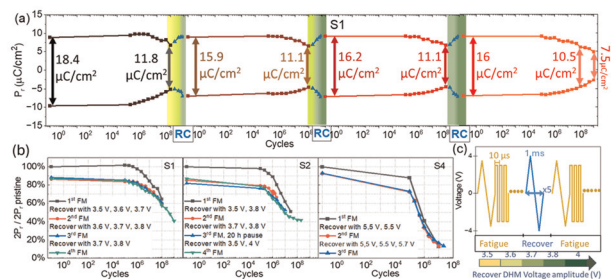
6049



Facile synthesis of Si/C composites for high-performance lithium-ion battery anodes

Jiasheng Chen, Xuanliang Wang, Zhaoping Deng, Eun Mi Kim* and Sang Mun Jeong*

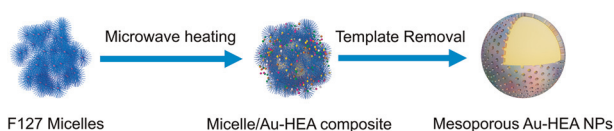
6058



Understanding fatigue and recovery mechanisms in Hf_{0.5}Zr_{0.5}O₂ capacitors for designing high endurance ferroelectric memory and neuromorphic hardware

Xinye Li, Padma Srivari, Ella Paasio and Sayani Majumdar*

6072



Microwave-assisted synthesis of mesoporous high-entropy alloy and core-shell nanoparticles

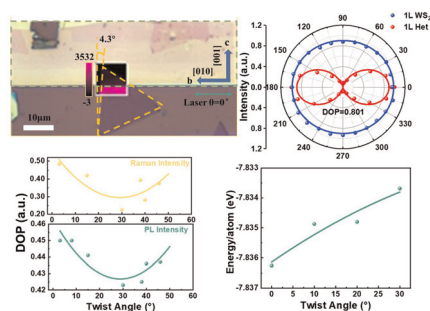
Chuyi Ni, Suni Guo, Cole Butler and Jonathan G. C. Veinot*



6079

Twist angle dependent high degree of anisotropic emission and phonon scattering in $WS_2/NbOCl_2$ heterostructures

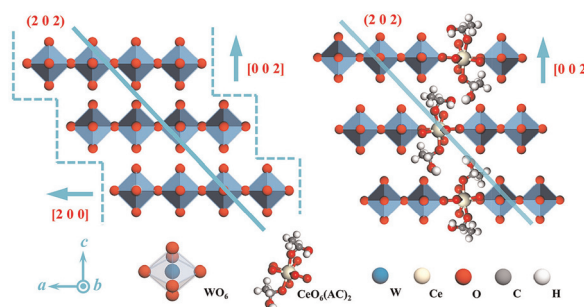
Mingyi Xu, Xinhui Yang, Xiao Guo, Jie Jiang, Shula Chen, Mengjian Zhu, Jiayu Dai, Fangyu Guo* and Xiaoming Yuan*



6090

Electrochromic thin films of tungsten oxide with high-exposure (002) crystal faces doped and modulated with cerium acetate

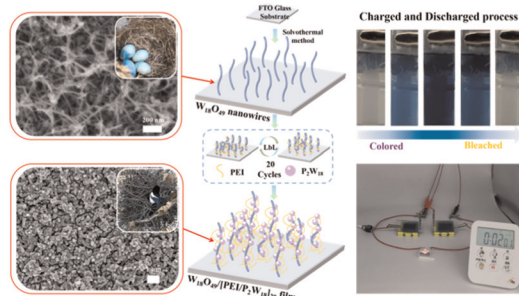
Shanshan Nie, Chengyi Wang, Miao Zhou, Yi Lian, Jie Liu, Mengnan Ruan* and Zhifeng Liu*



6103

A polyoxotungstate/ $W_{18}O_{49}$ nanocomposite with a bird-nest-like network supports high-performance electrochromic supercapacitors

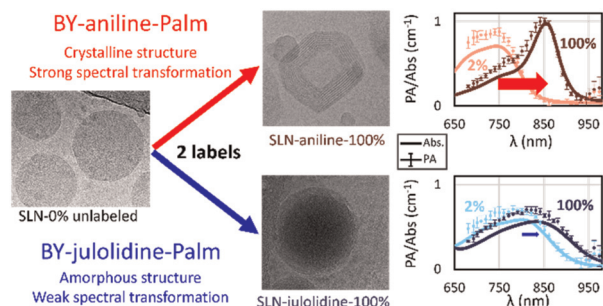
Bo Fu, Xiaoshu Qu,* Yingying Song, Fengru Li, Huiwen Shi, Yanxin Lv, Jilong Wang, Hua Jin, Xiaoyang Yu and Yanyan Yang*



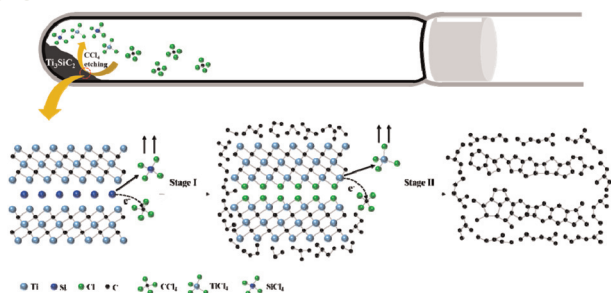
6115

Modulation of photoacoustic NIR BODIPY self-assembly in theranostic solid lipid nanoparticles via alpha-group variation: influence on spectral and nanostructural properties

Clément Linger, Frédéric Gobeaux, Mathieu Lordez, Justine Cois, Rachel Méallet, Gilles Clavier, Nicolas Tsapis* and Jérôme Gateau*



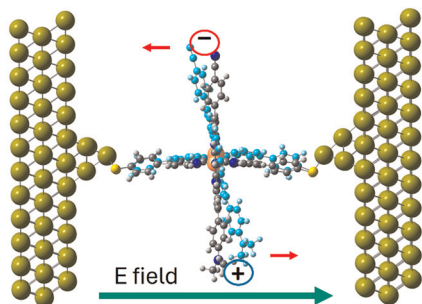
6134



Synthesis of MXene/carbon composites via controlled etching of Ti_3SiC_2 in the gaseous etchant CCl_4

Yu Wang, Xudong Wang, Mian Li, Zhifang Chai and Qing Huang*

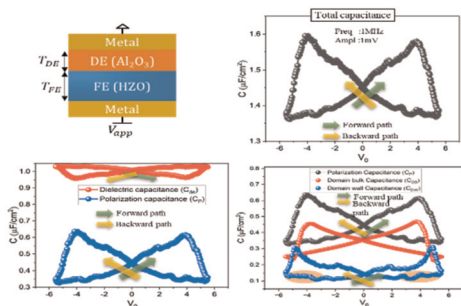
6141



Spin-state switching at the single-molecule level by distortion of the coordination sphere: validation based on quantum-chemistry calculations

Iman Jaber El Lala, Nicolas Montenegro-Pohlhammer, Rocío Sánchez-de-Armas and Carmen J. Calzado*

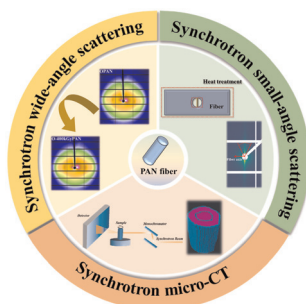
6154



Small-signal capacitance in ferroelectric hafnium zirconium oxide: mechanisms and physical insights

Revanth Koduru,* Atanu K. Saha, Martin M. Frank and Sumeet K. Gupta

6171



Heterogeneous and microporous structure evolution of heated/radiated polyacrylonitrile fibers revealed by X-ray micro-computed tomography and scattering

Yuhang Huang, Ruiqi Shao,* Feng Tian, Haiting Shi, Gaochui Wang, Wei Wang, Xiaoyuan Pei, Yanling Xue* and Zhiwei Xu*

