

## IN THIS ISSUE

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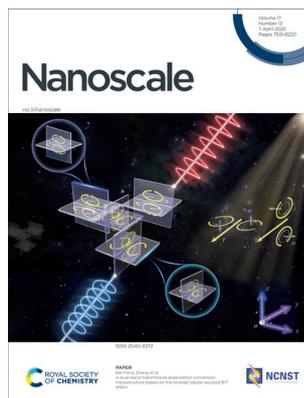


### Cover

See Miroslav Medved,  
Michal Otyepka *et al.*,  
pp. 7780–7789.

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### Inside cover

See Hai-Feng Zhang *et al.*,  
pp. 7790–7800.

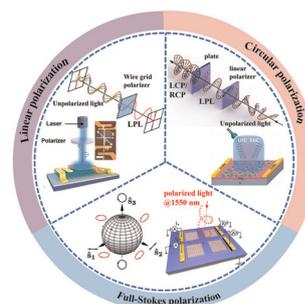
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Li Zeng, Tao Zhang, and  
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## REVIEWS

7533

### Modulation anisotropy of nanomaterials toward monolithic integrated polarization-sensitive photodetectors

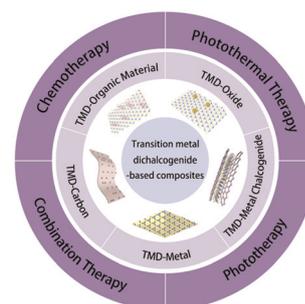
Yuan Pan, Huiru Sun, Lingxuan Ji, Xuanxuan He, Wenzhe Dong and Hongyu Chen\*



7552

### Recent progress on transition metal dichalcogenide-based composites for cancer therapy

Bo Chen,\* Yue Dai, Suxiang Yang, Chunhong Chen\* and Lianhui Wang\*



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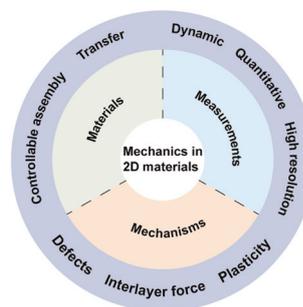
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## REVIEWS

7574

**Recent advances in the fundamentals and *in situ* characterizations for mechanics in 2D materials**

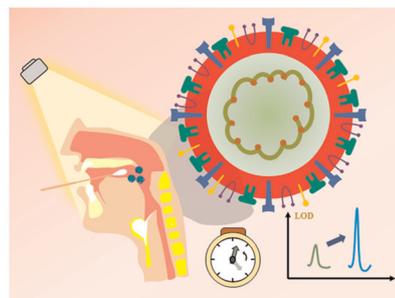
Hangkuan Ji, Zichen Song, An Wu, Yi-Chao Zou\* and Guowei Yang



7600

**Nanophotonic biosensors for COVID-19 detection: advances in mechanisms, methods, and design**

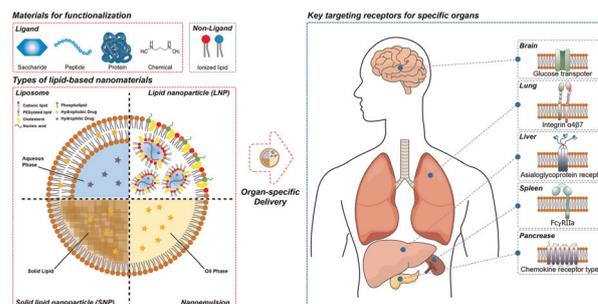
Jiawei Li, Linyan Zhou, Yabin Hao\* and Chenyang Xing\*



7617

**Recent advances in functional lipid-based nanomedicines as drug carriers for organ-specific delivery**

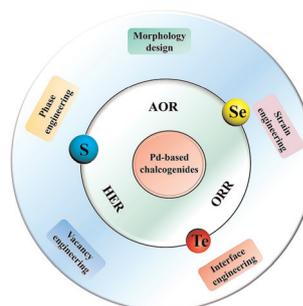
Yeochan Yun, Jeongmin An, Hyun Joong Kim, Hye Kyu Choi and Hyeon-Yeol Cho\*



7639

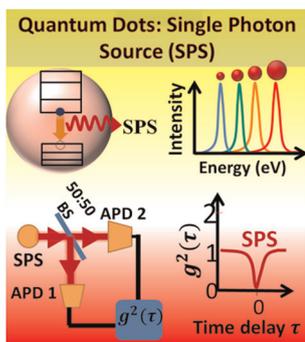
**Pd-based chalcogenides for energy conversion electrocatalysis**

Yingmei Zhou, Mi Li, Yigui Wan, Wenyi Tan,\* Zhao Li\* and Lin Tian\*



## REVIEWS

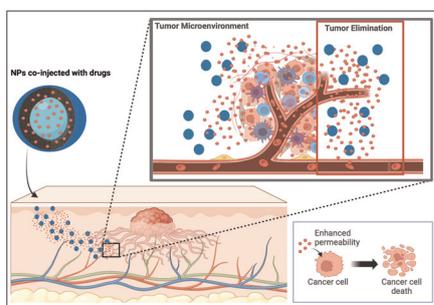
7651



### Single photon generation from quantum dots: recent advances, challenges and future directions

Dev Kumar Thapa\* and Soumava Biswas

7673



### Advanced disease therapeutics using engineered living drug delivery systems

Narsimha Mamidi,\* Fátima Franco De Silva and Amin Orash Mahmoudsalehi

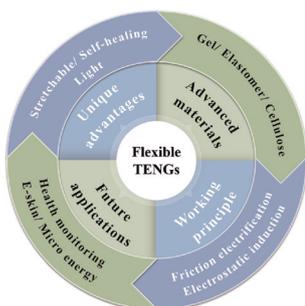
7697



### Recent advances in MXene nanozyme-based optical and electrochemical biosensors for food safety analysis

Chou-Yi Hsu, Nusiba M. M. Alshik,\* Irfan Ahmad, Subasini Uthirapathy, Suhas Ballal, Abhayveer Singh, Suman Saini and Kamal Kant Joshi

7713



### Advanced flexible self-healing triboelectric nanogenerators for applications in complex environments

Dinglong Xu, Zhaoyang Jing, Hong Wang,\* Weijun Yang, Pengwu Xu, Deyu Niu and Piming Ma\*

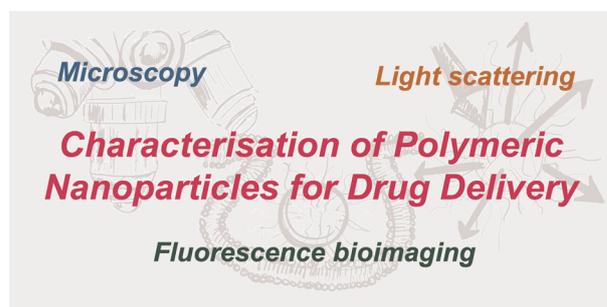


## MINIREVIEW

7738

**Characterisation of polymeric nanoparticles for drug delivery**

Thomas G. Floyd, Pratik Gurnani and Julia Y. Rho\*

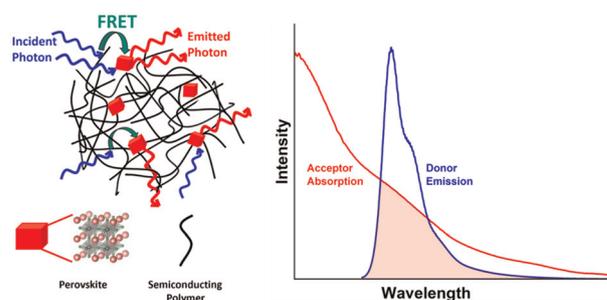


## COMMUNICATIONS

7753

**FRET-driven hybrid polymer–perovskite matrices for efficient pure-red emission**

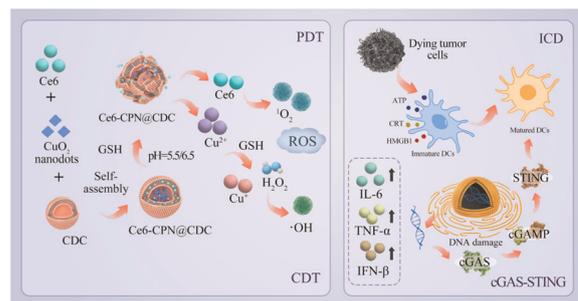
Jyoti Saxena,\* Rahul Murali, Avari Roy, Abdullah A. Al-Kahtani, Venugopal Rao Soma, Sai Santosh Kumar Raavi and Aditya Sadhanala\*



7760

**H<sub>2</sub>O<sub>2</sub> self-supplying nanoparticles for chemodynamic and synergistic photodynamic therapy to augment cGAS/STING activation**

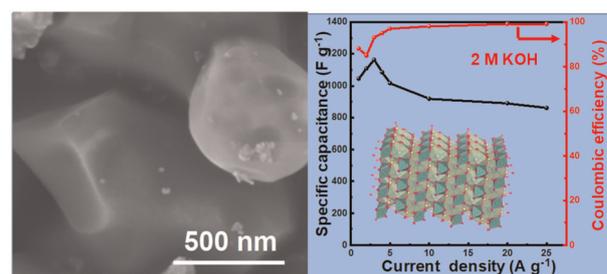
Ai-Hong Zhang, Wei-Chuang Kong, Xiao-Lei Zhang, Ya-Li Meng, Zhen-Hui Xin, Xiao-Juan Jia, Xu-Ying Liu\* and Yan-Fei Kang\*



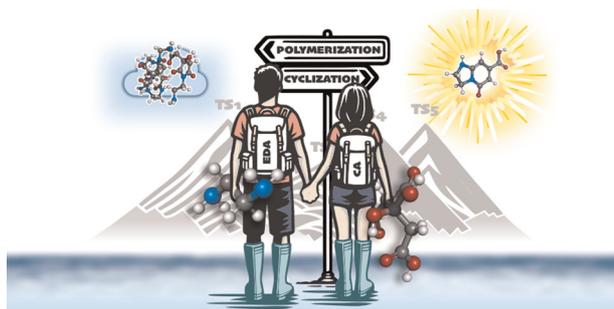
7772

**Single-crystal sodium nickel phosphate nanoparticles as supercapacitor cathodes with ultra-high capacitance and rate-performance**

Ning Wang, Zhijie Zhang, Jixian Ma, Jie Sun, Xuexia He, Zhibin Lei, Zong-huai Liu and Qi Li\*



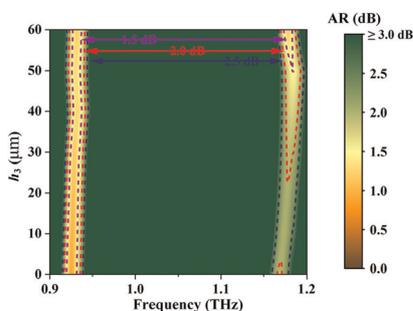
7780



### Thermodynamics and kinetics of early stages of carbon dot formation: a case of citric acid and ethylenediamine reaction

Martin Pykal, Jela Nociarová, David Řeha, Juraj Filo, Marek Šebela, Petr Zajíček, Markéta Paloncýová, Chiara Olla, Francesca Mocci, Antonio Cappai, Carlo Maria Carbonaro, Zdeněk Baďura, Lukáš Zdražil, Radek Zbořil, Andrey L. Rogach, Miroslav Medved\* and Michal Otyepka\*

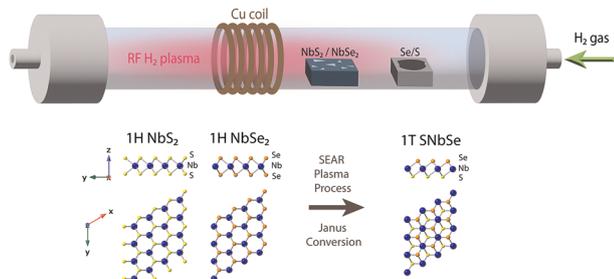
7790



### A dual-band transmissive polarization conversion metastructure based on the toroidal dipole-assisted EIT effect

Li Zeng, Tao Zhang and Hai-Feng Zhang\*

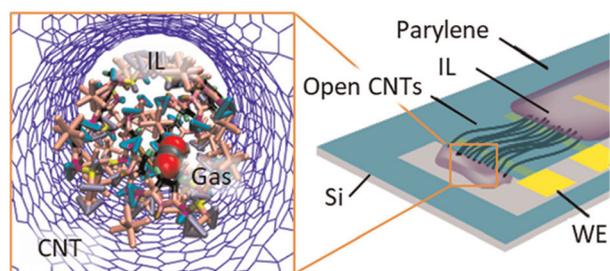
7801



### Metallic 2D Janus SNbSe layers driven by a structural phase change

Cheng-Lun Wu, Mohammad Y. Sayyad, Renee E. Sailus, Dibyendu Dey, Jing Xie, Patrick Hays, Jan Kopaczek, Yunbo Ou, Sandhya Susarla, Ivan S. Esqueda, Antia S. Botana and Seth A. Tongay\*

7813



### Mechanisms and effects of gas intercalation into ionic liquids confined within charged nanoscale volumes

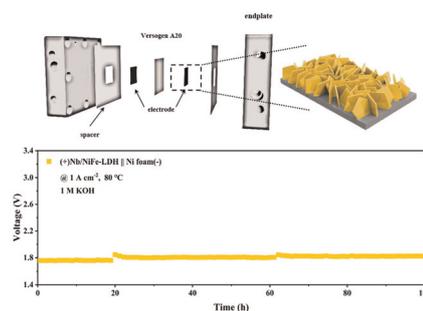
Fikret Aydin, Alex Abelson, Stephen E. Weitzner, Francesco Fornasiero, Tuan Anh Pham, Eric R. Meshot and Steven F. Buchsbaum\*



7825

### Formation of electron-deficient Ni in a Nb/NiFe-layered double hydroxide nanoarray via electrochemical activation for efficient water oxidation

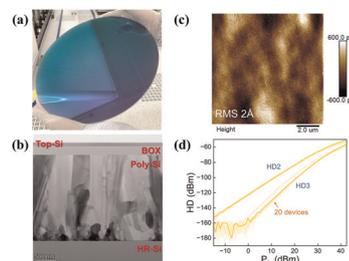
Boyu Ding, Zheheng Jiang, Xinlong Guo, Shukai Wen, Kairui Wang, Shihang Li, Yongqiang Yang, Qihao Sha, Bo Li, Liang Luo, Zhaowang Dan,\* Yaping Li\* and Xiaoming Sun\*



7830

### Demonstration of 300 mm RF-SOI wafers fabricated by layer transfer technology

Rongwang Dai, Jingjun Ding, Chenyu Shi, Han Zhong, Yun Liu, Zhongying Xue and Xing Wei\*

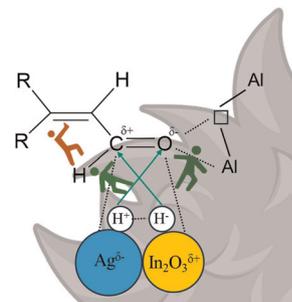


(a) Photograph of a self-developed 300 mm RF-SOI wafer; (b) Cross-section TEM image of the RF-SOI wafer; (c) AFM images of RF-SOI surface after non-contact smoothing; (d) Harmonic distortion of RF-SOI substrate.

7837

### Fluffy mesoporous Al<sub>2</sub>O<sub>3</sub> supported Ag–In<sub>2</sub>O<sub>3</sub> schottky junction catalysts for selective hydrogenation of C=O of $\alpha,\beta$ -unsaturated aldehydes

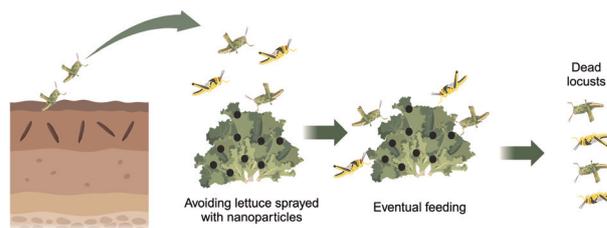
Jiasheng Wang,\* Tianyu Zhang, Jiliang Song, Fengxin Zhang, Hong Liu, Wan-Hui Wang and Ming Bao\*



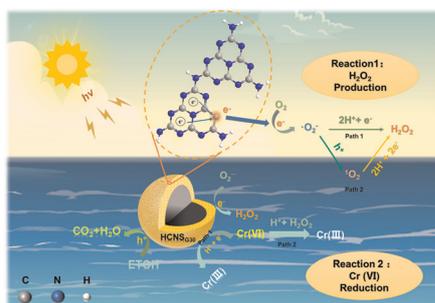
7844

### Nanoparticles alter locust development and behaviour

Preetam Kumar Sharma, Liya Wei, Atul Thakur, Jialing Pan, Chang Chen, Navneet Sooin, Le Kang\* and Nikhil Bhalla\*



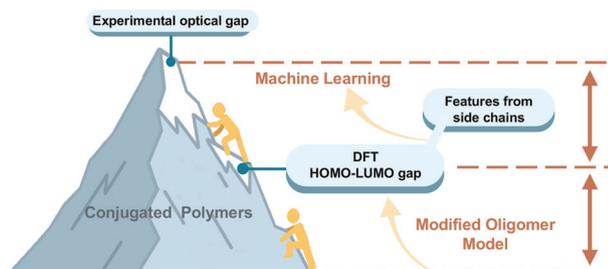
7856



### Rational synthesis of carbon-rich hollow carbon nitride spheres for photocatalytic H<sub>2</sub>O<sub>2</sub> production and Cr(VI) reduction

Yong Hu, Zhenchun Yang, Dandan Zheng,\*  
Wandong Xing\* and Guigang Zhang\*

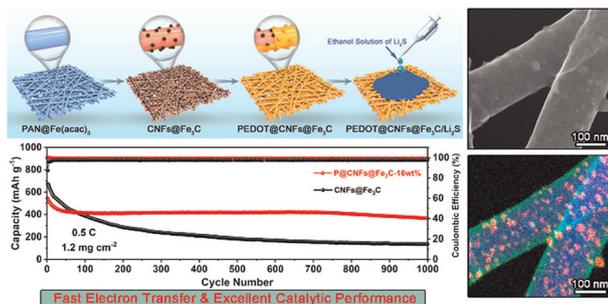
7865



### Harnessing DFT and machine learning for accurate optical gap prediction in conjugated polymers

Bin Liu, Yunrui Yan and Mingjie Liu\*

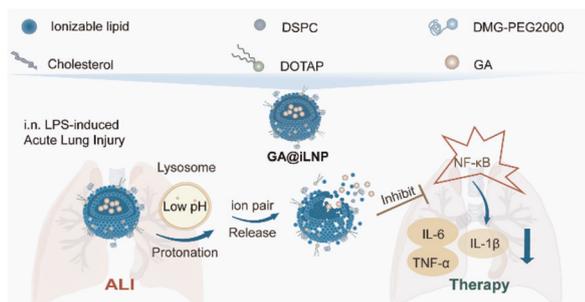
7877



### Self-supporting poly(3,4-ethylenedioxythiophene) and Fe<sub>3</sub>C Co-decorated electrospun carbon nanofibers as Li<sub>2</sub>S supporters for lithium–sulfur batteries

Na Yang, Jiarui Xue, Yuanxiao Ji, Jiyuan Zhang,  
Weiye Zhang, Xuexia He, Qi Li, Zhibin Lei,\* Zonghuai Liu  
and Jie Sun\*

7888



### Ionizable lipid nanoparticles enhance lung delivery of gold nanoclusters for improving acute lung injury alleviation

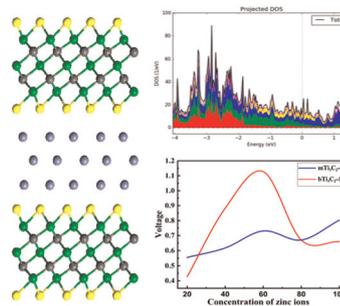
Yongning Bian, Yanggege Li, Dongfang Xia,  
Yuanyu Huang, Xueyun Gao, Dongdong Su\* and  
Qing Yuan\*



7898

### Sulphur-decorated $\text{Ti}_3\text{C}_2$ MXene structures as high-capacity electrode for Zn-ion batteries: a DFT study

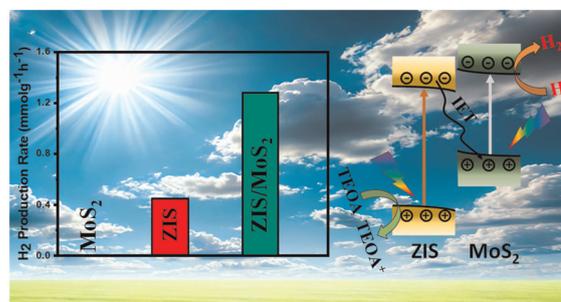
Sunita Saharan, Umesh Ghanekar and Shweta Meena\*



7908

### Ultrafast electron transfer at the $\text{ZnIn}_2\text{S}_4/\text{MoS}_2$ S-scheme interface for photocatalytic hydrogen evolution

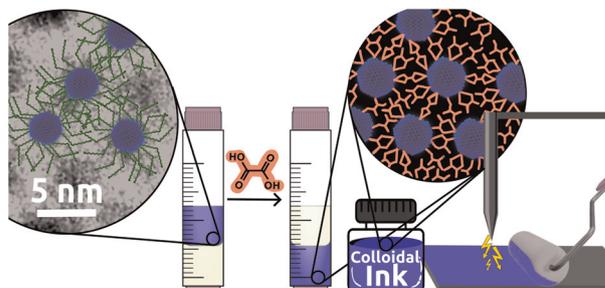
Himanshu Bhatt, Mahammed Suleman Patel, Tanmay Goswami, Dharmendra K. Yadav, Atal Swathi Patra and Hirendra N. Ghosh\*



7917

### Colloidal organometallic synthesis of solution-processable barium titanate nanoparticles for nanoelectronic applications

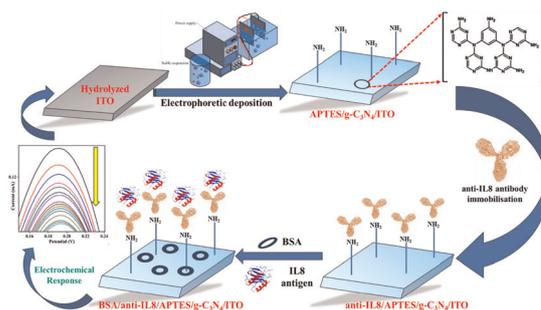
Lara Kim Linke, Katharina E. Dehm, Kirill Gubanov, Rainer H. Fink, Bartłomiej M. Szyja and Ryan W. Crisp\*



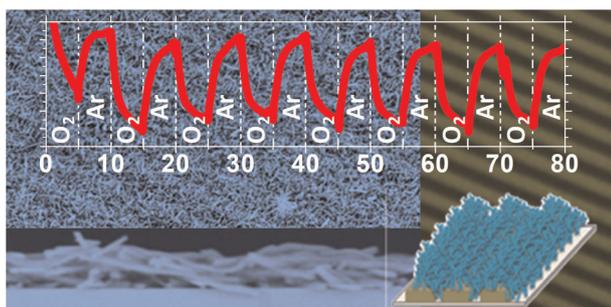
7926

### Functionalized graphitic carbon nitride as an efficient electro-analytical platform for the label-free electrochemical sensing of interleukin-8 in saliva samples

Sumit K. Yadav, Amit K. Yadav, Ajeet Kaushik and Pratima R. Solanki\*



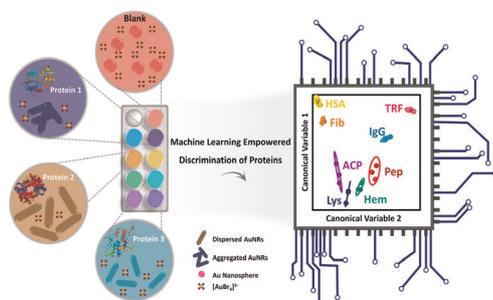
7945



### Facile integration of single-crystalline phthalocyanine nanowires and nanotrees as photo-enhanced conductometric sensors

A. Nicolás Filippin, Ángel Campos-Lendinez, Juan Delgado-Alvarez, Gloria Moreno-Martinez, Javier Castillo-Seoane, Víctor J. Rico, Vanda F. Godinho, Ángel Barranco, Juan R. Sanchez-Valencia\* and Ana Borrás\*

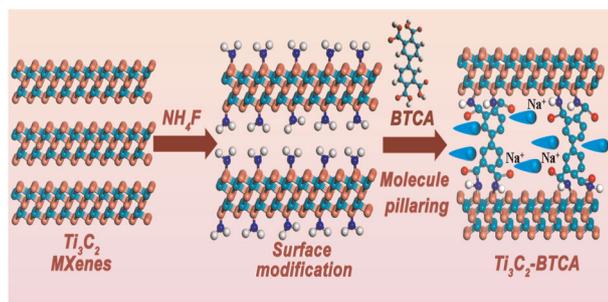
7957



### Gold nanorods as multidimensional optical nanomaterials: machine learning-enhanced quantitative fingerprinting of proteins for diagnostic applications

Afsaneh Orouji, Mahdi Ghamsari, Samira Abbasi-Moayed, Mahmood Akbari, Malik Maaza and Mohammad Reza Hormozi-Nezhad\*

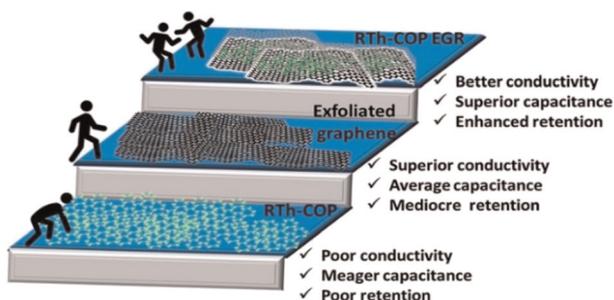
7970



### Rigid organic molecule pillared $Ti_3C_2$ towards high rate capability and fast sodium ion storage

Cai-Xia Zheng, Ai-Jun Jiao, Zhen-Hai Fu,\* Yu-Xia Hu, Min-Peng Li, Hong-Yan Li, Wei-Hai Yi, Xiao-Rui Wang, Meng-Chao Liu, Fu-Liang Zhu\* and Mao-Cheng Liu\*

7980



### Electrochemical energy storage enhanced by intermediate layer stacking of heteroatom-enriched covalent organic polymers in exfoliated graphene

Bharat Bhushan Upreti, Surajit Samui and Ramendra Sundar Dey\*

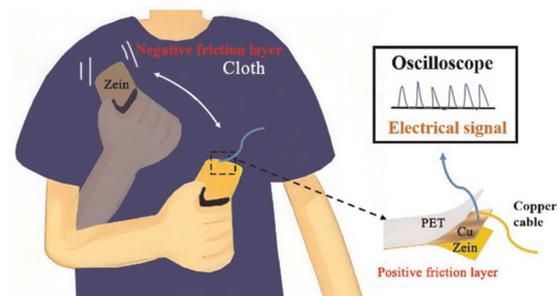


## PAPERS

7986

## Energy harvesting from clothing

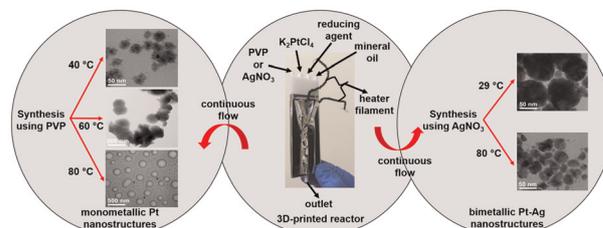
Shuting Wang, Fuqi Lu, Wenhui Guan, Zhongyuan You, Bin Liao, Meidong Huang,\* Yunliang Li,\* Weihai Fang\* and Ying Liu\*



7997

## Flow synthesis of Pt and Pt–Ag nanostructures towards hydrogen peroxide electroreduction

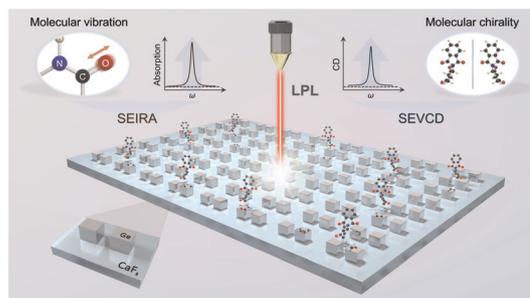
Vini Singh,\* Perali Ramu Sridhar and R. Singh



8005

## Quasi-BIC-enhanced integrated sensing dielectric metasurfaces for molecular fingerprint retrieval and chiral detection

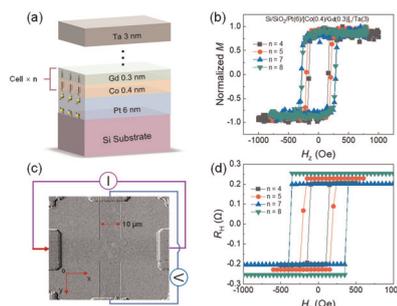
Yuhang Wei, Liming Si,\* Kunlin Han, Haoyan Xu, Xiue Bao and Weiren Zhu\*



8016

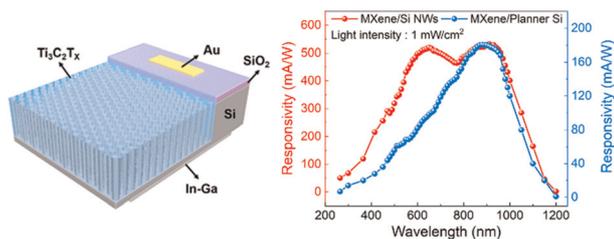
## Unraveling spin–orbit torque-induced multistate magnetization switching in Co/Gd ferrimagnetic multilayers for physically unclonable functions

Caiyun Li, Renyou Xu, Yuqi Duan, Xiuye Zhang, Daoqian Zhu,\* Ao Du, Zhiyang Peng, Shiqi Wang, Kewen Shi and Weisheng Zhao\*



## PAPERS

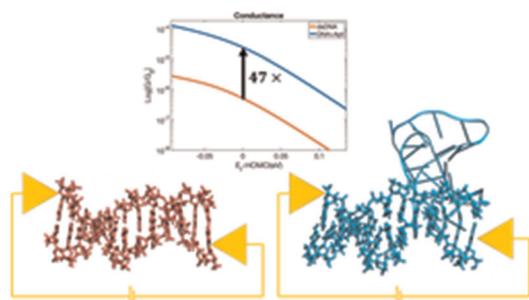
8025



### A visible light enhanced $\text{Ti}_3\text{C}_2\text{T}_x$ /silicon nanowire array heterojunction broadband photodetector based on leaky mode resonance

Jie Yu, Zhi-Yu Huang, Jin-Xulong Gao, Jiang Wang, Yi Hu, Andrew Yuxuan Liao and Feng-Xia Liang\*

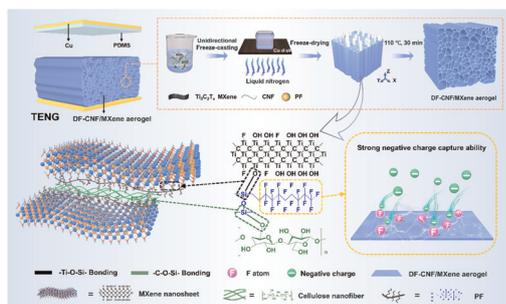
8035



### DNA conductance modulation *via* aptamer binding

Hashem Mohammad,\* Lina Alsaleh, Abrar Alotaibi, Olaiyan Alotaian, Taisei Takahashi, M. P. Anantram and Tomoaki Nishino

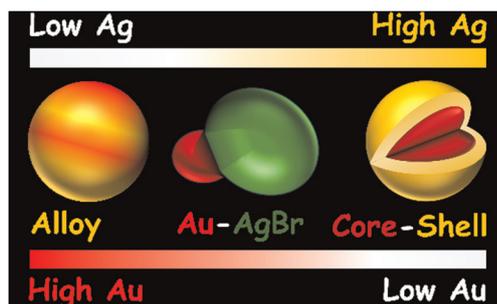
8047



### Super-elastic, hydrophobic composite aerogels for triboelectric nanogenerators

Shize Fang, Xin Xu, Yu Wei, Fangcheng Qiu, Weixin Huang, Hong Jiang, Ning Zhang, Yufeng Song,\* Meng Gao,\* Hongbin Liu, Yang Liu\* and Bowen Cheng

8057



### Ionic liquid-directed synthesis of Au–AgBr Janus nanoparticles *via* digestive ripening and solvated metal atom dispersion

Saibalendu Sarkar and Balaji R. Jagirdar\*

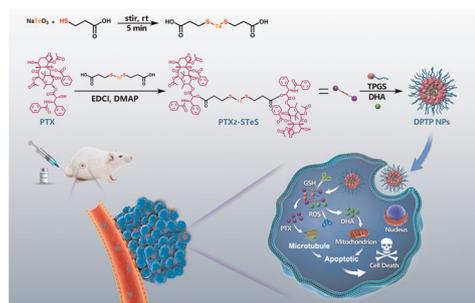


## PAPERS

8069

### Nanoassemblies of the redox paclitaxel prodrug with the natural active ingredient dihydroartemisinin for therapy of breast cancer

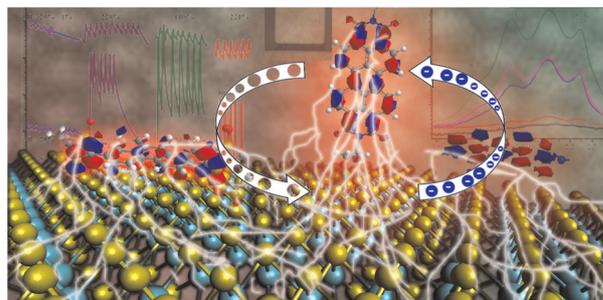
Rucheng Rui, Yi Li, Yiming Liu, Xiaocui Li, Gaochao Zhou, Chunai Zhao and Yang Han\*



8084

### Covalent functionalization of transition metal dichalcogenides with perylene for light harvesting devices

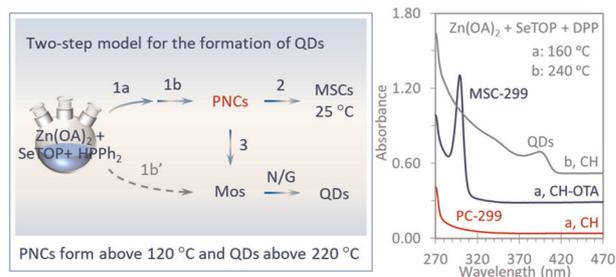
Ruben Canton-Vitoria,\* Yuki Matsunaga, Shaochun Zhang, Mengsong Xue, Minoru Osada and Ryo Kitaura



8101

### Formation of prenucleation clusters and transformation to ZnSe quantum dots and magic-size clusters

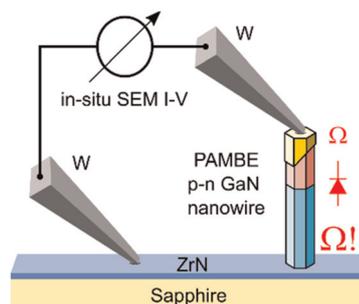
Wenting Wang, Qiu Shen, Yusha Yang, Andrei Sapelkin, Shasha Wang,\* Chaoran Luan\* and Kui Yu



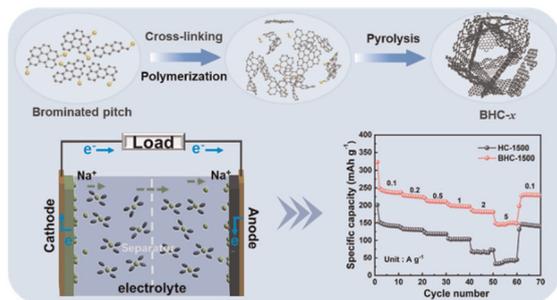
8111

### ZrN nucleation layer provides backside ohmic contact to MBE-grown GaN nanowires

Stanislav Tiagulskiy,\* Roman Yatskiv, Marta Sobanska, Karol Olszewski, Zbigniew R. Zykiewicz and Jan Grym\*



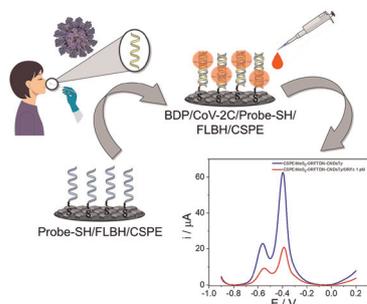
8118



### Fabrication of pitch-derived hard carbon via bromination-assisted pyrolysis strategy for sodium-ion batteries

Mengke Liu, Zhe Zhang, Xinghua Han,\* Jihao Wu and Juan Yang\*

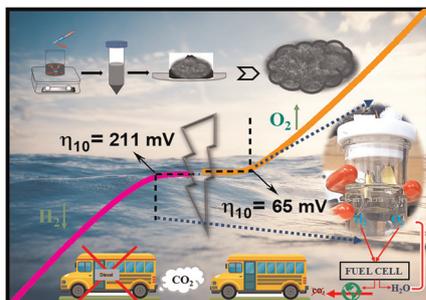
8126



### Advancing diagnostics with BODIPY-bismuthene DNA biosensors

Laura Gutiérrez-Gálvez, Estefanía Enebral-Romero, Miguel Ángel Valle Amores, Clara Pina Coronado, Iñigo Torres, David López-Diego, Mónica Luna, Alberto Fraile, Félix Zamora, José Alemán, Jesús Álvarez, María José Capitán, Encarnación Lorenzo and Tania García-Mendiola\*

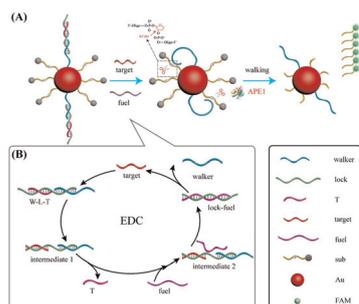
8141



### A step towards efficient water splitting: a high-performance $\text{CuCo(OH)}_2/\text{CNT}/\text{MoS}_2$ electrocatalyst

Sahana Raju, Darshan M, Bhanupriya H, Manjunatha S, Manjunath Krishnappa, Suman Kumar and Shivanna Marappa\*

8153



### A dual-switch fluorescence biosensor with an entropy-driven and DNA walker cascade amplification circuit for sensitive microRNA detection

Zikang Xie, Zhaolong Tang, Xindie Zhuang, Xinhao Li, Baozheng Wang, Hong Wang\* and Yingwei Zhang\*

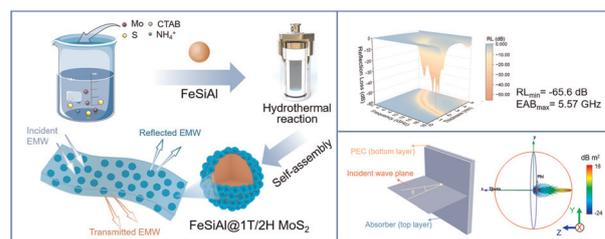


## PAPERS

8161

### Ultrathin and high-performance electromagnetic wave absorbers enabled by phase-engineered FeSiAl@1T/2H MoS<sub>2</sub> interfaces

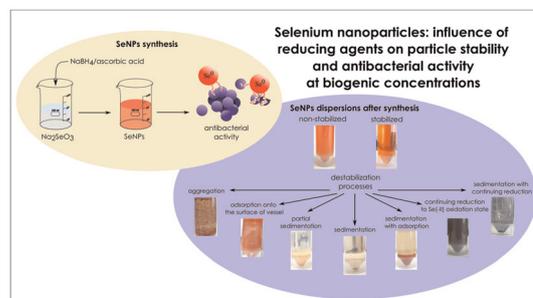
Kang Xie, Yige Han, Qin Zhang,\* Feng Chen\* and Qiang Fu



8170

### Selenium nanoparticles: influence of reducing agents on particle stability and antibacterial activity at biogenic concentrations

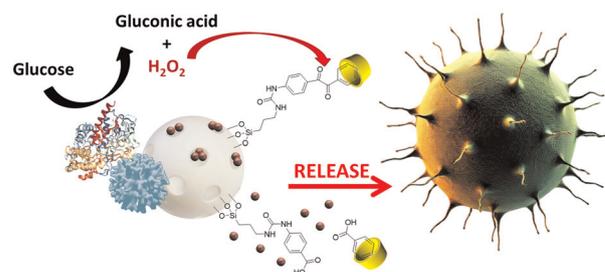
Aneta Bužková, Lucie Hochvaldová, Renata Večeřová, Tomáš Malina, Martin Petr, Josef Kašlík, Libor Kvítek, Milan Kolář, Aleš Panáček\* and Robert Prucek\*



8183

### A novel Janus nanomachine based on mesoporous silica nanoparticles anisotropically modified with PAMAM dendrimers for enzyme-controlled drug delivery

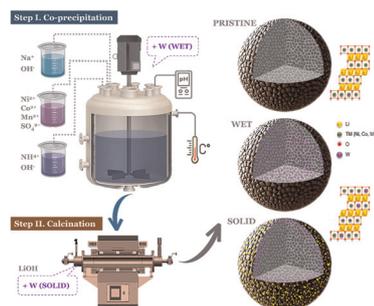
Beatriz Mayol, Esther García-Díez, Alexander Hoppe, Lucía Espejo, Miranda Muñoz, Marta González, Anabel Villalonga, Teresa Moreno, Alfredo Sánchez, Diana Vilela, Narcisa Martínez-Quiles, Paloma Martínez-Ruiz and Reynaldo Villalonga\*

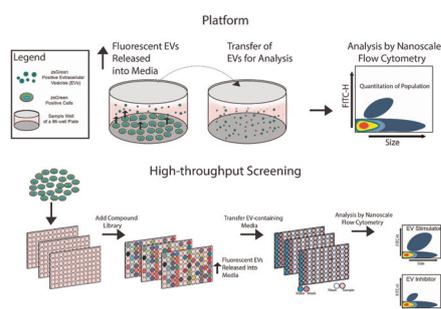


8192

### A comparative study of bulk and surface W-doped high-Ni cathode materials for lithium-ion batteries

Gulzat Nuroldayeva, Tanay Umurzak, Aziza Kireyeva, Assylzat Aishova, Orynassar Mukhan, Sung-Soo Kim, Zhumabay Bakonov\* and Nurzhan Umirov\*





## Identification of DYRK1b as a novel regulator of small extracellular vesicle release using a high throughput nanoscale flow cytometry screening platform

Sina Halvaei, Nikki Salmond and Karla C. Williams\*

