

Nano Research

March • 2020

Volume 13 · Number 3

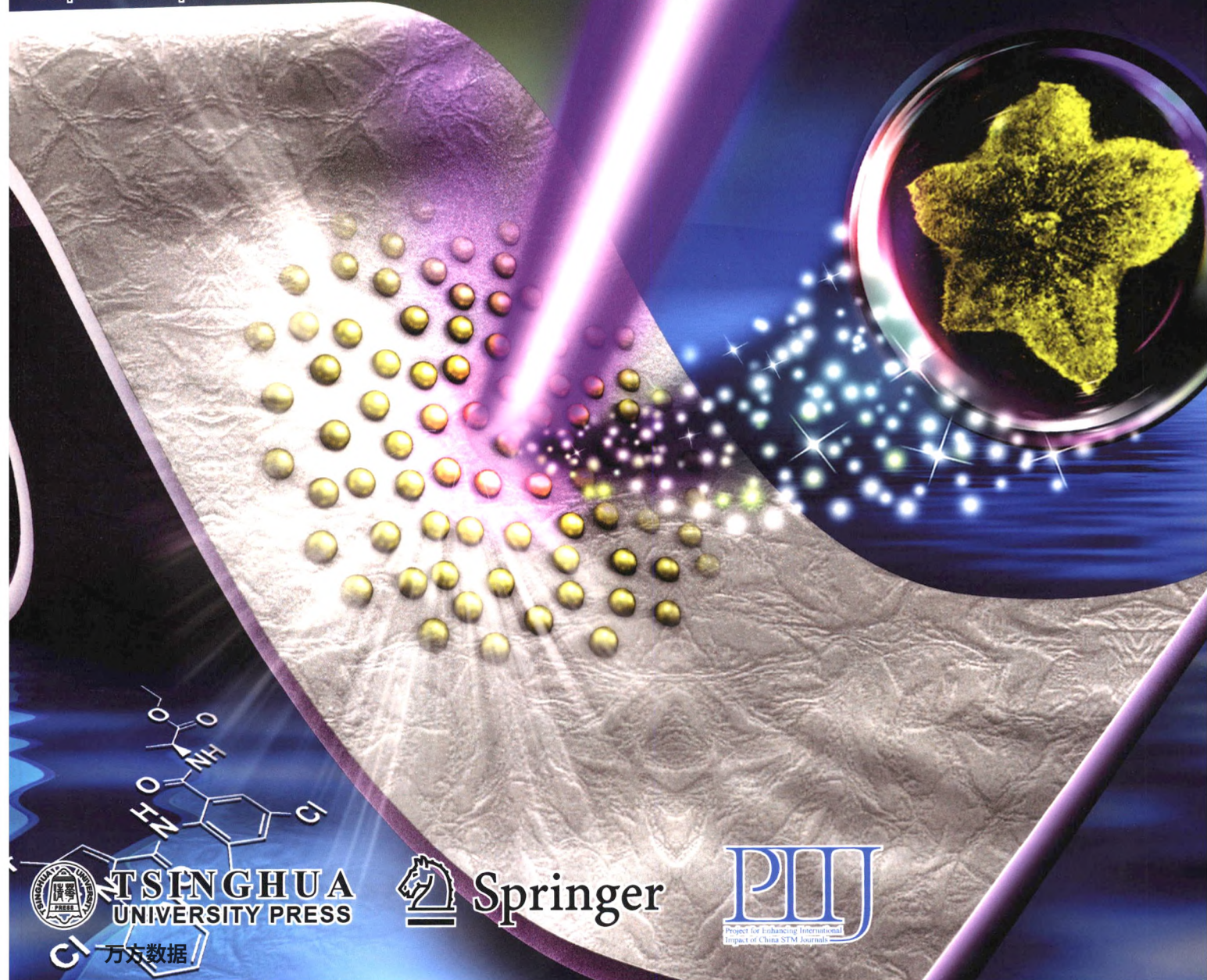


Q K 2 0 2 2 5 2 0

Removing contaminants from transferred CVD graphene

Nanoparticle-immersed paper imprinting mass spectrometry imaging reveals uptake and translocation mechanism of pesticides in plants

Shape anisotropic Fe_3O_4 nanotubes for efficient microwave absorption



TSINGHUA
UNIVERSITY PRESS



Springer

PIJ
Project for Enhancing International
Impact of China STM Journals

万方数据

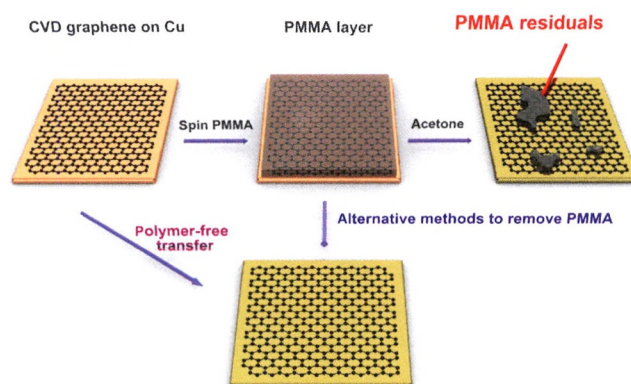
Contents

Review Article

Removing contaminants from transferred CVD graphene

Xiaojian Yang and Mingdi Yan*

University of Massachusetts Lowell, USA



Chemical vapor deposition (CVD) graphene prepared on Cu foil is frequently transferred to a different substrate by a poly(methyl methacrylate) (PMMA)-assisted transfer process which leaves polymer residuals on graphene. This review discusses ways to reduce and minimize contaminants in order to obtain clean graphene samples that are critically important for both fundamental studies and device applications.

599–610

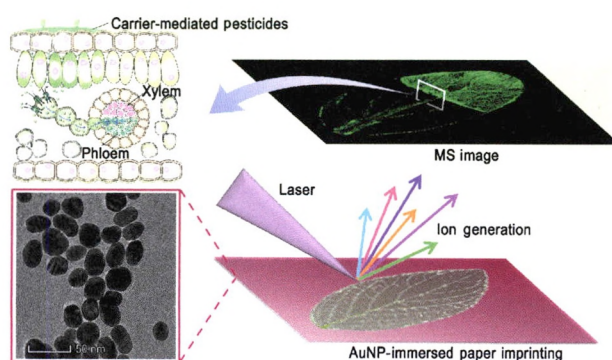
Research Articles

Nanoparticle-immersed paper imprinting mass spectrometry imaging reveals uptake and translocation mechanism of pesticides in plants

Xinzhou Wu¹, Run Qin¹, Hanxiang Wu¹, Guangkai Yao¹, Yue Zhang¹, Ping Li¹, Yizhu Xu¹, Zhixiang Zhang¹, Zhibin Yin^{2,*}, and Hanhong Xu^{1,*}

¹ South China Agricultural University, China

² Sun Yat-sen University, China



Gold nanoparticle (AuNP)-immersed paper imprinting mass spectrometry imaging (MSI) technique was developed for deciphering the elaborate plant translocation mechanism of agrochemicals for the first time, which is currently poorly understood.

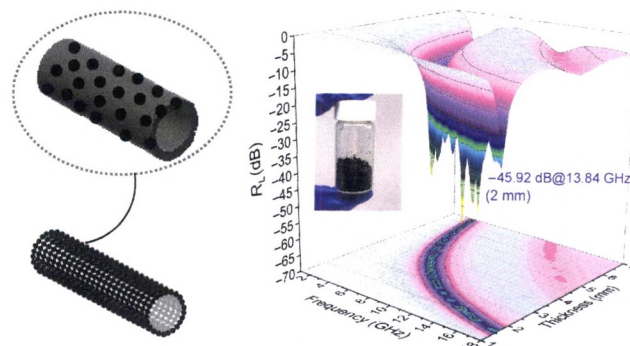
611–620

Shape anisotropic Fe₃O₄ nanotubes for efficient microwave absorption

Jialiang Pan^{1,2}, Honggui Guo², Min Wang¹, Hui Yang²,
Haowen Hu¹, Peng Liu¹, and Hongwei Zhu^{1,*}

¹ Tsinghua University, China

² The First Scientific Research Institute of Wuxi, China



The anisotropic Fe₃O₄ nanotubes with different aspect ratios are successfully prepared, which show effective microwave absorption performance for the synergetic effect of magnetic loss, dielectric loss, and impedance matching.

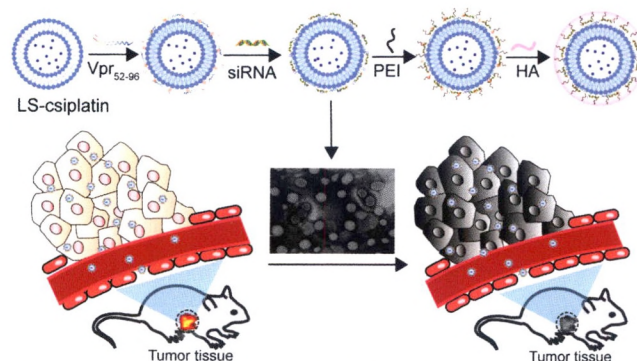
621–629

Stimuli-responsive combination therapy of cisplatin and Nrf2 siRNA for improving antitumor treatment of osteosarcoma

Ting-Ting Gu¹, Chengjun Li^{1,*}, Yurui Xu¹, Lei Zhang¹, Xue Shan¹,
Xinyu Huang¹, Leilei Guo¹, Kerong Chen¹, Xiaojian Wang²,
Haixiong Ge^{1,*}, and Xinghai Ning^{1,*}

¹ Nanjing University, China

² Nanjing Tech University, China



Hyaluronidase-responsive liposome (HLCN) has been developed for co-delivery of cisplatin and NF-E2-related factor 2 (Nrf2) siRNA (siNrf2), which can effectively decrease Nrf2 level, promote reactive oxygen species (ROS) generation, activate mitochondrial apoptotic pathway, and consequently enhance anticancer efficacy of cisplatin.

630–637

A general strategy for bimetallic Pt-based nano-branched structures as highly active and stable oxygen reduction and methanol oxidation bifunctional catalysts

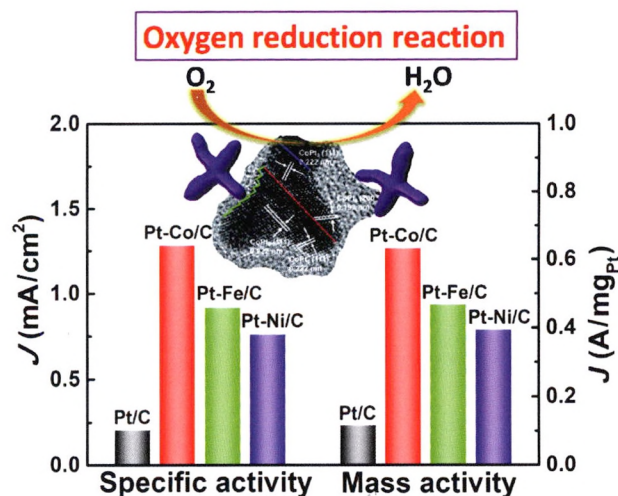
Wenjuan Lei^{1,2,4}, Menggang Li², Lin He², Xun Meng², Zijie Mu³, Yongsheng Yu^{1,2,*}, Frances M. Ross^{4,*}, and Weiwei Yang^{2,*}

¹ Jilin Normal University, China

² Harbin Institute of Technology, China

³ Northwest Normal University, China

⁴ Massachusetts Institute of Technology, USA



A general strategy was applied to prepare Pt-M bimetallic nano-branched structures with abundant step atoms, and to demonstrate their outstanding bifunctional catalytic performance in methanol fuel cells.

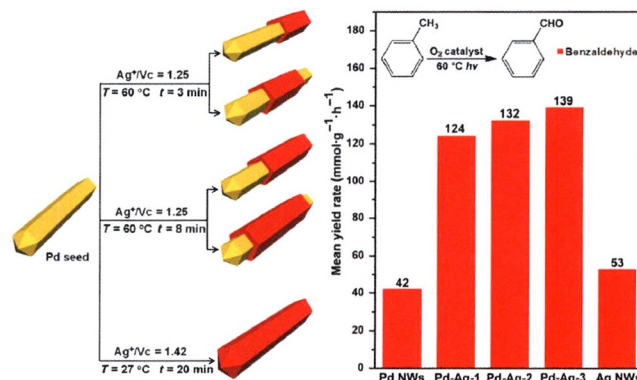
638–645

Screwdriver-like Pd-Ag heterostructures formed via selective deposition of Ag on Pd nanowires as efficient photocatalysts for solvent-free aerobic oxidation of toluene

Caihong He¹, Lingli Yu¹, Na Lu¹, Wenjing Wang¹, Wei Chen^{1,*}, Shaojie Lu¹, Yun Yang¹, Dekun Ma¹, and Shaoming Huang^{1,2,*}

¹ Wenzhou University, China

² Guangdong University of Technology, China



Screwdriver-like Pd-Ag heterostructured nanocrystals have been synthesized through the selective epitaxial overgrowth of Ag on Pd nanowires, which was realized by kinetic control. The intensified adsorption of light resulting from the interactions between Pd and Ag has prominently enhanced the photocatalytic activity of the heterostructures, which also exhibited excellent catalytic stability for reusing.

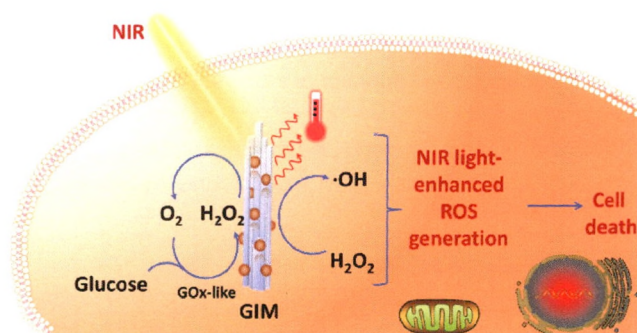
646–652

Gold nanoparticles doped metal-organic frameworks as near-infrared light-enhanced cascade nanozyme against hypoxic tumors

Xinli Liu¹, Yongchun Pan¹, Jingjing Yang¹, Yanfeng Gao¹, Ting Huang¹, Xiaowei Luan¹, Yuzhen Wang^{2,*}, and Yujun Song^{1,*}

¹ Nanjing University, China

² Nanjing Tech University, China



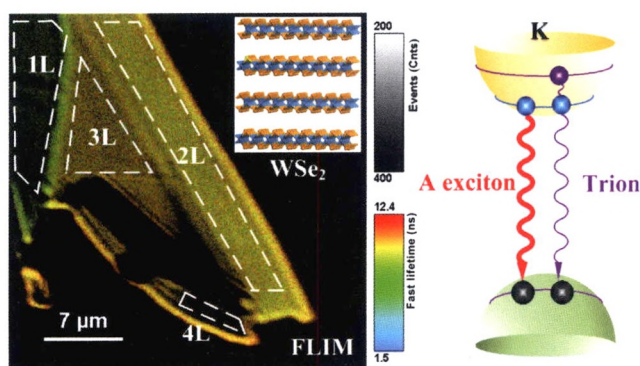
Gold nanoparticles (AuNPs) doped iron-based metal-organic framework (GIM), could protect the glucose oxidase-like activity of AuNPs with the satisfactory shield capability and displays near-infrared light-enhanced cascade nanozyme to promote reactive oxygen species generation against hypoxic tumors.

653–660

Layer-dependent signatures for exciton dynamics in monolayer and multilayer WSe₂ revealed by fluorescence lifetime imaging measurement

Yuanshuang Liu, Huanglong Li, Cuicui Qiu, Xiangmin Hu, and Dameng Liu*

Tsinghua University, China



Layer-dependent fluorescence lifetime is investigated in two-dimensional (2D) layered WSe₂. Such layer-dependent exciton dynamics signature is related to the recombination processes of neutral excitons (A excitons) and charged excitons (trions) in different number of layers.

661–666

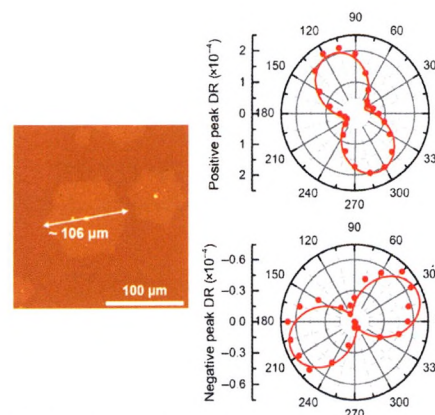
Salt-assisted growth and ultrafast photocarrier dynamics of largesized monolayer ReSe₂

Shaolong Jiang^{1,*}, Jin Yang^{2,3}, Yuping Shi¹, Jing Zhao^{2,3}, Chunyu Xie¹, Liyun Zhao¹, Jiatian Fu¹, Pengfei Yang¹, Yahuan Huan¹, Qin Xie¹, Huachao Jiang², Qing Zhang¹, Xianlong Wang², Fuhai Su^{2,*}, and Yanfeng Zhang¹

¹ Peking University, China

² Institute of Solid State Physics, Chinese Academy of Sciences, China

³ University of Science and Technology of China, China



Monolayer ReSe₂ flakes up to ~106 μm in size are synthesized on sapphire via an ambient-pressure chemical vapor deposition strategy, with the aid of Na promoter from sodium chloride. The photocarrier dynamics of bounded excitons, featuring strong anisotropy, and free electron-hole pairs in monolayer ReSe₂ are identified by combining optical pump-probe spectroscopy and time resolved terahertz spectroscopy.

667–675

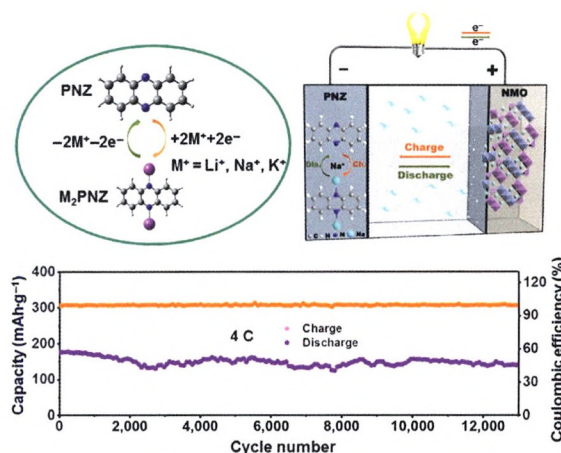
A phenazine anode for high-performance aqueous rechargeable batteries in a wide temperature range

Tianjiang Sun¹, Chang Liu¹, Jiayue Wang², Qingshun Nian¹, Yazhi Feng¹, Yan Zhang³, Zhanliang Tao^{1,*}, and Jun Chen¹

¹ Nankai University, China

² Dalian Institute of Chemical Physics (DICP), Chinese Academy of Sciences, China

³ Shandong University, China



Phenazine was first introduced into aqueous rechargeable batteries as anode material with excellent electrochemical performance and successfully used in wide temperature range.

676–683

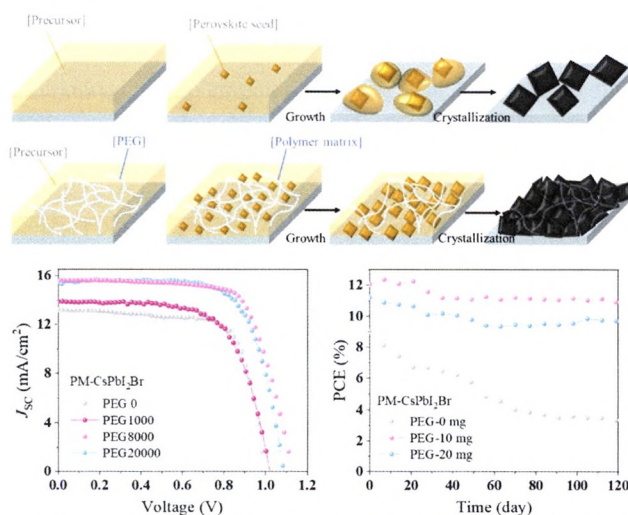
Polymer assisted deposition of high-quality CsPbI₂Br film with enhanced film thickness and stability

Jing Wei^{1,2}, Xi Wang², Xiangyu Sun², Zhaofeng Yang¹, Iwan Moreels³, Kun Xu², and Hongbo Li^{1,*}

¹ Beijing Institute of Technology, China

² Beijing University of Posts and Telecommunications, China

³ Ghent University, Belgium



The introduction of polymer during the fabrication of inorganic perovskite CsPbI₂Br film is helpful to improve the film quality in term of the uniformity, coverage, thickness and defects. Solar cells based on the polymer matrix-CsPbI₂Br films exhibit enhanced power conversion efficiency and stability.

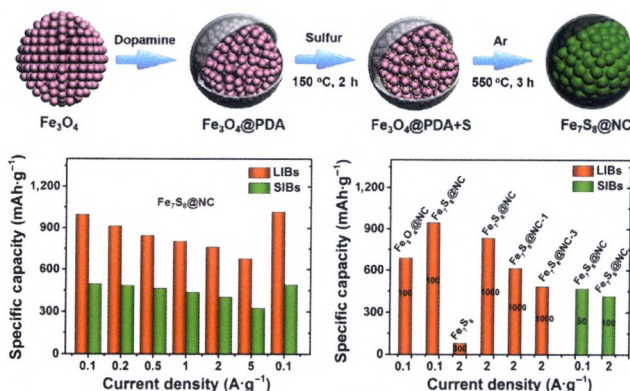
684–690

Pseudocapacitance boosted N-doped carbon coated Fe_7S_8 nano-aggregates as promising anode materials for lithium and sodium storage

Yanli Zhou¹, Ming Zhang¹, Qi Wang¹, Jian Yang², Xingyun Luo², Yanlu Li², Rong Du¹, Xinsheng Yan¹, Xueqin Sun¹, Caifu Dong¹, Xiaoyu Zhang¹, and Fuyi Jiang^{1,*}

¹ Yantai University, China

² Shandong University, China



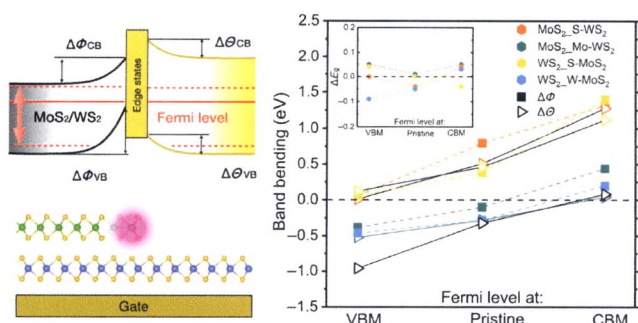
The core-shell structured N-doped carbon coated Fe_7S_8 nano-aggregates were controllably prepared via a simple three-step synthesis strategy. As anode materials for both lithium and sodium ion batteries, it exhibits excellent high rate cycling performance.

691–700

Edge induced band bending in van der Waals heterojunctions: A first principle study

Yang Ou, Zhuo Kang, Qingliang Liao, Zheng Zhang*, and Yue Zhang*

University of Science and Technology Beijing, China



Edge band bending and edge energy gap are various in p(n) doped MoS_2/WS_2 vdW heterojunctions. As Fermi level rises from conduct band minimum (CBM) to valence band maximum (VBM), metal terminated edge band bending shifts from upward to downward, but S terminated edge band bending stays upward. In addition, as the edge band bending evolves, the band gap keeps comparably stable and shows no regularity.

701–708

Effects of crystal structure on the activity of MnO_2 nanorods oxidase mimics

Yanxia Meng^{1,4}, Kunfeng Zhao^{2,3,4,*}, Zhaokun Zhang^{1,4}, Peng Gao^{5,*}, Jing Yuan³, Ting Cai³, Qin Tong³, Gang Huang⁴, and Dannong He^{2,4,*}

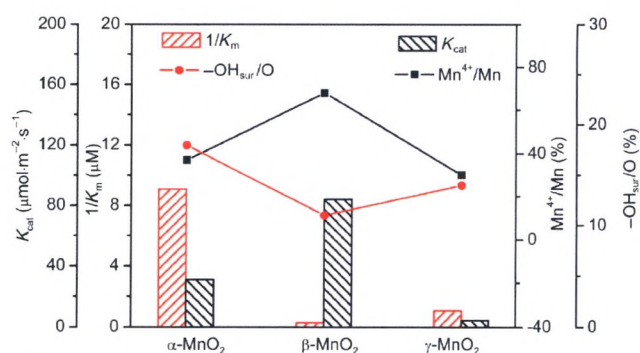
¹ University of Shanghai for Science and Technology, China

² Shanghai Jiao Tong University, China

³ National Engineering Research Center for Nanotechnology, China

⁴ Shanghai University of Medicine and Health Sciences, China

⁵ Ningbo Fundenergy Co., Ltd., China



$\beta\text{-MnO}_2$ nanorods, the most active oxidase mimic, had a catalytic constant ($83.75 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$), 2.7 and 19.0 times of those of $\alpha\text{-MnO}_2$ and $\gamma\text{-MnO}_2$ with identical morphology. The synergistic effect of appropriate amount of surface hydroxyl and Mn^{4+} significantly improved the activity of $\beta\text{-MnO}_2$ oxidase mimic.

709–718

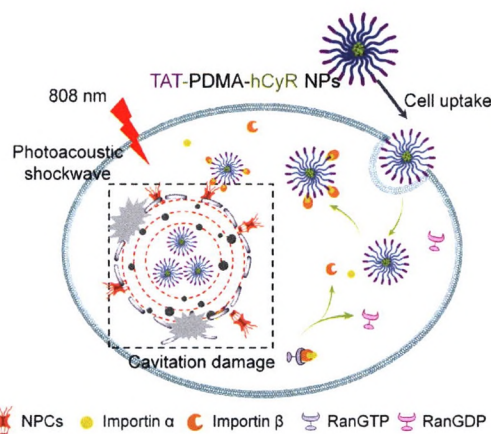
Specific photoacoustic cavitation through nucleus targeted nanoparticles for high-efficiency tumor therapy

Yuan Wang¹, Guangle Niu^{2,3}, Shadong Zhai¹, Wenjia Zhang¹, and Da Xing^{1,*}

¹ South China Normal University, China

² Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, China

³ The University of Hong Kong, Hong Kong, China



Photoacoustic cavitation of nucleus targeted nanoparticles can be used for effective tumor therapy.

719–728

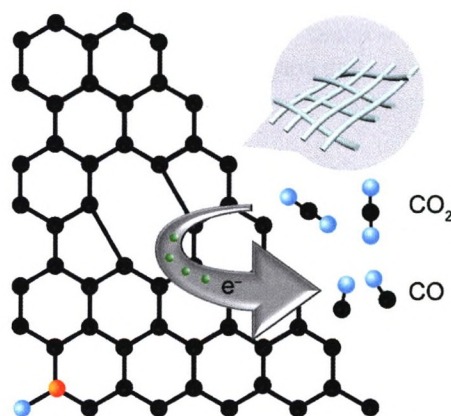
Intrinsic defects in biomass-derived carbons facilitate electroreduction of CO₂

Mengjie Chen¹, Shuai Wang¹, Haiyan Zhang¹, Ping Zhang¹, Ziqi Tian^{2,*}, Min Lu^{1,*}, Xiaoji Xie^{1,*}, Ling Huang¹, and Wei Huang^{1,3}

¹ Nanjing Tech University, China

² Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, China

³ Northwestern Polytechnical University, China



Biomass-derived carbons exhibit excellent catalytic performance towards CO₂ reduction, and the in-plane pentagon-containing defects are demonstrated to be the active site, facilitating the direct electron transfer to CO₂.

729–735

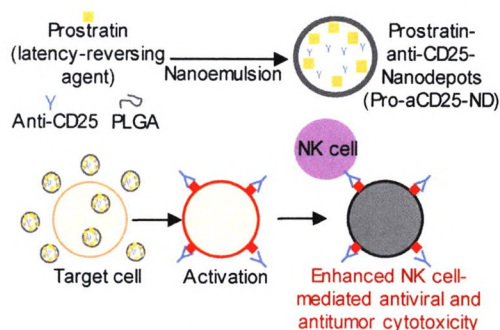
PLGA nanodepots co-encapsulating prostratin and anti-CD25 enhance primary natural killer cell antiviral and antitumor function

Elizabeth E. Sweeney¹, Preethi B. Balakrishnan¹, Allison B. Powell², Allan Bowen¹, Indra Sarabia¹, Rachel A. Burga¹, R. Brad Jones³, Alberto Bosque¹, C. Russell Y. Cruz^{1,2}, and Rohan Fernandes^{1,*}

¹ The George Washington University, USA

² Children's National Health System, USA

³ Weill Cornell Medical College, USA



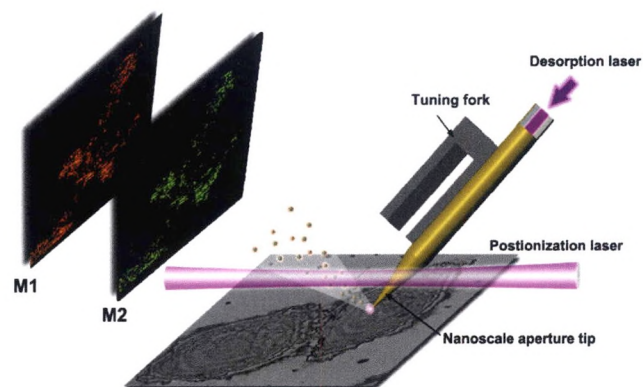
We describe the synthesis, characterization, and testing of poly (lactic-co-glycolic acid) (PLGA) nanodepots encapsulating prostratin, a latency-reversing agent, and anti-CD25 antibody (Pro-aCD25-ND). When administered to targeted cells, the co-release of prostratin and anti-CD25 from the nanodepots primes targeted cells for enhanced primary natural killer (NK) cell-mediated antiviral and antitumor cytotoxicity.

736–744

Subcellular chemical imaging of structurally similar acridine drugs by near-field laser desorption/laser postionization mass spectrometry

Xiaoling Cheng, Zhibin Yin, Liu Rong, and Wei Hang*

Xiamen University, China



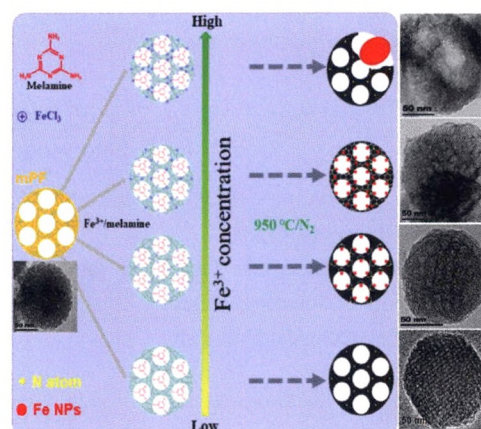
Near-field laser desorption/ionization mass spectrometry (NDPI-MS) was demonstrated for acquiring the single-cell distribution of two structurally similar acridine drugs and their phenotype changes.

745–751

Graphitizing N-doped mesoporous carbon nanospheres via facile single atom iron growth for highly efficient oxygen reduction reaction

Yunshi Xu, Liping Zhu, Xuexue Cui, Mingyu Zhao, Yaling Li, Leilei Chen, Weicun Jiang, Ting Jiang, Shuguang Yang, and Yi Wang*

Donghua University, China



Single atom iron-promoted growth of N-doped mesoporous carbon nanospheres with complete graphitization and plentiful pyridinic N/graphitic N was illuminated for oxygen reduction reaction, which expounded the unique role of iron species on the degree of graphitization and exhibited comparable catalytic activity, better durability and more excellent methanol tolerance than the state-of-the-art commercial Pt/C catalyst.

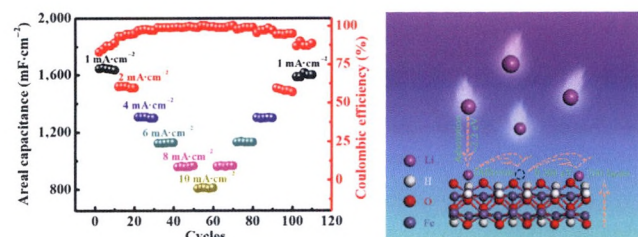
752–758

Low Li ion diffusion barrier on low-crystalline FeOOH nanosheets and high performance of energy storage

Jien Li¹, Shuang Luo¹, Congcong Wang¹, Qian Tang¹, Yanwei Wang¹, Xiangyu Han¹, Hao Ran¹, Jing Wan¹, Xiao Gu^{2,*}, Xue Wang^{1,*}, and Chenguo Hu^{1,*}

¹ Chongqing University, China

² Ningbo University, China



Low-crystalline FeOOH nanosheets anchored on activated carbon cloth present high performance of energy storage. The low Li⁺ ions diffusion potential barrier on the exposed facet of FeOOH contributes excellent pseudocapacitive performance.

759–767

Multi-shelled CuO microboxes for carbon dioxide reduction to ethylene

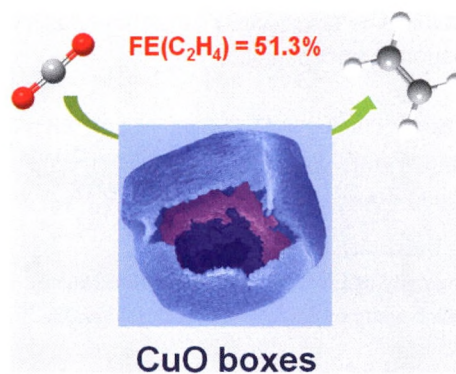
Dongxing Tan^{1,2}, Jianling Zhang^{1,2,3,*}, Lei Yao⁴, Xiuniang Tan^{1,2}, Xiuyan Cheng^{1,2}, Qiang Wan^{1,2}, Buxing Han^{1,2,3}, Lirong Zheng⁴, and Jing Zhang⁴

¹ Institute of Chemistry, Chinese Academy of Sciences, China

² University of Chinese Academy of Sciences, China

³ Huairou National Comprehensive Science Center, China

⁴ Institute of High Energy Physics, Chinese Academy of Sciences, China



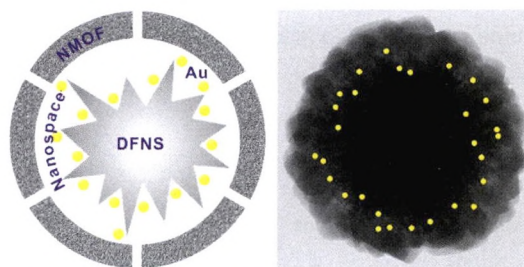
Here we demonstrate the formation of multi-shelled CuO microboxes for the efficiently and selectively convert CO₂ into C₂H₄ with a maximum faradaic efficiency of 51.3% in 0.1 M K₂SO₄.

768–774

“Nanospace engineering” by the growth of nano metal-organic framework on dendritic fibrous nanosilica (DFNS) and DFNS/gold hybrids

Ngoc Minh Tran, Soeun Jung, and Hyojong Yoo*

Hanyang University, Republic of Korea



➤ Nanospace engineering in nanohybrids ➤ Cooperative all-in-one catalysts

Advanced nanohybrids composed of dendritic fibrous nanosilica (DFNS) and DFNS/gold (DFNS/Au) hybrids as the core and zinc-based NMOF (Zn-NMOF) as the shell (DFNS@Zn-NMOF) are successfully fabricated through a solution-based approach. The combined fibrous morphology of DFNS and micropores of NMOF can be directly employed for nanospace engineering in the resulting multi-compositional and hierarchical systems in a controllable manner.

775–784

Modulation of the magnetic properties of gold-spinel ferrite heterostructured nanocrystals

Elvira Fantechi^{1,*}, Claudia Innocenti^{2,3}, Giovanni Bertoni^{4,5}, Claudio Sangregorio^{2,3}, and Francesco Pineider¹

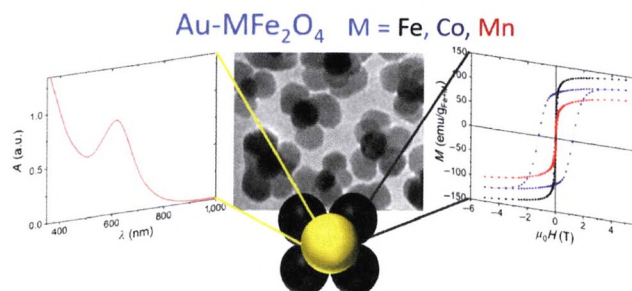
¹ University of Pisa, Italy

² Institute for the Chemistry of OrganoMetallic Compounds, Italy

³ University of Florence, Italy

⁴ Institute of Materials for Electronics and Magnetism, Italy

⁵ CNR-Istituto Nanoscienze, Italy



We present the synthesis and the structural, magnetic and optical characterization of heterostructured nanocrystals based on Au and MFe₂O₄ (M = Fe, Co, Mn). We demonstrate the possibility to tune the magnetic properties of these nanostructures while keeping an excellent plasmonic response.

785–794

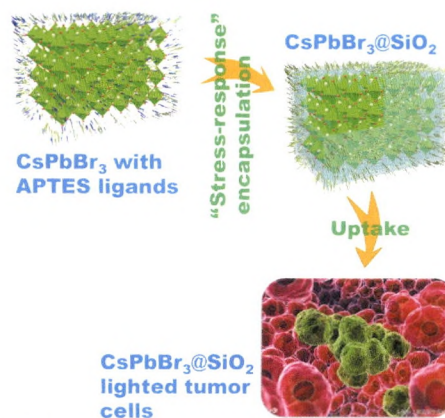
Super stable CsPbBr₃@SiO₂ tumor imaging reagent by stressresponse encapsulation

Wentao Song¹, Yiming Wang¹, Bing Wang¹, Yingfang Yao^{1,*}, Wenguang Wang¹, Jinhui Wu¹, Qing Shen², Wenjun Luo¹, and Zhigang Zou^{3,*}

¹ Nanjing University, China

² The University of Electro-Communications, Japan

³ Macau University of Science and Technology, Macau, China



A smart "stress-response" encapsulation strategy is introduced to design and fabricate tense SiO₂ nanoshells on CsPbBr₃ nanocrystal to prevent them from being corroded by water. Such structure display distinct brightness, water stability, biocompatibility, and low cytotoxicity, providing a novel way for CsPbBr₃ nanocrystals to early tumor diagnoses.

795–801

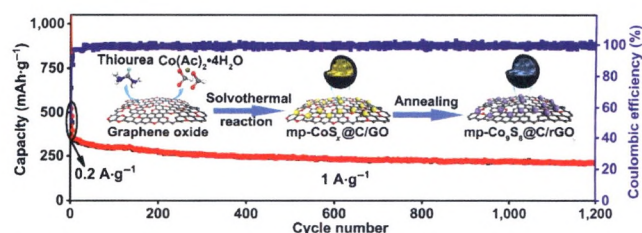
Carbon-coated mesoporous Co₉S₈ nanoparticles on reduced graphene oxide as a long-life and high-rate anode material for potassium-ion batteries

Guangyao Ma¹, Xiao Xu¹, Zhenyu Feng¹, Chenjing Hu¹, Yansong Zhu¹, Xianfeng Yang², Jian Yang^{1,*}, and Yitai Qian^{1,3}

¹ Shandong University, China

² South China University of Technology, China

³ University of Science and Technology of China, China



Carbon-coated mesoporous Co₉S₈ nanoparticles supported on reduced graphene oxide is successfully synthesized. This composite exhibits the high rate capability and the long cycle life for K storage.

802–809

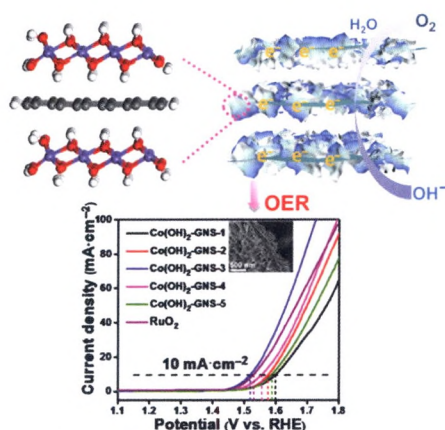
Self-transforming ultrathin α-Co(OH)₂ nanosheet arrays from metal-organic framework modified graphene oxide with sandwich-like structure for efficient electrocatalytic oxygen evolution

Mengqiu Huang¹, Weiwei Liu^{2,†}, Lei Wang¹, Jiwei Liu¹, Guanyu Chen¹, Wenbin You¹, Jie Zhang¹, Lijun Yuan², Xuefeng Zhang², and Renchao Che^{1,*}

¹ Fudan University, China

² Hangzhou Dianzi University, China

[†] Present address: Fudan University, China



Metal-organic framework derived ultrathin α-Co(OH)₂ nanosheet arrays electrocatalyst is prepared on graphene oxide support via on-site transformation method. The sandwich-like structure endows the composites with efficient electrochemical oxygen evolution reaction performance and excellent stability.

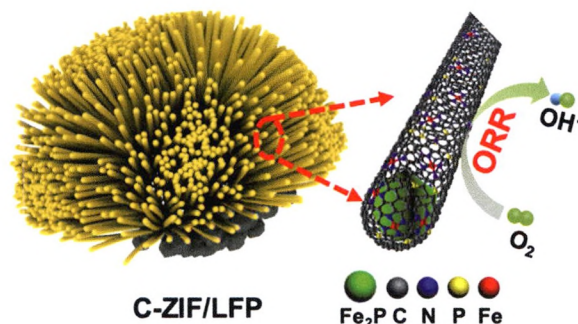
810–817

ZIF-8/LiFePO₄ derived Fe-N-P Co-doped carbon nanotube encapsulated Fe₂P nanoparticles for efficient oxygen reduction and Zn-air batteries

Huihui Jin¹, Huang Zhou¹, Pengxia Ji¹, Chengtian Zhang¹, Jiahuan Luo^{1,2}, Weihao Zeng¹, Chenxi Hu¹, Daping He^{1,*}, and Shichun Mu^{1,*}

¹ Wuhan University of Technology, China

² Anyang Institute of Technology, China



LiFePO₄ as iron and phosphorus sources reacting with ZIF-8 can produce an excellent catalyst (C-ZIF/LFP) for oxygen reduction reaction (ORR) and Zn-air batteries, thus we put forward a new direction to recycle the waste LiFePO₄ material in lithium ion batteries in the future.

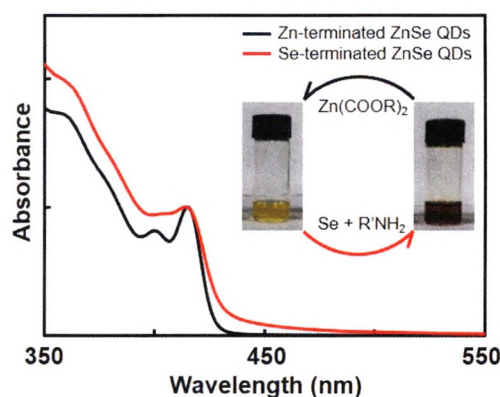
818–823

Surface and intrinsic contributions to extinction properties of ZnSe quantum dots

Shangxin Lin^{1,2}, Jiongzhao Li², Chaodan Pu², Hairui Lei², Meiye Zhu², Haiyan Qin², and Xiaogang Peng^{2,*}

¹ Huaqiao University, China

² Zhejiang University, China



Smearred and low-energy tail absorption spectrum is found in Se-terminated ZnSe quantum dots (QDs).

824–831

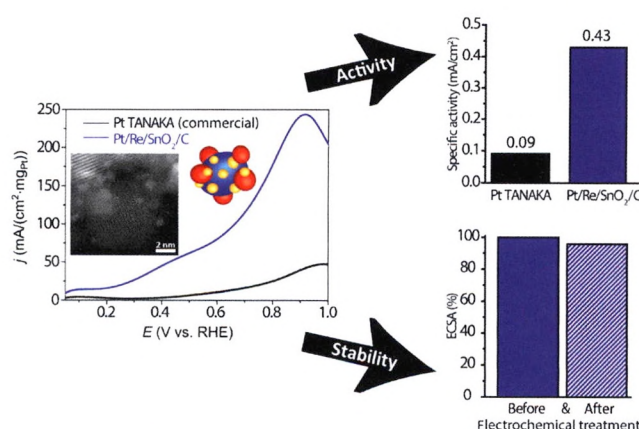
Ternary Pt/Re/SnO₂/C catalyst for EOR: Electrocatalytic activity and durability enhancement

El bieta Drzymala^{1,*}, Grzegorz Gruzel¹, Joanna Depciuch¹, Mirosława Pawlyta², Mikołaj Donten³, and Magdalena Parlinska-Wojtan¹

¹ Institute of Nuclear Physics Polish Academy of Sciences, Poland

² Silesian University of Technology, Poland

³ University of Warsaw, Poland



Ternary Pt/Re/SnO₂/C catalyst synthesized in this paper shows great electrocatalytic activity towards ethanol oxidation. In comparison to commercially available platinum catalyst, it reaches nearly 11 times higher current densities and a definitely better durability.

832–842

Tailoring molecular island shapes: Influence of microscopic interaction on mesostructure

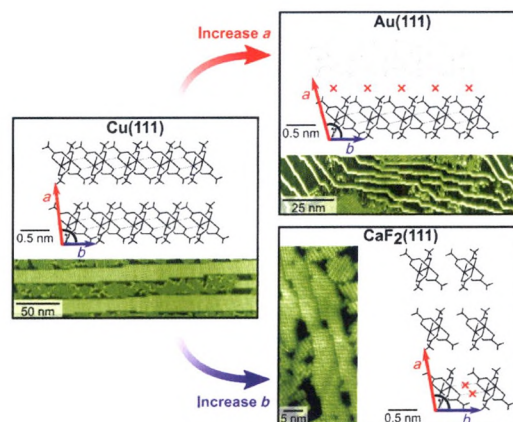
Simon Aeschlimann^{1,2}, Lu Lyu³, Benjamin Stadtmüller^{2,3}, Martin Aeschlimann^{2,3}, and Angelika Kühnle^{4,*}

¹ Johannes Gutenberg University Mainz, Germany

² Graduate School Materials Science in Mainz, Germany

³ University of Kaiserslautern, Germany

⁴ Bielefeld University, Germany



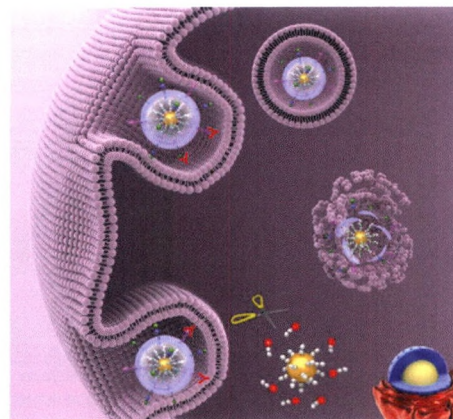
In this work, we present how to tailor the mesoscopic island shape of self-assembled adsorbates by rationally changing the substrates lattice constant. We illustrate this approach by high-resolution scanning probe measurements of dimolybdenum tetraacetate adsorbed on several prototypical surfaces, namely Cu(111), Au(111), and CaF₂(111).

843–852

Direct cytoplasm delivery of gold nanoparticles for real-time apoptosis detection

Qiang Li, Fengchao Wang, Jie Yang*, and Dingbin Liu*

Nankai University, China



A multifunctional nanogel was designed to directly deliver gold nanoparticle (AuNP) probes into the cytoplasm of target cells. The fast endo/lysosomal-escape effect prevents the AuNP@gel probe from being trapped in the lysosomes, which enhances their intracellular stability for the real-time and high-fidelity imaging of apoptosis in living cells.

853–860

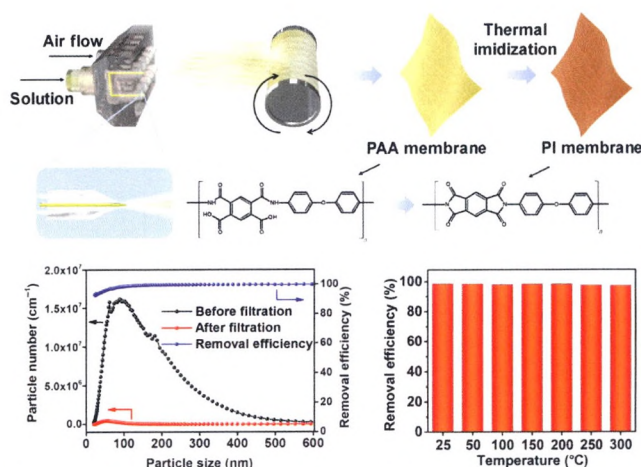
Large-scale blow spinning of heat-resistant nanofibrous air filters

Ziwei Li¹, Jianan Song¹, Yuanzheng Long¹, Chao Jia¹, Zhenglian Liu², Lei Li¹, Cheng Yang¹, Junchen Liu³, Sen Lin³, Haiyang Wang¹, Yibo Liu¹, Minghao Fang², and Hui Wu^{1,*}

¹ Tsinghua University, China

² China University of Geosciences, China

³ Beijing University of Posts and Telecommunications, China



Heat-resistant polyimide nanofibrous air filters are fabricated via a simple and scalable solution blow-spinning method. The air filters exhibit high filtration efficiency at both room and high temperatures, showing great promise in high temperature air filtration fields.

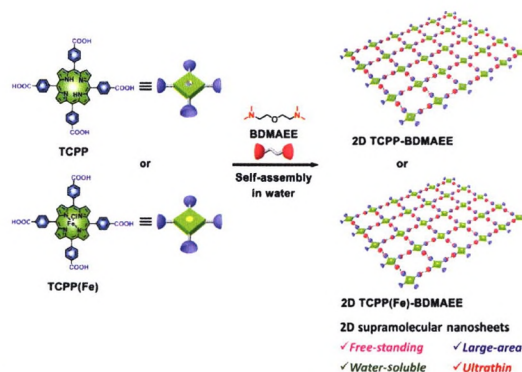
861–867

Facile synthesis of large-area ultrathin two-dimensional supramolecular nanosheets in water

Bojian Hu¹ and Peiyi Wu^{1,2,*}

¹ Fudan University, China

² Donghua University, China



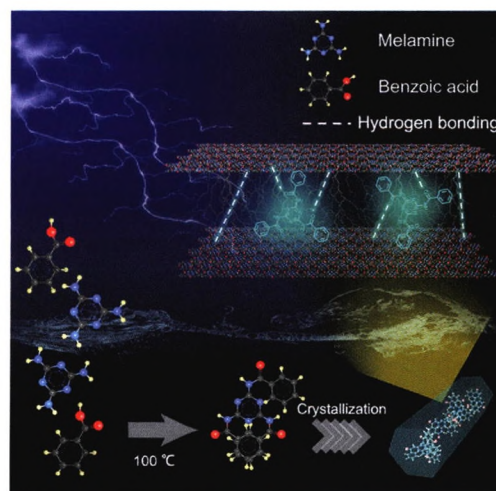
The first example of two unprecedented large-area ultrathin well-dispersed two-dimensional (2D) supramolecular nanosheets in water is reported. These 2D supramolecular nanosheets possess large area and excellent dispersibility features offering promising opportunity for catalytic and sensing applications, for instance, the obtained 2D Fe(III) tetra(4-carboxyphenyl)porphine chloride (TCPP(Fe))-bis(2-dimethylaminoethyl) ether (BDMAEE) with heme-like active center displays intrinsic peroxidase-like catalytic activity.

868–874

Water-induced ultralong room temperature phosphorescence by constructing hydrogen-bonded networks

Ya-Chuan Liang, Yuan Shang, Kai-Kai Liu*, Zhen Liu, Wen-Jie Wu, Qian Liu, Qi Zhao, Xue-Ying Wu, Lin Dong, and Chong-Xin Shan*

Zhengzhou University, China



Water-induced ultralong room temperature phosphorescence through constructing hydrogen-bonded networks in the organic microrod (OMR) has been demonstrated, and the lifetime of the OMR can reach 1.64 s from 1.92 ns.

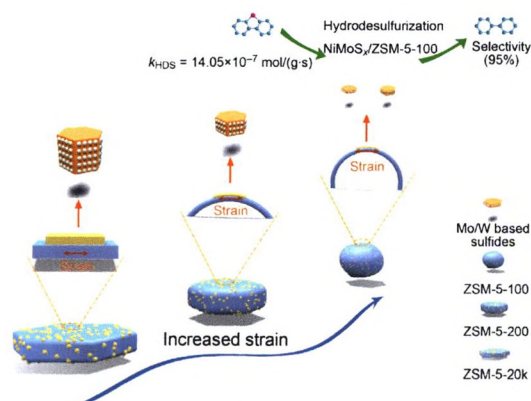
875–881

Surface curvature-confined strategy to ultrasmall nickel-molybdenum sulfide nanoflakes for highly efficient deep hydrodesulfurization

Xin Kang¹, Jiancong Liu^{1,*}, Chungui Tian¹, Dongxu Wang¹, Yaorui Li², Hongyan Zhang¹, Xusheng Cheng¹, Aiping Wu¹, and Honggang Fu^{1,*}

¹ Heilongjiang University, China

² Harbin Engineering University, China



A facile and general “surface curvature-confined synthesis” strategy is developed to modulate the slab lengths and stacking numbers of a series of molybdenum- and tungsten-based sulfides by controlling the strain induced by different surface curvature of nanosized ZSM-5 supports. Notably, NiMoS_x/ZSM-5-100 catalyst with smaller slab lengths, lower stacking numbers, and more edge active sites shows superior k_{HDS} value of dibenzothiophene ($14.05 \times 10^{-7} \text{ mol/(g·s)}$) and high direct desulfurization selectivity (> 95%).

882–890

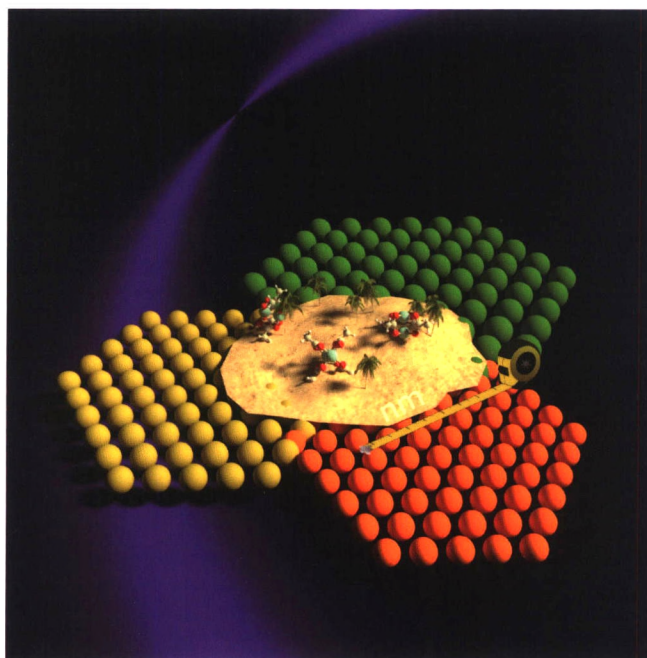
ISSN 1998-0124

CN 11-5974/O4

Nano Research

Volume 13 · Number 3 · March 2020

(Monthly, started in 2008)



纳米研究 (英文版) (月刊, 2008年创刊) 第13卷 第3期 2020年3月出版

Editors-in-Chief Hongjie Dai, Yadong Li

Sponsored by Tsinghua University & Chinese Chemical Society

Edited by Nano Research Editorial Office

Published by Tsinghua University Press

Address Xueyan Building,
Tsinghua University,
Beijing 100084, China

Website www.theNanoResearch.com & www.springer.com/journal/12274

Online Manuscript Submission, Review and Tracking System www.editorialmanager.com/nare

主管单位 中华人民共和国教育部

主办单位 清华大学

中国化学会

主 编 戴宏杰 李亚栋

编 辑 《纳米研究》编辑部

出版发行 清华大学出版社有限公司

印刷单位 北京地大彩印有限公司

ISSN 1998-0124



万方数据