

Nano Research

January · 2021

Volume 14 · Number 1

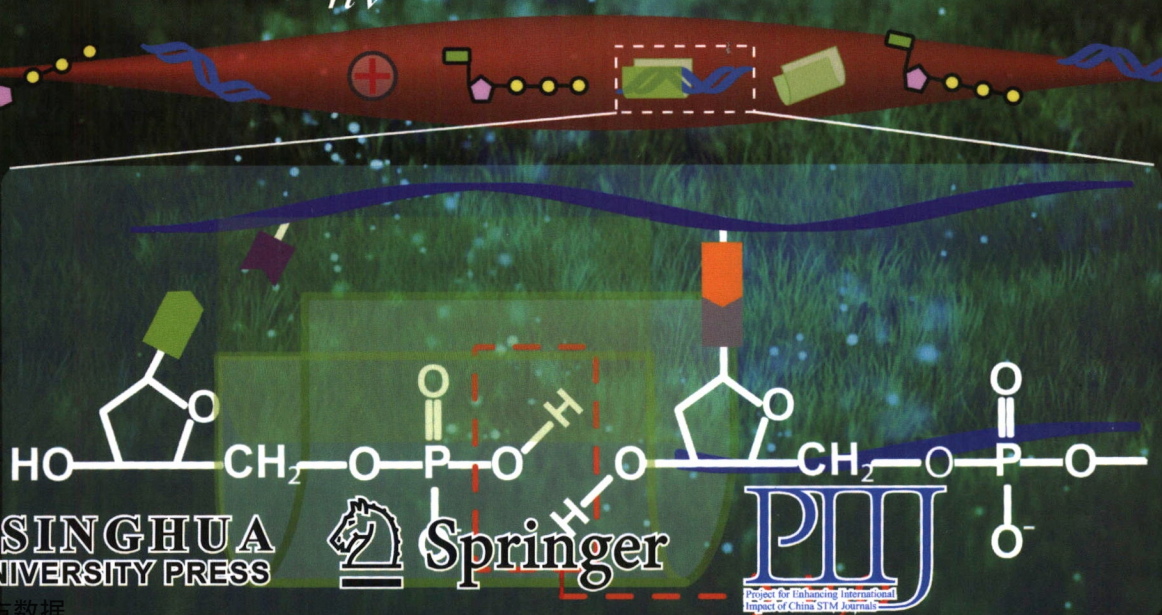
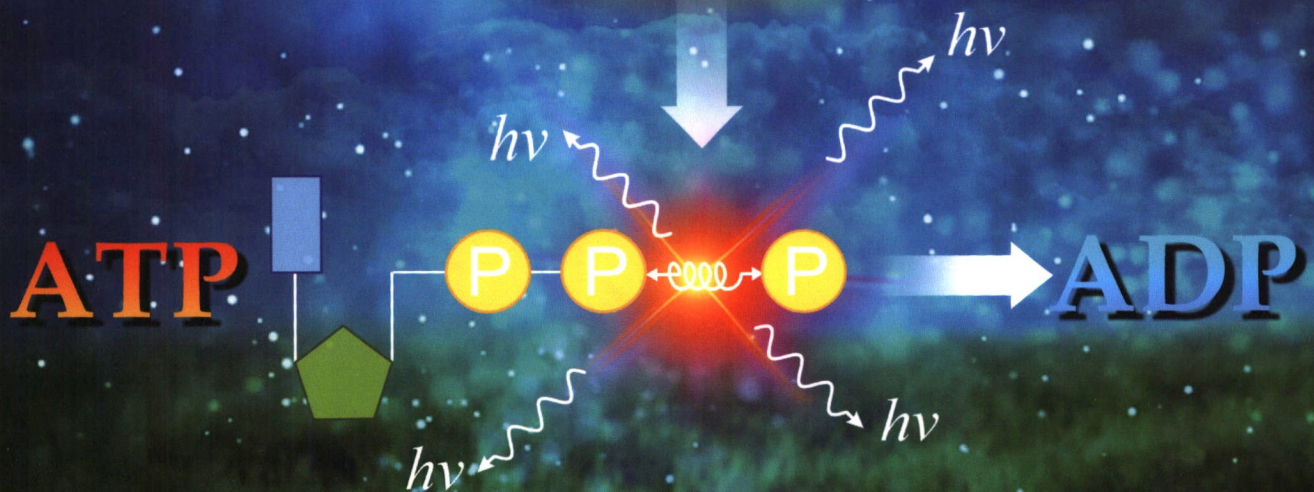


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Emerging porous nanosheets: From fundamental synthesis to promising applications

How defects influence the photoluminescence of TMDCs

Demonstration of biophoton-driven DNA replication via gold nanoparticle-distance modulated yield oscillation



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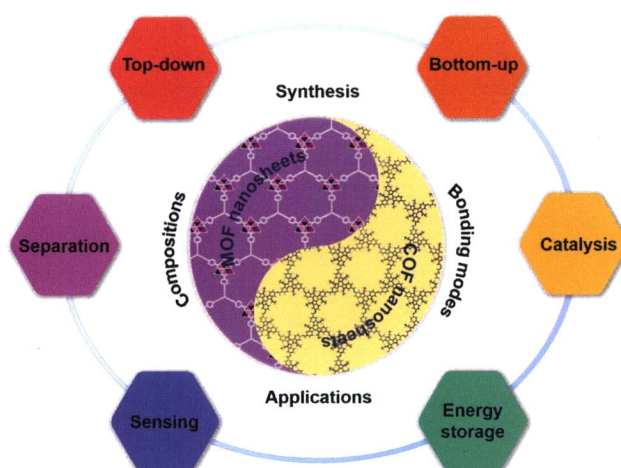
Contents

Perspective Review

Emerging porous nanosheets: From fundamental synthesis to promising applications

Yun Fan, Jia Zhang, Yu Shen, Bing Zheng, Weina Zhang*, and Fengwei Huo*

Nanjing Tech University, China



Based on their different compositions and bonding modes, significant differences have emerged in the applications of metal-organic framework (MOF) and covalent organic framework (COF) nanosheets in various fields, despite of their shared similar properties. Hence, we summarize the recent progress of MOF and COF nanosheets by comparative analysis on their advantages and limitations in synthesis, properties, and applications.

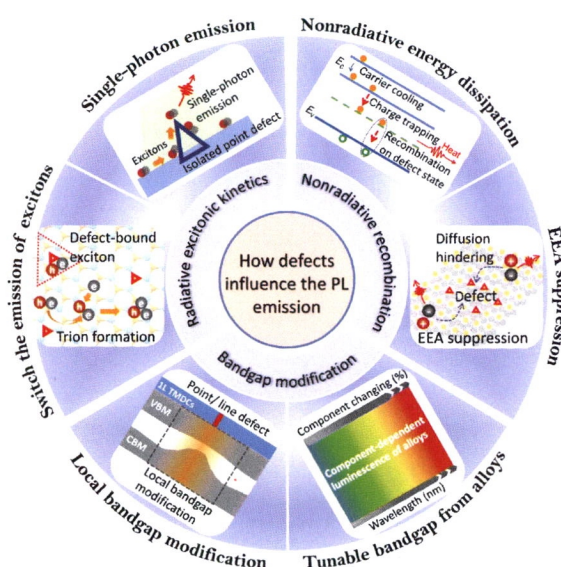
1–28

Review Article

How defects influence the photoluminescence of TMDCs

Mengfan Zhou, Wenhui Wang, Junpeng Lu*, and Zhenhua Ni*

Southeast University, China



We provide a comprehensive review on the fundamental mechanisms of how defects influence the photoluminescence (PL) emission of two-dimensional (2D) transition metal dichalcogenide (TMDC), including radiative/nonradiative recombination kinetics and band structure modification.

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Research Articles

Demonstration of biophoton-driven DNA replication via gold nanoparticle-distance modulated yield oscillation

Na Li^{1,2}, Daoling Peng³, Xianjing Zhang^{1,2}, Yousheng Shu⁴,
Feng Zhang^{1,2,5,*}, Lei Jiang^{6,7,8,*}, and Bo Song^{1,*}

¹ University of Shanghai for Science and Technology, China

² Guangzhou Medical University, China

³ South China Normal University, China

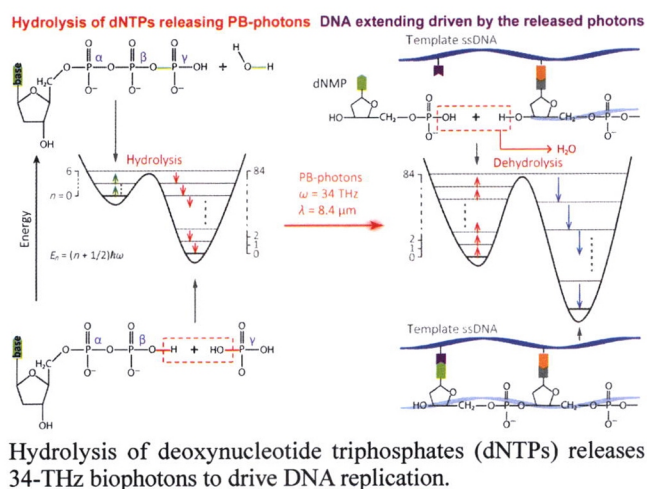
⁴ Fudan University, China

⁵ Inner Mongolia Agricultural University, China

⁶ Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, China

⁷ University of Chinese Academy of Sciences, China

⁸ Beihang University, China

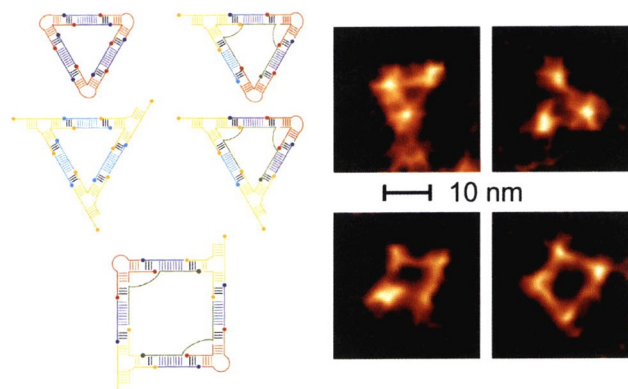


40-45

Complex RNA–DNA hybrid nanoshapes from iterative mix-and-match screening

Shi Chen, Zhiyuan Zhang, Eugene Alforque, and Thomas Hermann*

University of California, San Diego, USA



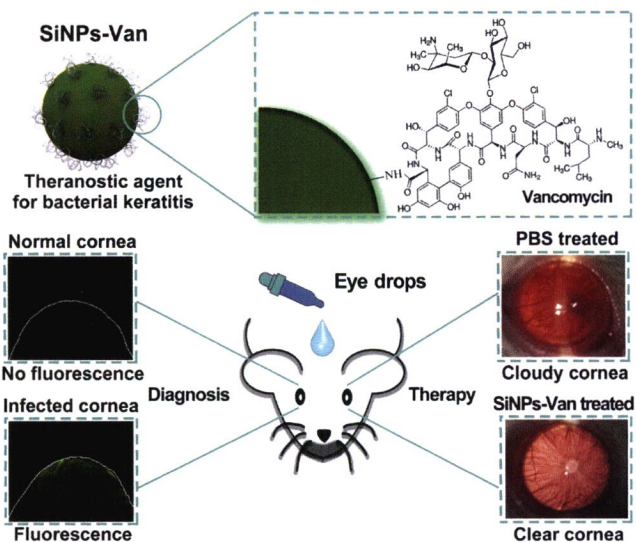
Ribonucleic acid (RNA)–deoxyribonucleic acid (DNA) hybrid nanoshapes that self-assemble from multiple different nucleic acid building modules provide versatile building blocks for complex materials with features at the sub-10 nm scale. Stable nanoshapes containing multiple different nucleic acid modules were identified by an iterative mix-and-match screening approach from combinations of RNA corner motifs and DNA connectors.

46-51

Fluorescent silicon nanoparticles-based nanotheranostic agents for rapid diagnosis and treatment of bacteria-induced keratitis

Lu Zhang, Xiaoyuan Ji, Yuanyuan Su*, Xia Zhai, Hua Xu, Bin Song, Airui Jiang, Daoxia Guo, and Yao He*

Soochow University, China



A kind of theranostic agents made of vancomycin (Van)-modified fluorescent silicon nanoparticles (SiNPs) enables rapid and non-invasive diagnosis and treatment of Gram-positive bacteria-induced keratitis in a simultaneous manner.

52–58

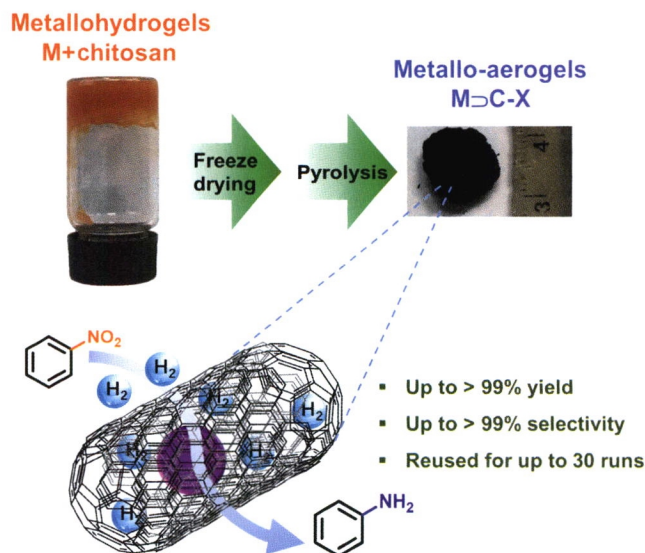
Metallo-aerogels derived from chitosan with encapsulated metal nanoparticles as robust, efficient and selective nanocatalysts towards reduction of nitroarenes

Yajing Shen¹, Qingshu Zheng¹, Jianhong Liu¹, and Tao Tu^{1,2,3,*}

¹ Fudan University, China

² Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences, China

³ Zhengzhou University, China



Robust metallo-aerogels consisting of well encapsulated metal nanoparticles (MNPs) by graphite shells were fabricated by pyrolysis of xerometallo-hydrogels derived from chitosan and earth-abundant metal salts (M = Fe, Co, Ni). The metallo-aerogels exhibited high activity and selectivity in the hydrogenation of nitroarenes to anilines with broad substrates scope, good functional group tolerance, and could be recycled for more than 30 runs without obvious loss of activity and selectivity.

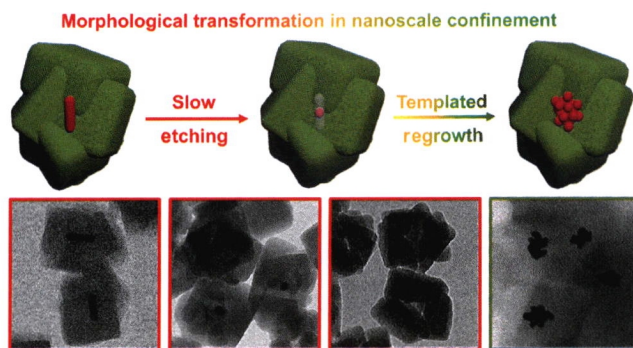
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Mechanistic insight into gold nanorod transformation in nanoscale confinement of ZIF-8

Cheongwon Bae¹, Jaedeok Lee¹, Lehan Yao², Suhyeon Park¹,
Yeonju Lee¹, Jieun Lee¹, Qian Chen², and Juyeong Kim^{1,*}

¹ Gyeongsang National University, Republic of Korea

² University of Illinois at Urbana-Champaign, USA



A gold nanorod core encapsulated by a zeolitic imidazolate framework (ZIF) shows template-dependent behavior in its morphological transformation due to nanoscale confining environment. In the etching event, the nanorod core is spherically carved from its tips, which becomes much slower than in bulk. The regrowth on the spherically etched core inside the ZIF shell gives rise to formation of a raspberry-like branched nanostructure in contrast to the growth of an octahedral shape in bulk condition.

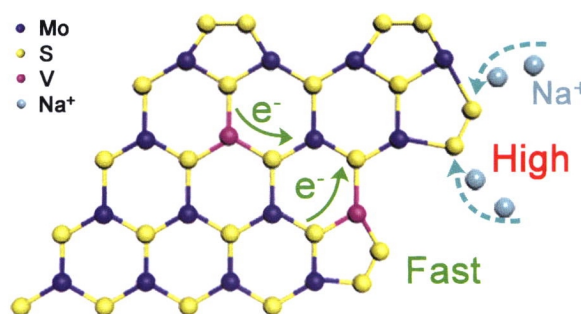
66–73

Supersaturated bridge-sulfur and vanadium co-doped MoS₂ nanosheet arrays with enhanced sodium storage capability

Yuru Dong¹, Zhengju Zhu¹, Yanjie Hu^{1,*}, Guanjie He², Yue Sun¹,
Qilin Cheng¹, Ivan P. Parkin², and Hao Jiang^{1,*}

¹ East China University of Science & Technology, China

² University College London, UK



The supersaturated bridge-sulfur and vanadium co-doped MoS₂ nanosheet delivers ultrahigh sodium storage capacity and fast reaction kinetics.

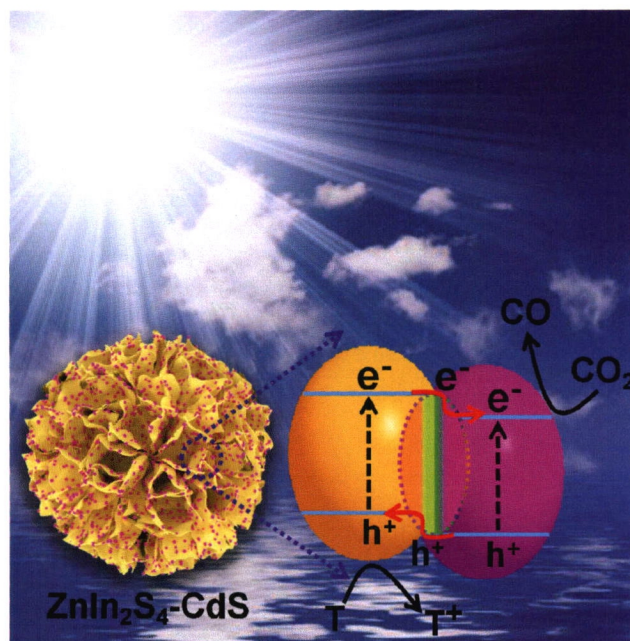
74–80

A hierarchical heterostructure of CdS QDs confined on 3D ZnIn₂S₄ with boosted charge transfer for photocatalytic CO₂ reduction

Zezhou Zhu^{1,2}, Xiaoxia Li¹, Yunteng Qu¹, Fangyao Zhou¹, Zhiyuan Wang¹, Wenyu Wang¹, Changming Zhao¹, Huijuan Wang¹, Liqiang Li^{1,2}, Yagang Yao^{2,*}, Qun Zhang^{1,*}, and Yuen Wu^{1,*}

¹ University of Science and Technology of China, China

² Suzhou Institute of Nano-tech and Nano-bionics, Chinese Academy of Sciences, China



The hierarchical ZnIn₂S₄-CdS heterostructure that involves zero-dimensional (0D) CdS quantum dots uniformly confined on three-dimensional (3D) ZnIn₂S₄ nanoflowers, which achieves an excellent catalytic performance of CO₂ photoconversion under visible-light irradiation.

81–90

Boosting Zn-ion storage capability of self-standing Zn-doped Co₃O₄ nanowire array as advanced cathodes for high-performance wearable aqueous rechargeable Co//Zn batteries

Qiulong Li^{1,2,4}, Qichong Zhang³, Zhengyu Zhou³, Wenbin Gong³, Chenglong Liu³, Yongbao Feng¹, Guo Hong⁵, and Yagang Yao^{2,3,*}

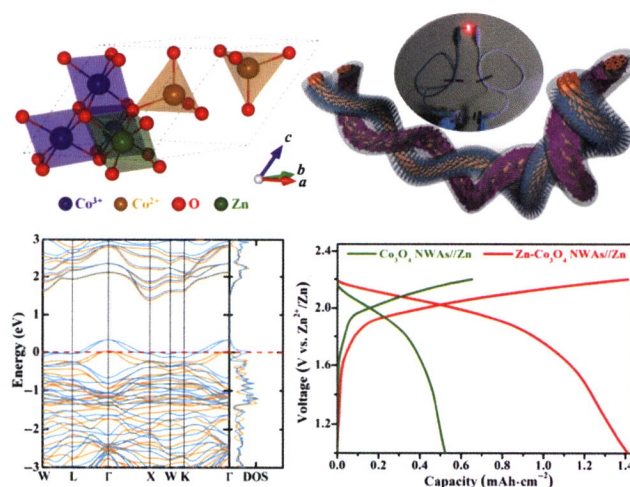
¹ Nanjing Tech University, China

² Nanjing University, China

³ Suzhou Institute of Nanotech and Nanobionics, Chinese Academy of Sciences, China

⁴ National University of Singapore, Singapore

⁵ University of Macau, Macau, China



Density functional theory (DFT) calculations demonstrate that the substitution of Zn for Co³⁺ leads to an insulator-metal transition in the Zn-doped Co₃O₄. High-performance fiber-shaped aqueous rechargeable Co//Zn battery with 2.2 V-high voltage based on Zn-doped Co₃O₄ was demonstrated.

91–99

Superbroad-band actively tunable acoustic metamaterials driven from poly (ethylene terephthalate)/carbon nanotube nanocomposite membranes

Ying Li^{1,2}, Wen Ning³, Qingyu Peng^{2,4}, Minglong Yang², Dongyi Lei¹, Siyao Guo¹, Peng Liu^{3,*}, Kaili Jiang³, Xiaodong He^{2,4,*}, and Yibin Li^{2,4,*}

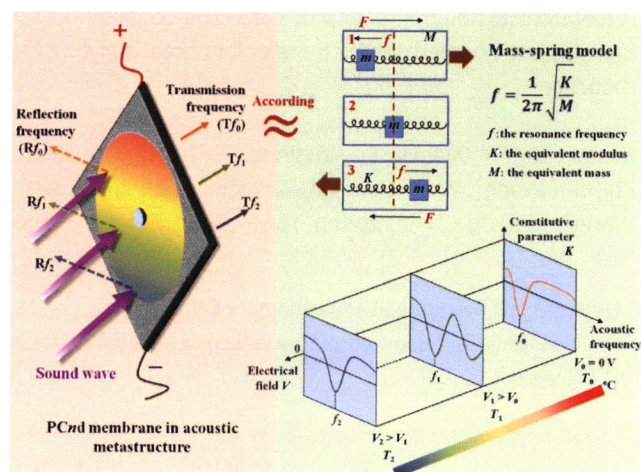
¹ Qingdao University of Technology, China

² Harbin Institute of Technology, China

³ Tsinghua University, China

⁴ Shenzhen STRONG Advanced Materials Institute Ltd. Corp, China

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A superbroad-band actively tunable acoustic metamaterials consisting of a laminated poly (ethylene terephthalate)/carbon nanotube (PET/CNT) nanocomposite membrane were proposed, which exhibits adjustable acoustic bandwidth of 419 Hz under low applied voltage of 60 V, resulting in great potential in noise reduction applications.

Coarse and fine-tuning of lasing transverse electromagnetic modes in coupled all-inorganic perovskite quantum dots

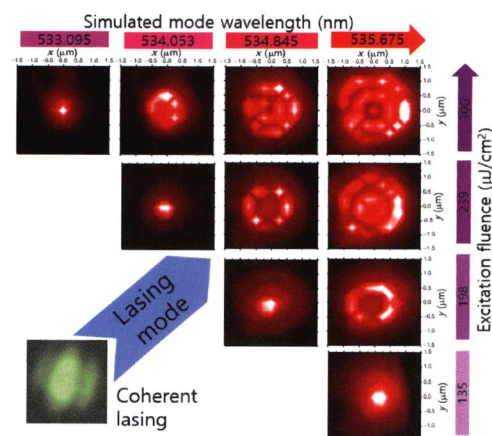
Youngsin Park¹, Guanhua Ying², Atanu Jana¹, Vitaly Osokin², Claudius C. Kocher², Tristan Farrow^{3,2,*}, Robert A. Taylor^{2,*}, and Kwang S. Kim^{1,*}

¹ Ulsan National Institute of Science and Technology, Republic of Korea

² University of Oxford, UK

³ National University of Singapore, Singapore

108–113



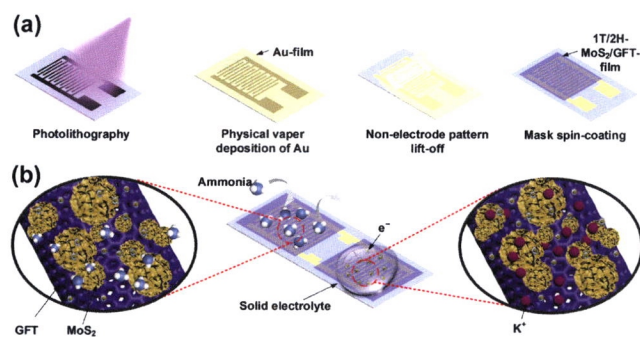
We present transverse electromagnetic lasing modes from CsPbBr₃ quantum dots with a long coherence time ~ 9.5 ps and a blueshift of the emission wavelength without heating the system. We demonstrate also how the wavelength of the modes can be controlled via two independent tuning-mechanisms including the excitation pump power and temperature.

Hybridized 1T/2H-MoS₂/graphene fishnet tube for high-performance on-chip integrated micro-systems comprising supercapacitors and gas sensors

Chi Zhang, Jing Ning*, Boyu Wang, Haibin Guo, Xin Feng, Xue Shen, Yanqing Jia, Jianguo Dong, Dong Wang, Jincheng Zhang*, and Yue Hao

Xidian University, China

114–121



The hybrid three-dimensional stereo nanostructure, including MoS₂ nanosheets and graphene fishnet tube (GFT), provides the K⁺ ions with a short diffusion pathway and more active sites, and the different phases of MoS₂ play different roles in different devices of the multifunctional systems.

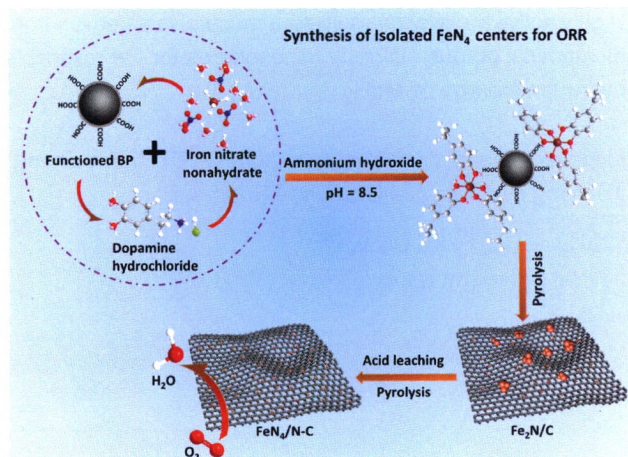
Highly active sites of low spin $\text{Fe}^{\text{II}}\text{N}_4$ species: The identification and the ORR performance

Huizhu Cai¹, Bingbing Chen¹, Xiao Zhang¹, Yuchen Deng², Dequan Xiao³, Ding Ma^{2,*}, and Chuan Shi^{1,*}

¹ Dalian University of Technology, China

² Peking University, China

³ University of New Haven, USA



Single sites of FeN_4 species were obtained by acid leaching of $\text{Fe}_2\text{N/C}$ sample. A linear correlation between kinetic current density and the content of low spin $\text{Fe}^{\text{II}}\text{N}_4$ species was established, which identified the catalytic functions of low spin $\text{Fe}^{\text{II}}\text{N}_4$ species as highly active sites for oxygen reduction reaction (ORR).

122–130

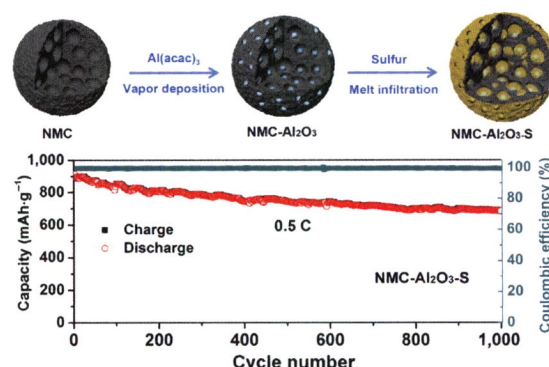
Vapor deposition of aluminium oxide into N-rich mesoporous carbon framework as a reversible sulfur host for lithium-sulfur battery cathode

Fei Sun^{1,*}, Zhibin Qu¹, Hua Wang¹, Xiaoyan Liu², Tong Pei¹, Rui Han¹, Jihui Gao¹, Guangbo Zhao¹, and Yunfeng Lu^{3,*}

¹ Harbin Institute of Technology, China

² Shanghai Normal University, China

³ University of California, Los Angeles, USA



Amorphous Al_2O_3 homogeneously decorated in nitrogen-rich mesoporous carbon framework ($\text{NMC-Al}_2\text{O}_3$) is synthesized to prevent polysulfide shuttling effect. Both experimental and density functional theory (DFT) calculations reveal that the implanted Al_2O_3 can greatly enhance the chemical adsorption interaction and catalytic conversion for lithium polysulfides and thereby effectively improve the utilizability, reversibility and stability of constructed sulfur cathode.

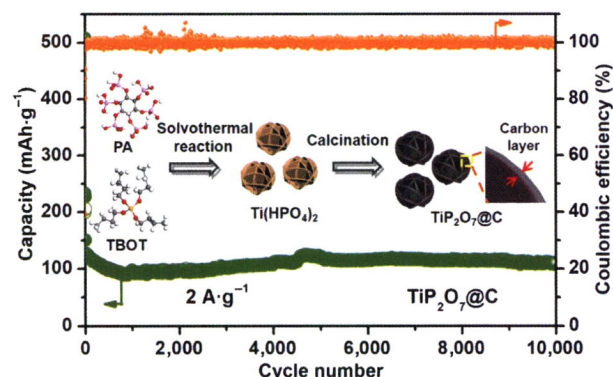
131–138

Improved Na storage and Coulombic efficiency in $\text{TiP}_2\text{O}_7@\text{C}$ microflowers for sodium ion batteries

Jun Pan¹, Nana Wang², Lili Li¹, Feng Zhang¹, Zhenjie Cheng¹, Yanlu Li¹, Jian Yang^{1,*}, and Yitai Qian¹

¹ Shandong University, China

² University of Wollongong Innovation Campus, Australia



TiP_2O_7 as a promising Ti-based anode material, combines enhanced specific capacity, increased Coulombic efficiency and low operation voltage together. These features can be associated with the underlying electrochemical reactions for Na storage, very different from the case of TiO_2 .

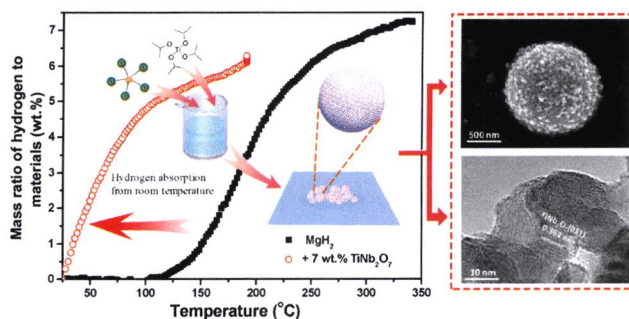
139–147

Highly active multivalent multielement catalysts derived from hierarchical porous TiNb_2O_7 nanospheres for the reversible hydrogen storage of MgH_2

Lingchao Zhang¹, Ke Wang¹, Yongfeng Liu^{1,*}, Xin Zhang¹, Jianjiang Hu², Mingxia Gao¹, and Hongge Pan¹

¹ Zhejiang University, China

² Yantai University, China



A multivalent multielement surrounding of catalysis was created *in situ* for hydrogen storage in MgH_2 by using hierarchical porous TiNb_2O_7 as precursors, which enables hydrogen uptake from 25 °C under a hydrogen pressure of 50 bar.

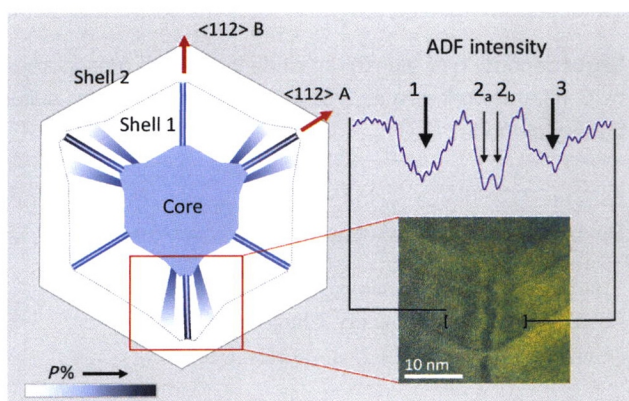
148–156

Multiple radial phosphorus segregations in GaAsP core-shell nanowires

H. Aruni Fonseka^{1,*}, Yunyan Zhang², James A. Gott¹, Richard Beanland¹, Huiyun Liu², and Ana M. Sanchez¹

¹ University of Warwick, UK

² University College London, UK



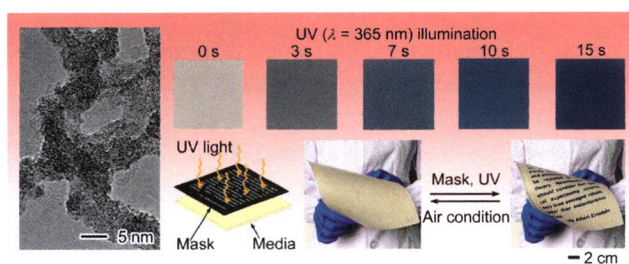
Multiple radial segregation bands are observed in the vicinity of a single radius. A total of up to 18 segregation bands can form, as opposed to the six known before.

157–164

Light-responsive color switching of self-doped $\text{TiO}_{2-x}/\text{WO}_3 \cdot 0.33\text{H}_2\text{O}$ hetero-nanoparticles for highly efficient rewritable paper

Jingmei Zhao, Luntao Liu, Yun Zhang, Zhenyu Feng, Feifei Zhao, and Wenshou Wang*

Shandong University, China



A seeded growth strategy was designed for the synthesis of $\text{TiO}_{2-x}/\text{WO}_3 \cdot 0.33\text{H}_2\text{O}$ hetero-nanoparticles (HNPs), on which Ti^{3+} species are self-doped in TiO_{2-x} NPs and Ti-O-W linkages are formed between TiO_{2-x} and $\text{WO}_3 \cdot 0.33\text{H}_2\text{O}$ HNPs. The $\text{TiO}_{2-x}/\text{WO}_3 \cdot 0.33\text{H}_2\text{O}$ HNPs exhibited excellent color switching properties and promising applications in ink-free, light-printable rewritable paper.

165–171

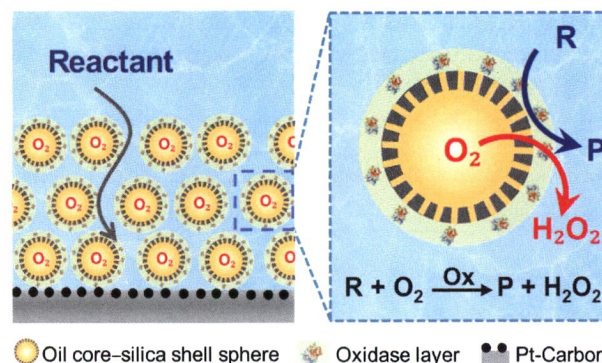
Enhancement of interfacial catalysis in a triphase reactor using oxygen nanocarriers

Lu Zhou¹, Liping Chen¹, Zhenyao Ding¹, Dandan Wang¹, Hao Xie¹, Weihai Ni¹, Weixiang Ye¹, Xiqi Zhang¹, Lei Jiang^{2,3,*}, and Xinjian Feng^{1,*}

¹ Soochow University, China

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

³ University of Chinese Academy of Sciences, China



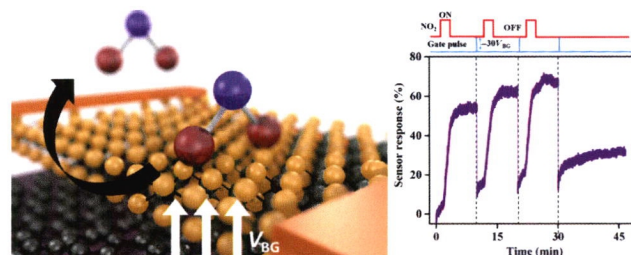
An efficient water-solid-oil triphase biocatalytic system using oxygen nanocarriers that consist of an oil core and a mesoporous silica shell architecture was demonstrated.

172–176

A novel approach towards molecular memory device in gate tunable structure of MoS₂-graphene

Rahul Tripathi and Abha Misra*

Indian Institute of Science, India



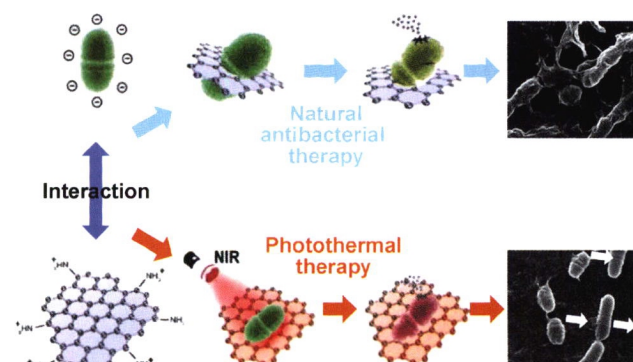
Electrostatic field-controlled molecular response is observed in MoS₂-graphene heterostructure with a thin bottom graphene layer. A molecular memory operation is achieved in MoS₂-graphene heterostructure for an ultrasensitive molecular interaction leading to molecular memory device with ultrafast recovery.

177–184

Functionalized graphene oxide nanosheets with unique three-in-one properties for efficient and tunable antibacterial applications

Bo-Yao Lu, Guan-Yin Zhu, Chen-Hao Yu, Ge-Yun Chen, Chao-Liang Zhang, Xin Zeng, Qian-Ming Chen, and Qiang Peng*

Sichuan University, China



Three essential properties (positive charge, strong photothermal effect, and natural cutting effect) are integrated into amino-functionalized graphene oxide (AGO) which is synthesized by amino-functionalization of graphene oxide (GO). As such, AGO can be used for efficient and tunable antibacterial therapy.

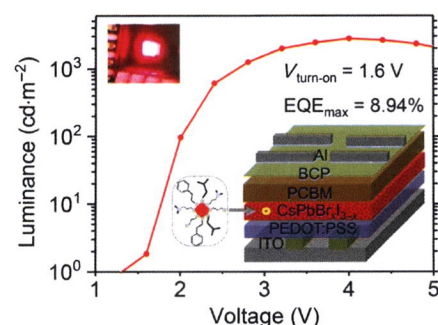
185–190

CsPbBr_xI_{3-x} thin films with multiple ammonium ligands for low turn-on pure-red perovskite light-emitting diodes

Maowei Jiang, Zhanhao Hu, Luis K. Ono, and Yabing Qi*

Okinawa Institute of Science and Technology Graduate University (OIST), Japan

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CsPbBr_xI_{3-x} thin films featuring nano-sized crystallites were prepared via incorporating multiple ammonium ligands in a one-step spin-coating route. The CsPbBr_xI_{3-x} light-emitting diode (LED), adopting a conventional device structure of indium-doped tin oxide (ITO)/poly(3,4-ethylenedioxythiophene):poly(styrenesulfonate) (PEDOT:PSS)/CsPbBr_xI_{3-x}/[6,6]-phenyl C61 butyric acid methyl ester (PCBM)/bathocuproine (BCP)/Al, showed a pure-red color at 659 nm, low turn-on voltage (1.6 V), high brightness (2,859 cd·m⁻²), and high external quantum efficiency (8.94%).

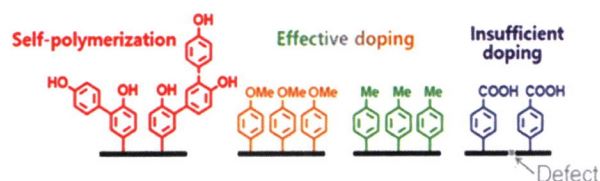
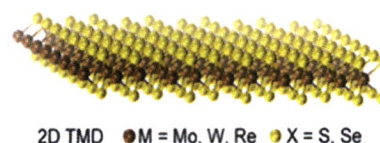
The effect of the dopant's reactivity for high-performance 2D MoS₂ thin-film transistor

Hanleem Lee¹, Sora Bak^{1,2}, Joosung Kim^{1,2}, and Hyoyoung Lee^{1,2,*}

¹ Institute for Basic Science (IBS), Republic of Korea

² Sungkyunkwan University, Republic of Korea

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To fabricate the reproducible electronic devices with high electronic properties, and optimization of the doping reaction condition for two-dimensional (2D) semiconductors is important. Herein, we examined the organic doping reaction on 2D semiconductors using four different dopants, and it showed the effective functionalization using mild reactive molecules only provided high I_{on}/I_{off} and mobility.

Tumor-responsive copper-activated disulfiram for synergetic nanocatalytic tumor therapy

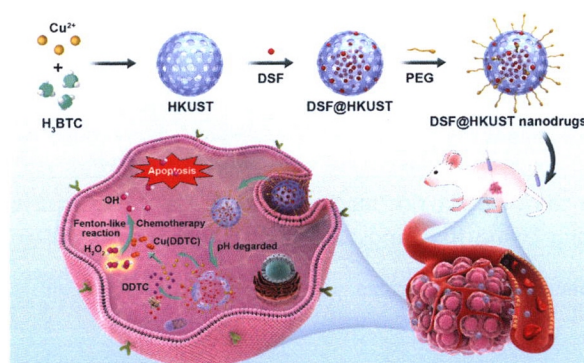
Hao Chen¹, Xi Li¹, Minfeng Huo^{3,*}, Liying Wang⁴, Yu Chen^{2,3,*}, Wei Chen¹, and Bailiang Wang^{1,*}

¹ Wenzhou Medical University, China

² Shanghai University, China

³ Shanghai Institute of Ceramics, Chinese Academy of Sciences, China

⁴ Tongji University, China



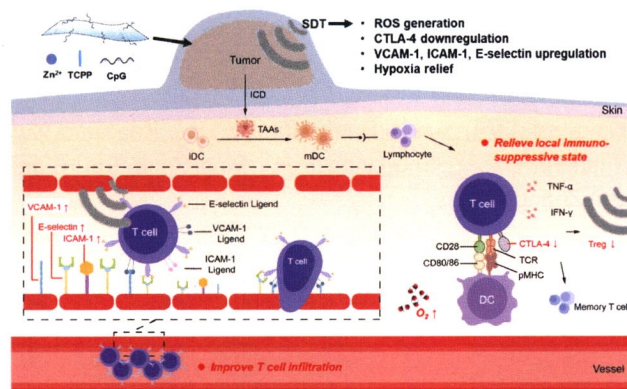
Disulfiram incorporated HKUST nanodrugs (DSF@HKUST) have been designed and served for biocompatible efficient synergetic tumor chemotherapy and nanocatalytic therapy. The tumor-responsive degradation of HKUST-framework enables the intratumoral copper supply and subsequent activation of DSF drug to form cytotoxic chemotherapeutic species Cu(DDTC)₂, simultaneously triggering the Cu⁺-mediated Fenton-like reactions for highly active hydroxyl radicals production. The *in-situ* generation of these toxic species synergistically contributes to satisfied nanocatalytic tumor therapy with high biocompatibility.

205–211

Sonodynamic therapy with immune modulatable two-dimensional coordination nanosheets for enhanced anti-tumor immunotherapy

Wenjun Zhu, Qian Chen*, Qitong Jin, Yu Chao, Lele Sun, Xiao Han, Jun Xu, Longlong Tian, Jinglei Zhang, Teng Liu, and Zhuang Liu*

Soochow University, China

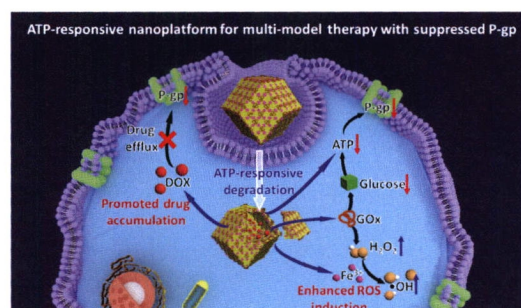


Two-dimensional (2D) coordination nanosheets composed of Zn^{2+} and tetrakis(4-carboxyphenyl) porphyrin (TCPP) are fabricated. Such 2D nanosheets show high loading capacity of oligodeoxynucleotides such as CpG, function as whole-tumor-cell vaccines to trigger tumor-specific immune responses. With the application of sonication, strengthened anti-tumor immune responses are achieved for highly effective cancer treatment.

ATP-responsive hollow nanocapsules for DOX/GOx delivery to enable tumor inhibition with suppressed P-glycoprotein

Huimin Zhu, Guodong Cao, Yike Fu, Chao Fang, Qiang Chu, Xiang Li*, Yulian Wu*, and Gaorong Han

Zhejiang University, China



Nanocapsules with fine hollow microstructure, which can effectively degrade in the presence of adenosine triphosphate (ATP), are synthesized for the delivery of doxorubicin (DOX) and glucose oxidase (GOx) to enable multi-model therapy with suppressed tumor multidrug resistance (MDR). Two mechanisms, production inhibition and consumption of intracellular ATP, are achieved in one therapeutic platform to tackle the challenges of P-gp suppression and anticancer drug efflux. Due to the successful construction of DOX/GOx/hollow ferric-tannic acid (HFe-TA) nanocapsules, the agitated glucose consumption, promoted reactive oxygen species (ROS) induction and enhanced drug accumulation occur intracellularly in a synergistic manner to enable considerable tumor inhibition both *in vitro* and *in vivo*.

Ultrathin flexible InGaZnO transistor for implementing multiple functions with a very small circuit footprint

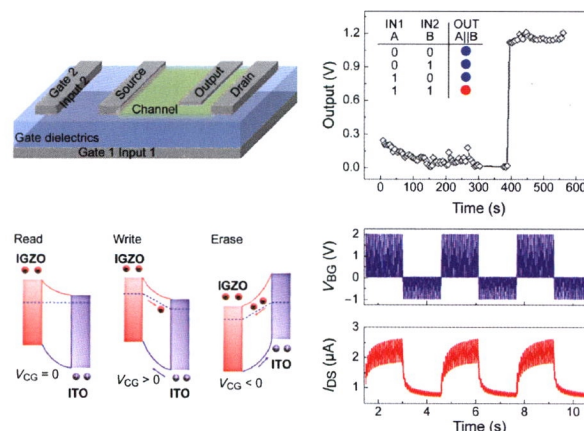
Chaoqi Dai^{1,2}, Peiqin Chen², Shaocheng Qi², Yongbin Hu², Zhitang Song^{3,4,*}, and Mingzhi Dai^{2,3,*}

¹ Kunming University of Science and Technology, China

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

³ University of Chinese Academy of Sciences, China

⁴ Shanghai Microsystem and Information Technology Institute, Chinese Academy of Sciences, China



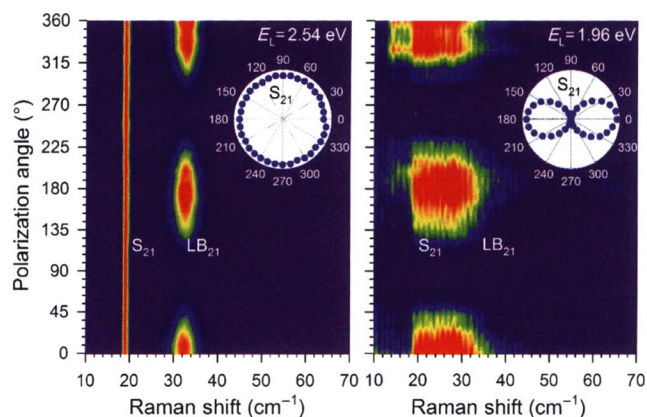
This article proposes a novel flexible transistor design that can implement logic gate, memory, and artificial synapse functions using a single IGZO (InGaZnO, indium-gallium-zinc-oxide) transistor. This design can accelerate the development of flexible electronics that require a higher level of device integration.

Breakdown of Raman selection rules by Frölich interaction in few-layer WS₂

Qing-Hai Tan¹, Yu-Jia Sun¹, Xue-Lu Liu¹, Kai-Xuan Xu¹, Yuan-Fei Gao^{1,2}, Shu-Liang Ren¹, Ping-Heng Tan^{1,2}, and Jun Zhang^{1,2,*}

¹ University of Chinese Academy of Sciences, China

² Beijing Academy of Quantum Information Science, China



By using resonant Raman scattering technology, this work studies the breakdown of polarization Raman selection in few-layer WS₂. A new Raman tensor determined by the intraband Frölich interaction between phonons and dark excitons dominates the polarized response of scattering signal (phonons).

239–244

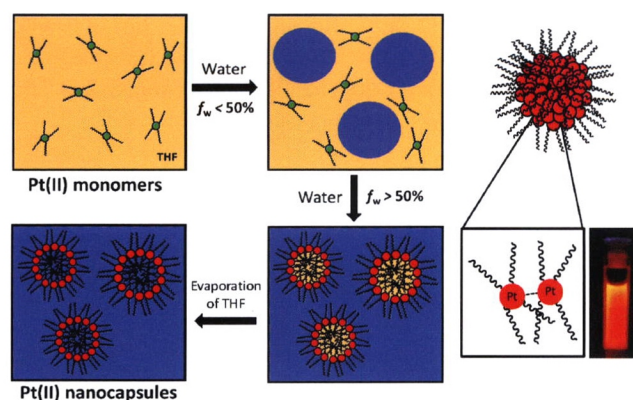
Water-soluble hollow nanocrystals from self-assembly of AIEE-active Pt(II) metallomesogens

Cristián Cuerva^{1,*}, Javier Fernández-Lodeiro^{1,2}, Mercedes Cano³, José Luis Capelo-Martínez^{1,2}, and Carlos Lodeiro^{1,2,*}

¹ NOVA University, Portugal

² PROTEOMASS Scientific Society, Portugal

³ Ciudad Universitaria, Spain



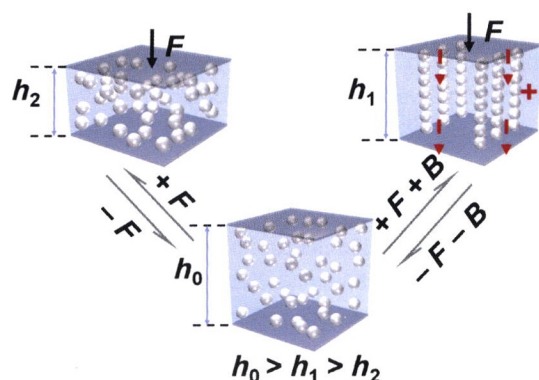
We have demonstrated that luminescent Pt(II) metallomesogens can be well-dispersed in water despite their great hydrophobic nature, forming nanocapsules useful for entrapment of hydrophobic drugs.

245–254

Magnetic-programmable organohydrogels with reconfigurable network for mechanical homeostasis

Yingchao Yang, Qian Liu, Tianyi Zhao*, Yunfei Ru, Ruochen Fang, Yichao Xu, Jin Huang, and Mingjie Liu*

Beihang University, China



The organohydrogels with heterogeneous dynamic architecture exhibit magnetic-programmable mechanics resulting from the aligned chain-like assemblies of nanoparticles induced by magnetic field. The organohydrogel-based effector can realize mechanical homeostasis by regulating the modulus.

255–259

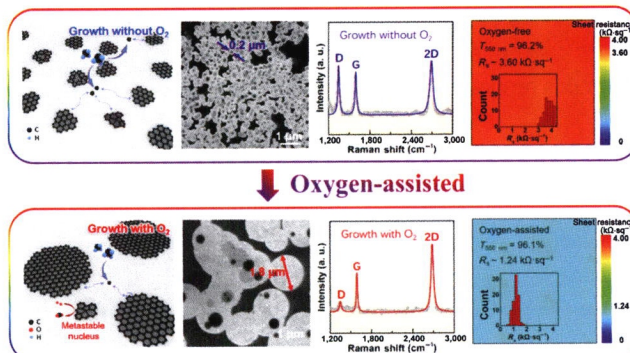
Oxygen-assisted direct growth of large-domain and high-quality graphene on glass targeting advanced optical filter applications

Bingzhi Liu^{1,2}, Huihui Wang², Wei Gu², Le Zhou¹, Zhaolong Chen¹, Yufeng Nie², Congwei Tan¹, Haina Ci³, Nan Wei³, Lingzhi Cui¹, Xuan Gao², Jingyu Sun^{2,3,*}, Yanfeng Zhang^{1,2,*}, and Zhongfan Liu^{1,2,3,*}

¹ Peking University, China

² Beijing Graphene Institute (BGI), China

³ Soochow University, China



The oxygen-assisted chemical vapor deposition (CVD) strategy allows the direct synthesis of 6-inch-scale graphene glass harvesting markedly increased graphene domain size (from 0.2 to 1.8 μm). As-produced graphene glass attains record high electrical conductivity and good transparency, readily serving as transparent electrodes for fabricating advanced optical filter devices.

260–267

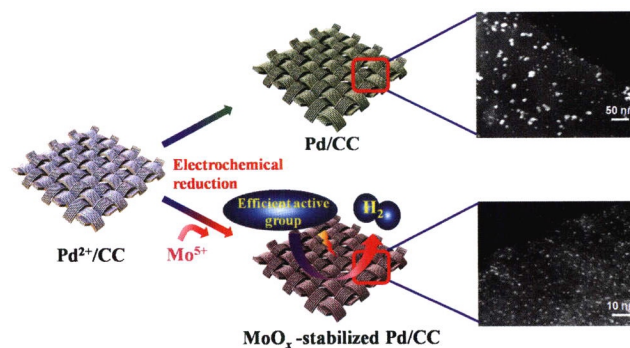
Robust enhanced hydrogen production at acidic conditions over molybdenum oxides-stabilized ultrafine palladium electrocatalysts

Ji Sun^{1,2}, Xian Zhang¹, Meng Jin^{1,2}, Qizhong Xiong¹, Guozhong Wang¹, Haimin Zhang^{1,*}, and Huijun Zhao^{1,3,*}

¹ Institute of Solid State Physics, Chinese Academy of Sciences, China

² University of Science and Technology of China, China

³ Griffith University, Australia



Employing a facile electrochemical reduction strategy, a self-supported MoO_x -stabilized ultrafine palladium electrocatalyst on carbon cloth (MoO_x -Pd/CC) was acquired to attain excellent catalytic efficiency for the electrochemical hydrogen evolution reaction (HER) in acidic condition.

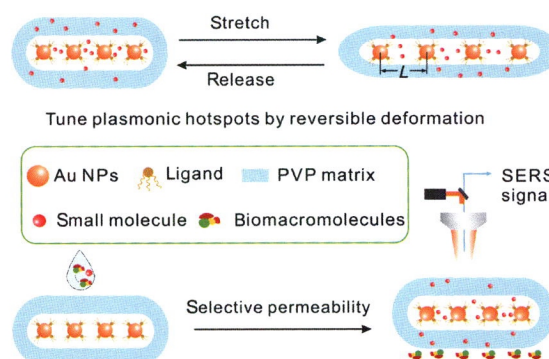
268–274

Continuous mechanical tuning of plasmonic nanoassemblies for tunable and selective SERS platforms

Xiunan Yan¹, Qing Chen¹, Qun Song¹, Ziyu Huo¹, Ning Zhang^{2,*}, and Mingming Ma^{1,*}

¹ University of Science and Technology of China, China

² Hefei University, China



Avoid the fluorescence interference of biomacromolecules
Plasmonic gold nanochains (Au NCs) are embedded in an elastic polyvinylpyrrolidone (PVP) film, which can be simultaneously and reversibly tuned by mechanical deformation of the PVP film. This plasmonic film can serve as a sensitive and selective surface-enhanced Raman scattering (SERS) platform for quick analysis of small molecule analytes in complex biological samples and food, without any pretreatment process.

275–284

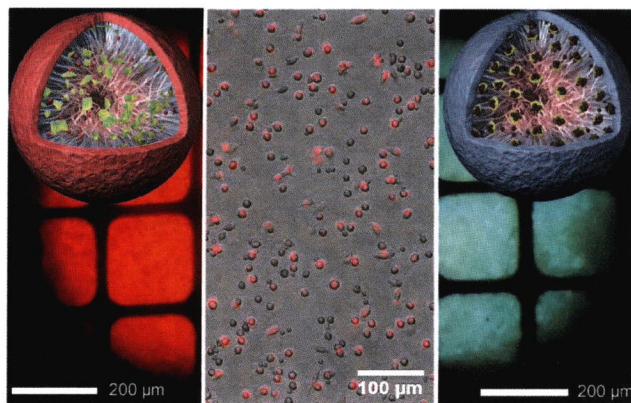
3D confined self-assembling of QD within super-engineering block copolymers as biocompatible superparticles enabling stimulus responsive solid state fluorescence

Xiaohong He¹, Kun Jia^{1,*}, Robert Marks², Yiguo Hu³, and Xiaobo Liu¹

¹ University of Electronic Science and Technology of China, China

² Ben-Gurion University of the Negev, Israel

³ Sichuan University, China



Biocompatible superparticles showing unprecedented fluorescence stability in solution and stimulus responsive fluorescence emission in solid state are obtained via confinement self-assembly of quantum dots in super-engineering block copolymers.

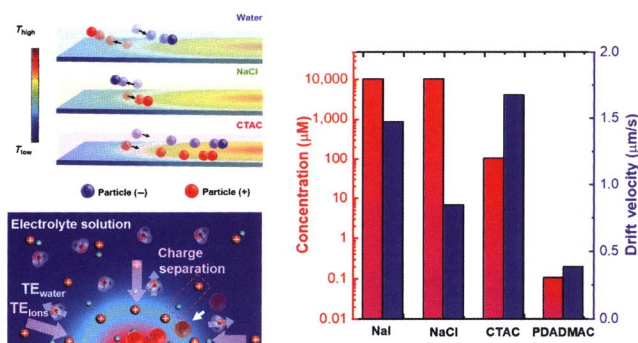
285–294

Atomistic modeling and rational design of optothermal tweezers for targeted applications

Hongru Ding¹, Pavana Siddhartha Kollipara¹, Linhan Lin^{2,*}, and Yuebing Zheng^{1,*}

¹ The University of Texas at Austin, USA

² Tsinghua University, China



This work unravels the underlying mechanism of optothermal tweezers at the atomistic level: The trapping of tiny objects is dominated by the opto-thermoelectric effect arising from water polarization and charge separation. The atomistic view guides us on the development of new types of optothermal tweezers with enhanced performance.

295–303

Unveiling the role of Fe_3O_4 in polymer spin valve near Verwey transition

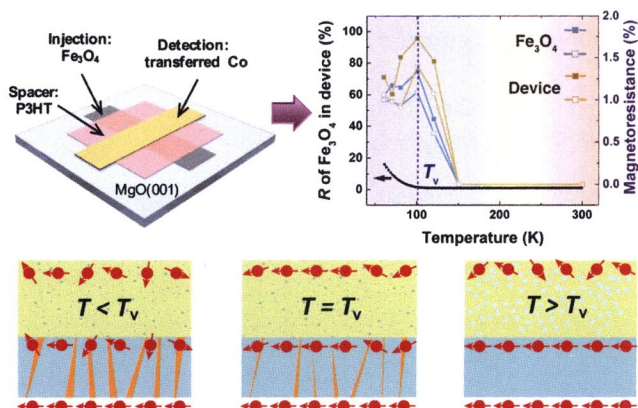
Shuaishuai Ding^{1,2}, Yuan Tian^{2,3,*}, Xiang Liu¹, Ye Zou², Huanli Dong², Wenbo Mi^{1,*}, and Wenping Hu^{1,2,4,*}

¹ Tianjin University, China

² Institute of Chemistry, Chinese Academy of Sciences, China

³ Hunan University, China

⁴ Collaborative Innovation Center of Chemical Science and Engineering, China



Drastic enhancement of magnetoresistance (MR) ratios was achieved at Verwey transition point in polymer spin valve with vertical configuration of Fe_3O_4 /P3HT/Co.

304–310

Flexible Au micro-array electrode with atomic-scale Au thin film for enhanced ethanol oxidation reaction

Xun Cao^{1,2}, Dongdong Peng², Cao Wu^{2,3}, Yongmin He², Chaojiang Li⁴, Bowei Zhang⁵, Changcun Han¹, Junsheng Wu^{5,*}, Zheng Liu^{2,*}, and Yizhong Huang^{1,2,*}

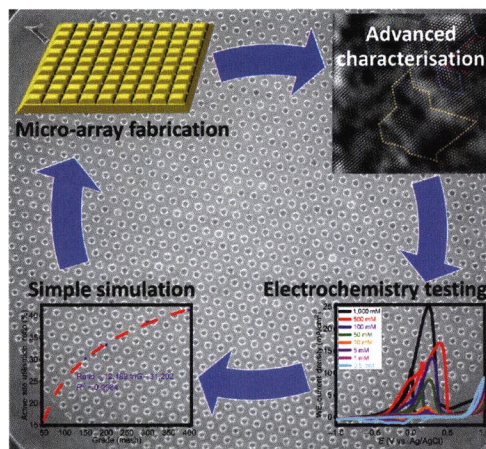
¹ Hubei University of Technology, China

² Nanyang Technological University, Singapore

³ Nanjing University of Aeronautics and Astronautics, China

⁴ Beijing Institute of Technology, China

⁵ University of Science and Technology Beijing, China



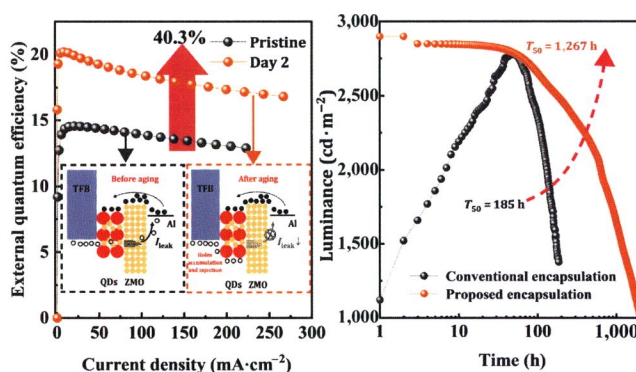
Atomic-scale three-dimensional (3D) nanostructures are directly visualised with a maximum depth of 6 atomic layers; *in-situ* observation unveils the growth of atomic-scale active sites in the form of twinning. Active site utilisation ratio is important to build double layers for efficient charge transfer.

311–319

Effect and mechanism of encapsulation on aging characteristics of quantum-dot light-emitting diodes

Zinan Chen, Qiang Su, Zhiyuan Qin, and Shuming Chen*

Southern University of Science and Technology, China



By developing a physical model and an analytical model, we identify that the positive aging of quantum-dot light-emitting diodes (QLEDs) is mainly attributed to the suppression of hole leakage current that is resulted from the passivation of ZnMgO defects. To fully take the advantage of positive aging, a new encapsulation method is proposed, which improved the device lifetime by 6.0 folds.

320–327

Adaptive nanopores: A bioinspired label-free approach for protein sequencing and identification

Andrea Spitaleri^{1,2}, Denis Garoli^{1,3}, Moritz Schütte⁴, Hans Lehrach^{4,5}, Walter Rocchia^{1,*}, and Francesco De Angelis^{1,*}

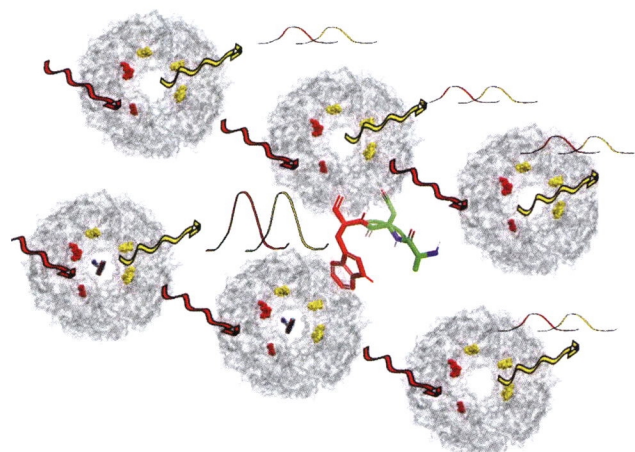
¹ Istituto Italiano di Tecnologia, Italy

² IRCCS San Raffaele Scientific Institute, Italy

³ AB ANALITICA s.r.l., Italy

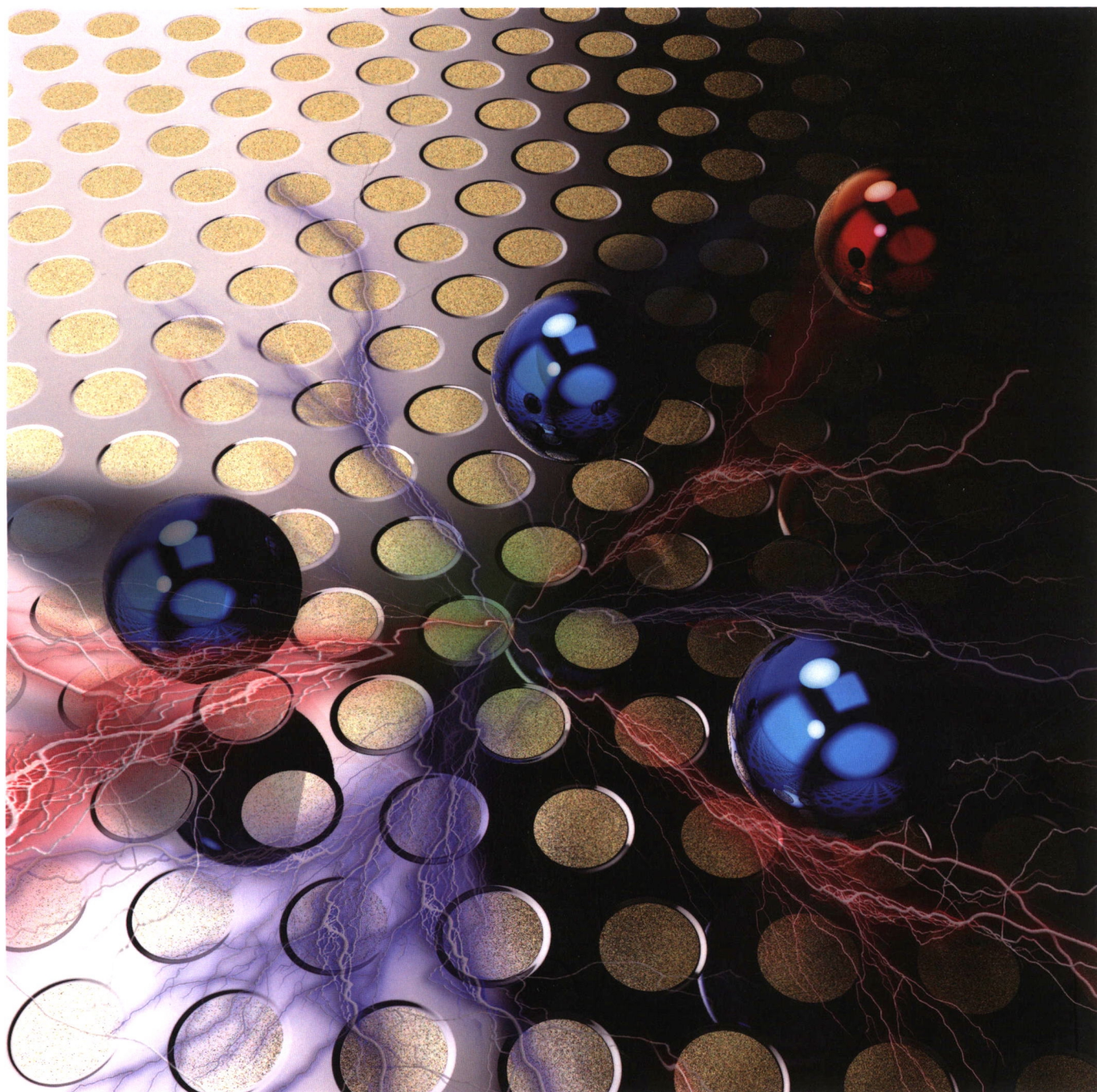
⁴ Alacris Theranostics GmbH, Germany

⁵ Max Planck Institute for Molecular Genetics, Germany



In this work, we introduce the concept of “adaptive nanopore” as the foundation for a novel class of protein sequencing devices. In the proposed approach the nanopore is realized by an engineered protein construct that adapts to the sequence of the translocating polypeptide due to the same molecular forces involved in bio-molecular recognition.

328–333



纳米研究 (英文版) (月刊, 2008年创刊) 第14卷 第1期 2021年1月出版

Editors-in-Chief Yadong Li, Shoushan Fan

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 李亚栋 范守善

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

