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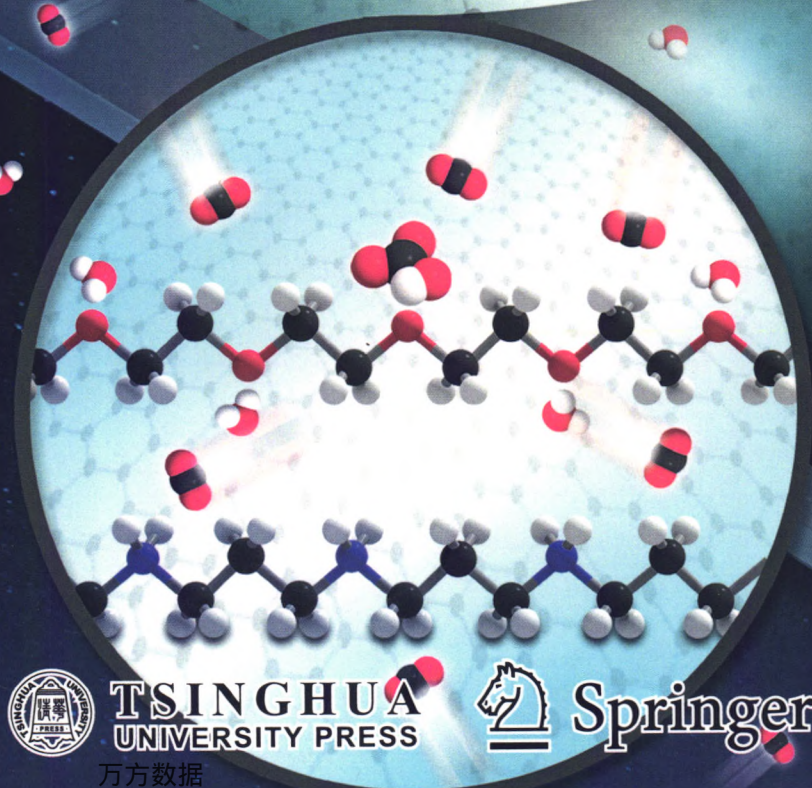
Volume 11 · Number 7



Ultra-dense planar metallic nanowire arrays with extremely large anisotropic optical and magnetic properties

Charge transfer in graphene/polymer interfaces for CO₂ detection

Bio-inspired design of hierarchical FeP nanostructure arrays for the hydrogen evolution reaction



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Contents

Research Articles

Ultra-dense planar metallic nanowire arrays with extremely large anisotropic optical and magnetic properties

Qi Jia^{1,2,4}, Xin Ou^{1,2,*}, Manuel Langer¹, Benjamin Schreiber¹, Jörg Grenzer¹, Pablo F. Siles³, Raul D. Rodriguez^{3,5}, Kai Huang^{1,2,4}, Ye Yuan¹, Alireza Heidarian¹, René Hübner¹, Tiangui You², Wenjie Yu², Kilian Lenz¹, Jürgen Lindner¹, Xi Wang², and Stefan Facsko¹

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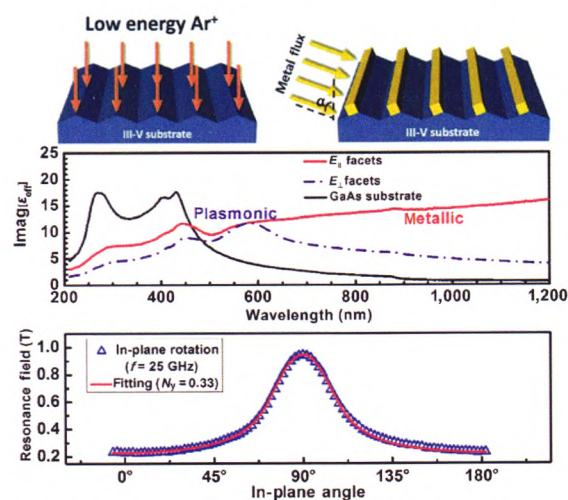
² Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China

³ Technische Universität Chemnitz, Germany

⁴ University of Chinese Academy of Sciences, China

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3519–3528



An efficient self-assembly method to fabricate large-area and ultra-dense planar metallic nanowire arrays on faceted surfaces is presented. The surfaces of crystalline III-V semiconductors are faceted by reverse epitaxy, and the deposited Au and Fe nanowire arrays with periodicities down to 45 nm exhibit extremely large anisotropic optical and magnetic properties.

Charge transfer in graphene/polymer interfaces for CO₂ detection

Myungwoo Son¹, Yusin Pak¹, Sang-Soo Chee¹, Francis Malar Auxilia¹, Kihyeun Kim¹, Byung-Kee Lee², Sungeun Lee², Sun Kil Kang², Chaedeok Lee², Jeong Soo Lee², Ki Kang Kim³, Yun Hee Jang⁴, Byoung Hun Lee¹, Gun-Young Jung^{1,*}, and Moon-Ho Ham^{1,*}

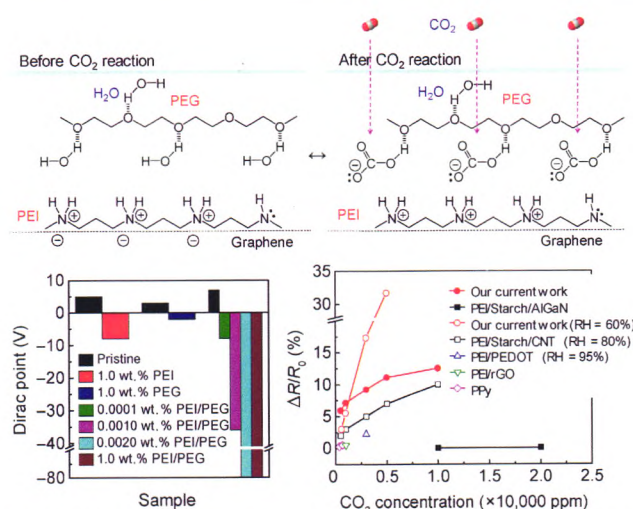
¹ Gwangju Institute of Science & Technology, Republic of Korea

² Woomyeon R&D Campus, Republic of Korea

³ Dongguk University, Republic of Korea

⁴ Daegu Gyeongbuk Institute of Science & Technology, Republic of Korea

3529–3536



The charge transfer processes between graphene and amine-rich polyethyleneimine (PEI) upon CO₂ exposure were significantly improved by the introduction of hygroscopic polyethylene glycol (PEG) in humid air, prompting the development of highly sensitive portable graphene-based chemiresistive sensors able to operate at room temperature and low power.

Bio-inspired design of hierarchical FeP nanostructure arrays for the hydrogen evolution reaction

Ya Yan^{1,5}, Xue Rong Shi^{3,4}, Mao Miao², Ting He², Ze Hua Dong², Ke Zhan¹, Jun He Yang¹, Bin Zhao^{1,5,*}, and Bao Yu Xia^{2,6,*}

¹ University of Shanghai for Science and Technology, China

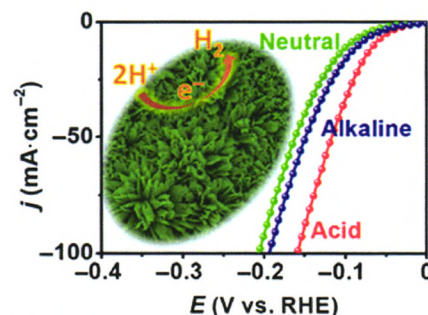
² Huazhong University of Science and Technology (HUST), China

³ Shanghai University of Engineering Science, China

⁴ University of Innsbruck, Austria

⁵ Shanghai Innovation Institute for Materials, China

⁶ Shenzhen Institute of Huazhong University of Science and Technology, China



A hierarchical FeP nanoarray electrode composed of FeP nanopetals is successfully fabricated for hydrogen evolution reaction. Theoretical calculations reveal that the mixed P/Fe termination of the FeP surface is responsible for the high catalytic activity of the FeP electrode.

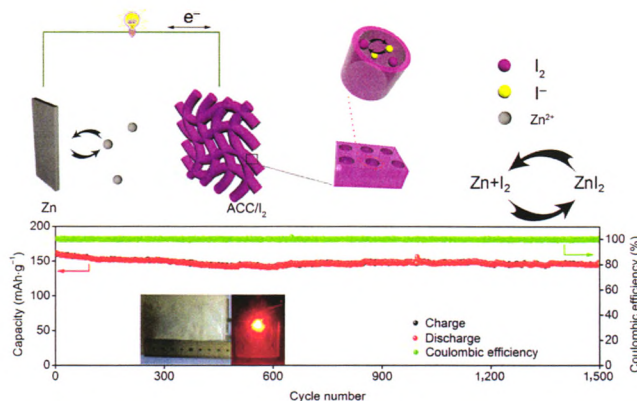
3537–3547

A sustainable aqueous Zn-I₂ battery

Chong Bai¹, Fengshi Cai², Lingchang Wang², Shengqi Guo², Xizheng Liu^{2,*}, and Zhihao Yuan^{1,2,*}

¹ Tianjin University, China

² Tianjin University of Technology, China



An eco-friendly aqueous rechargeable Zn-I₂ battery undergoes a single conversion reaction process involving full utilization of iodine atoms, thus showing high performance.

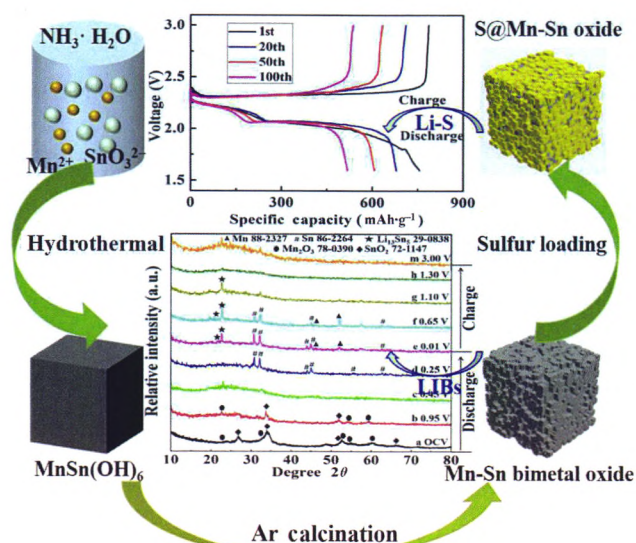
3548–3554

Mesoporous Mn-Sn bimetallic oxide nanocubes as long cycle life anodes for Li-ion half/full cells and sulfur hosts for Li-S batteries

Yanyan He¹, Liqiang Xu^{1,*}, Chuanchuan Li¹, Xiaoxia Chen¹, Gang Xu¹, and Xiaoyun Jiao²

¹ Shandong University, China

² Shandong Normal University, China



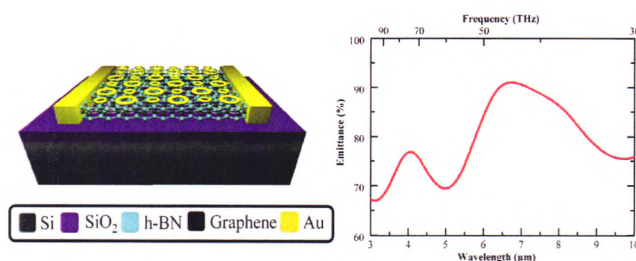
Mesoporous Mn-Sn bimetallic oxide nanocubes, fabricated via a facile hydrothermal method, show long cycle life in Li-ion half and full cells. The application of these materials as sulfur hosts for Li-S batteries is also investigated.

3555–3566

Metamaterial-based graphene thermal emitter

Cheng Shi, Nathan H. Mahlmeister, Isaac J. Luxmoore, and Geoffrey R. Nash*

University of Exeter, UK



A metamaterial-based graphene thermal emitter was designed, fabricated, and characterized. The results demonstrate the feasibility of a new generation of thermal emitters.

3567–3573

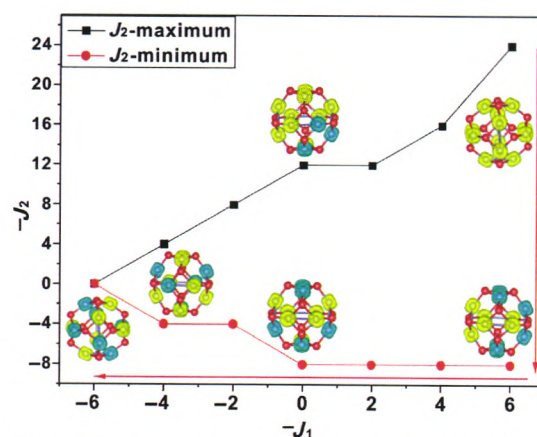
Stability of the $\text{Fe}_{12}\text{O}_{12}$ cluster

Xiaohu Yu^{1,2,3,*}, Xuemei Zhang¹, and Xun-Wang Yan³

¹ Shaanxi University of Technology, China

² Moscow Institute of Physics and Technology, Russia

³ Anyang Normal University, China



A highly stable bare cage $\text{Fe}_{12}\text{O}_{12}$ cluster is predicted by using an evolutionary algorithm and DFT+U calculations. Using Heisenberg's model, we trace the origin of the unexpected stability and exotic geometry of the bare $\text{Fe}_{12}\text{O}_{12}$ cluster to magnetic competition between the exchange constants J_1 and J_2 , induced by superexchange interactions.

3574–3581

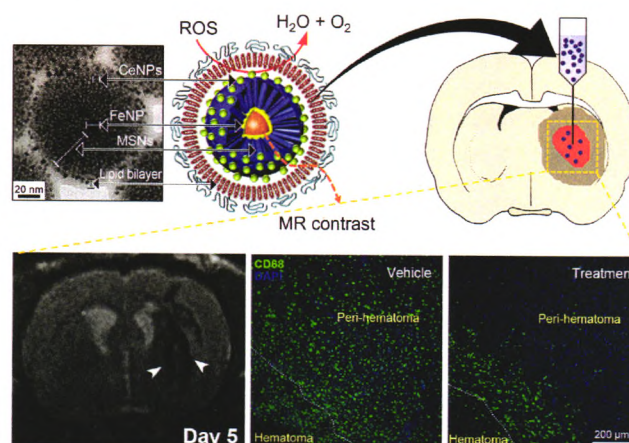
Customized lipid-coated magnetic mesoporous silica nanoparticle doped with ceria nanoparticles for theragnosis of intracerebral hemorrhage

Bong Geun Cha¹, Han-Gil Jeong², Dong-Wan Kang², Myong-Joo Nam¹, Chi Kyung Kim^{2,3}, Do Yeon Kim², In-Young Choi², Seul Ki Ki², Song I Kim², Ju hee Han², Jaeyun Kim^{1,*}, and Seung-Hoon Lee^{2,*}

¹ Sungkyunkwan University, Republic of Korea

² Seoul National University Hospital 101 Daehak-ro, Republic of Korea

³ Korea University Guro Hospital and Korea University College of Medicine, Republic of Korea



Lipid-coated magnetic mesoporous silica nanoparticles doped with ceria nanoparticles (LMCs) successfully reduced inflammation and brain edema, and they were visualized by magnetic resonance imaging.

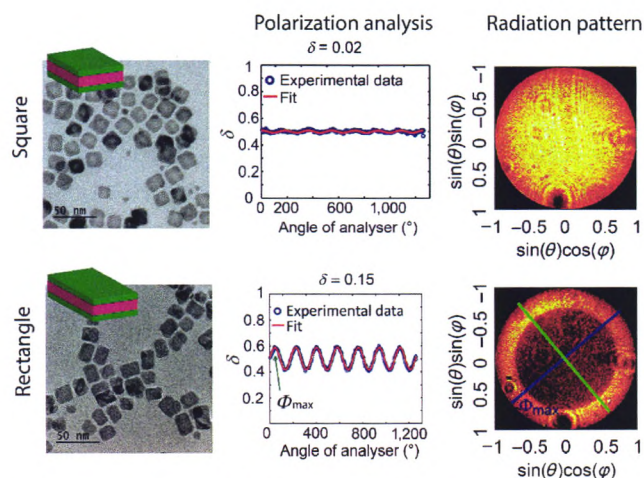
3582–3592

Consequence of shape elongation on emission asymmetry for colloidal CdSe/CdS nanoplatelets

Fu Feng¹, Loan Thu Nguyen^{1,2}, Michel Nasilowski¹, Brice Nadal¹, Benoît Dubertret¹, Laurent Coolen¹, and Agnès Maître^{1,*}

¹ UPMC Univ Paris 6, France

² Vietnam Academy of Science and Technology, Vietnam



Individual square nanoplatelets are shown to emit unpolarized photoluminescence, with isotropic radiation patterns. In contrast, rectangular nanoplatelets exhibit polarized anisotropic emission, which can be appropriately described by the dielectric antenna effect caused by the elongated shape of the nanoplatelet.

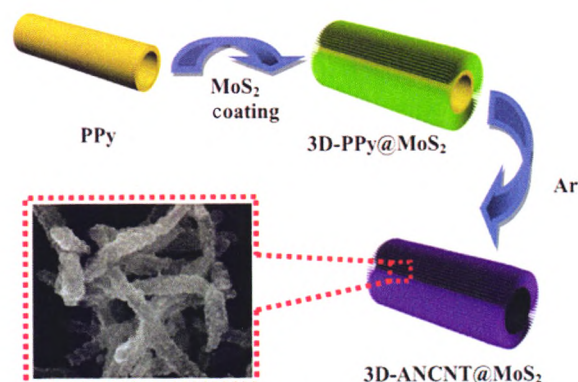
3593–3602

Ultrathin MoS₂ with expanded interlayers supported on hierarchical polypyrrole-derived amorphous N-doped carbon tubular structures for high-performance Li/Na-ion batteries

Xiaojun Zhao^{1,2}, Gang Wang¹, Xiaojie Liu^{1,*}, Xinliang Zheng¹, and Hui Wang^{1,*}

¹ Northwest University, China

² Ankang University, China



Design of ultrathin MoS₂ nanosheets with expanded interlayers supported on amorphous N-doped carbon nanotube (ANCNT) exhibits the improved electrochemical properties of lithium-ion batteries (LIBs) and sodium-ion batteries (SIBs).

3603–3618

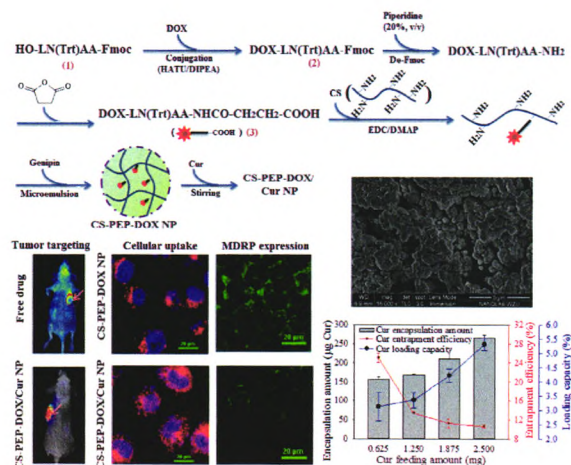
Efficiency against multidrug resistance by co-delivery of doxorubicin and curcumin with a legumain-sensitive nanocarrier

Sen Lin^{1,2,*}, Peiling Xie¹, Mengmeng Luo¹, Qing Li^{1,2}, Ling Li¹, Jinzhao Zhang¹, Qinxiang Zheng¹, Hao Chen¹, and Kaihui Nan^{1,*}

¹ Wenzhou Medical University, China

² Wenzhou Institute of Biomaterials and Engineering, Chinese Academy of Science, China

3619–3635



Co-delivery of doxorubicin and curcumin within a legumain-sensitive nanocarrier significantly enhanced multidrug resistance-reversing efficiency and tumor-targeting properties.

Nanoscale inhibition of polymorphic and ambidextrous IAPP amyloid aggregation with small molecules

Aleksandr Kakinen¹, Jozef Adamcik², Bo Wang³, Xinwei Ge³, Raffaele Mezzenga^{2,*}, Thomas P. Davis^{1,4,*}, Feng Ding^{3,*}, and Pu Chun Ke^{1,*}

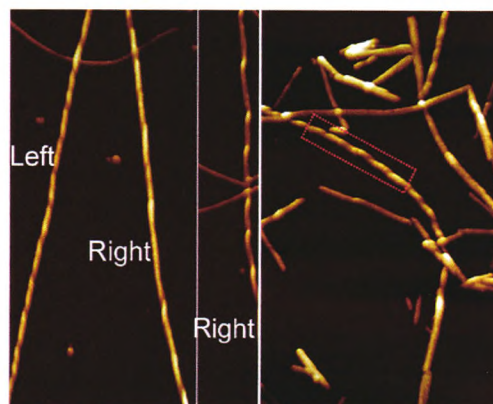
¹ Monash University, Australia

² ETH Zurich, Switzerland

³ Clemson University, USA

⁴ Warwick University, UK

3636–3647



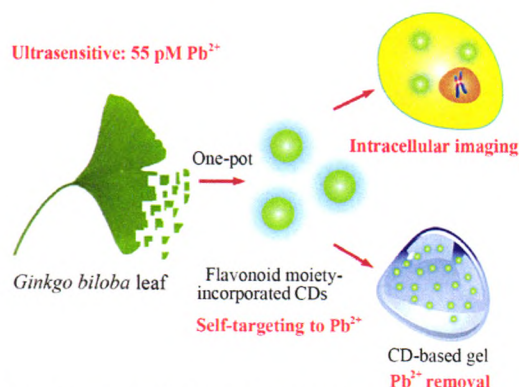
Human islet amyloid polypeptides (IAPP) in fibrillar form are polymorphic, ambidextrous, and possess multiple periodicities. Upon interfacing with the small molecule epigallocatechin gallate (EGCG), IAPP fibrils displayed kinks and branching but conserved the twisted morphology.

Flavonoid moiety-incorporated carbon dots for ultrasensitive and highly selective fluorescence detection and removal of Pb²⁺

Jing Xu, Xu Jie, Fengfeng Xie, Haimei Yang, Weili Wei*, and Zhining Xia

Chongqing University, China

3648–3657



The flavonoid extract of *G. biloba* leaf derived carbon dot is highly fluorescent, biocompatible, and self-targeting to Pb²⁺. It can be used for ultrasensitive detection and removal of Pb²⁺.

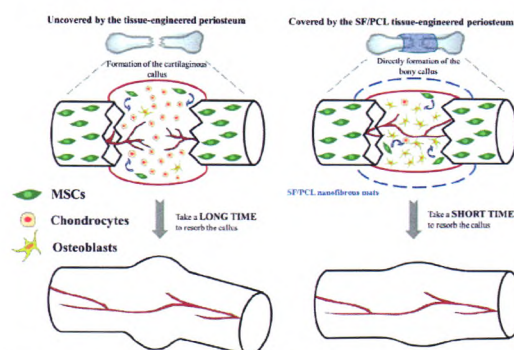
Promoting osteogenic differentiation in pre-osteoblasts and reducing tibial fracture healing time using functional nanofibers

Gu Cheng¹, Jiajia Chen¹, Qun Wang², Xuewen Yang¹, Yuet Cheng¹, Zhi Li¹, Hu Tu¹, Hongbing Deng^{1,*}, and Zubing Li^{1,*}

¹ Wuhan University, China

² Iowa State University, USA

3658–3677



Silk fibroin/polycaprolactone (SF/PCL) composite membranes were used to form a synthetic periosteum that enabled osteoinduction and cellular delivery, and was able to function as a barrier. Following interruption of the tissue-engineered periosteum, mesenchymal stem cells (MSCs) at the fracture sites were induced to form osteoblasts rather than chondrocytes, and bony calluses rather than cartilaginous tissue formed in the fracture gap.

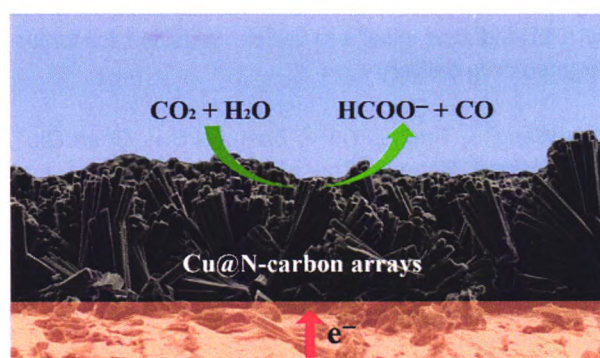
Ultra-small Cu nanoparticles embedded in N-doped carbon arrays for electrocatalytic CO₂ reduction reaction in dimethylformamide

Xiaolong Zhang¹, Ying Zhang¹, Fengwang Li¹, Christopher D. Easton², Alan M. Bond¹, and Jie Zhang^{1,*}

¹ Monash University, Australia

² CSIRO Manufacturing, Australia

3678–3690



Ultra-small Cu nanoparticles embedded in N-doped carbon arrays exhibit a significantly enhanced catalytic activity for CO₂ reduction in dimethylformamide in comparison with polycrystalline Cu, with an order magnitude larger catalytic current density at a potential of -2.7 V vs. Fc/Fc^+ (Fc = ferrocene).

Synthesis, mechanical investigation, and application of nitrogen and phosphorus co-doped carbon dots with a high photoluminescent quantum yield

Quan Xu^{1,*}, Bofan Li¹, Yingchun Ye¹, Wei Cai¹, Weijun Li¹, Chuanyao Yang², Yusheng Chen³, Meng Xu⁴, Neng Li^{5,*}, Xusheng Zheng⁶, Jason Street⁷, Yan Luo⁸, and Lulu Cai^{2,*}

¹ China University of Petroleum (Beijing), China

² University of Electronic Science and Technology of China, China

³ University of Akron, USA

⁴ General Hospital of Chinese People's Liberation Army, China

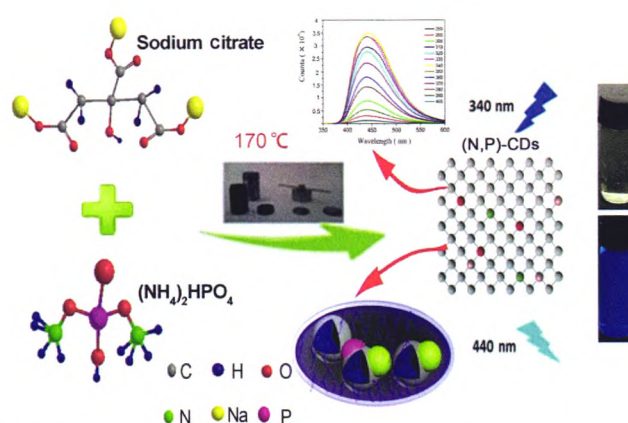
⁵ Wuhan University of Technology, China

⁶ University of Science and Technology of China, China

⁷ Mississippi State University, USA

⁸ West Virginia University, USA

3691–3701



In this study, a single-step, high-efficiency hydrothermal method was applied to synthesize nitrogen and phosphorous-doped carbon dots ((N,P)-CDs) with a quantum yield of up to 53.8% with independent emission behavior.

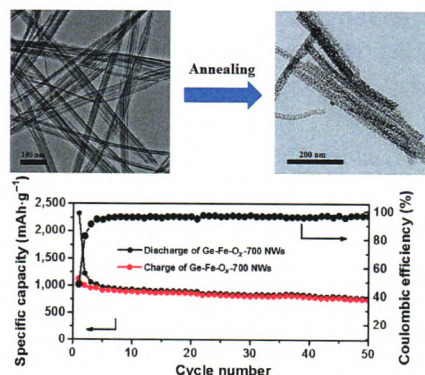
Facile synthesis of porous germanium-iron bimetal oxide nanowires as anode materials for lithium-ion batteries

Xiongwu Zhong¹, Huijuan Huan¹, Xiaowu Liu¹, and Yan Yu^{1,2,*}

¹ University of Science and Technology of China, China

² Nankai University, China

3702–3709



We designed porous Ge-Fe bimetal oxide nanowires (Ge-Fe-O_x-700 NWs) by a large-scale and facile solvothermal reaction. When used as the anode material for lithium-ion batteries, these Ge-Fe-O_x-700 NWs exhibited superior electrochemical performance and good cycling performance.

Highly uniform ultrasound-sensitive nanospheres produced by a pH-induced micelle-to-vesicle transition for tumor-targeted drug delivery

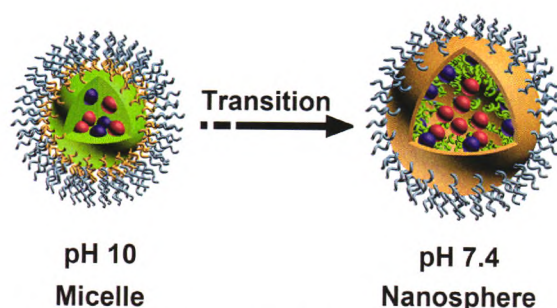
Yiru Wang^{1,2}, Tinghui Yin^{1,2}, Zhenwei Su², Chen Qiu¹, Yong Wang², Rongqin Zheng^{1,2,*}, Meiwan Chen³, and Xintao Shuai^{1,2,*}

¹ The Third Affiliated Hospital of Sun Yat-sen University, China

² Sun Yat-sen University, China

³ University of Macau, Macau, China

3710–3721



Nanospheres with ultrasound sensitivity and a uniform size distribution for effective drug delivery to solid tumors are described here; the nanospheres were prepared by a pH-induced micelle-to-vesicle transition, which allowed the encapsulation of a hydrophobic phase-transitional imaging agent into the vesicular lumen. A tumor site-specific release and tissue-penetrating delivery of an anticancer drug was achieved *in vivo*.

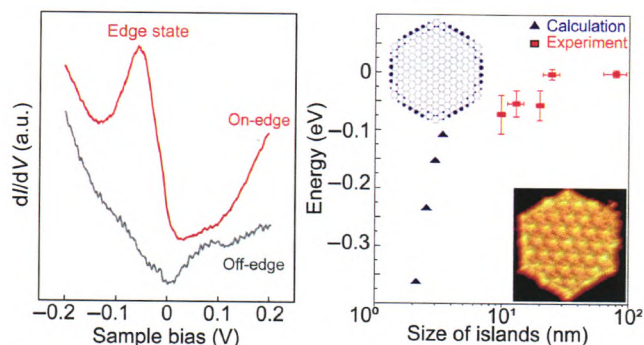
Recovery of edge states of graphene nanoislands on an iridium substrate by silicon intercalation

Hui Chen¹, Yande Que¹, Lei Tao¹, Yu-Yang Zhang^{1,2}, Xiao Lin¹, Wende Xiao¹, Dongfei Wang¹, Shixuan Du^{1,*}, Sokrates T. Pantelides^{2,1}, and Hong-Jun Gao^{1,*}

¹ Institute of Physics & University of Chinese Academy of Sciences, Chinese Academy of Sciences, China

² Vanderbilt University, USA

3722–3729



Edge states of free-standing graphene nanoislands suppressed by Ir substrates can be recovered by intercalating a layer of Si atoms between the graphene and the Ir substrate. The edge states gradually shift to the Fermi level with increasing island size.

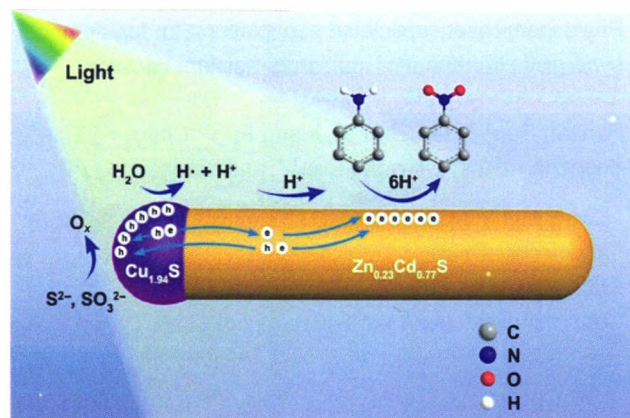
Photocatalytic hydrogenation of nitroarenes using $\text{Cu}_{1.94}\text{S}-\text{Zn}_{0.23}\text{Cd}_{0.77}\text{S}$ heteronanorods

Zhanjun Yu¹, Zheng Chen¹, Yueguang Chen², Qing Peng^{1,*}, Rui Lin¹, Yu Wang¹, Rongan Shen¹, Xing Cao¹, Zhongbin Zhuang^{2,*}, and Yadong Li^{1,*}

¹ Tsinghua University, China

² Beijing University of Chemical Technology, China

3730–3738



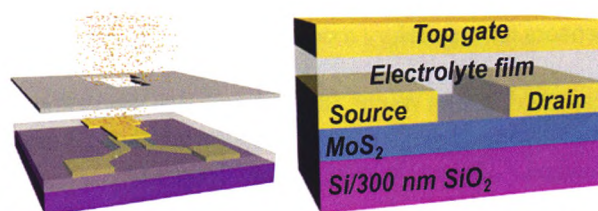
Active hydrogen species and photo-generated electrons can be directly applied to the hydrogenation process with $\text{Cu}_{1.94}\text{S}-\text{Zn}_{0.23}\text{Cd}_{0.77}\text{S}$ semiconductor heterojunction nanorods.

Large capacitance and fast polarization response of thin electrolyte dielectrics by spin coating for two-dimensional MoS_2 devices

Wu Zan, Qiaochu Zhang, Hu Xu, Fuyou Liao, Zhongxun Guo, Jianan Deng, Jing Wan*, Hao Zhu, Lin Chen, Qingqing Sun, Shijin Ding, Peng Zhou, Wenzhong Bao*, and David Wei Zhang*

Fudan University, China

3739–3745



This work demonstrates a top-gated MoS_2 transistor with a spin-coated electrolyte layer as the dielectric. The superior carrier tuning capability together with a small film thickness of the electrolyte layer enables good performance at a relatively high operating frequency.

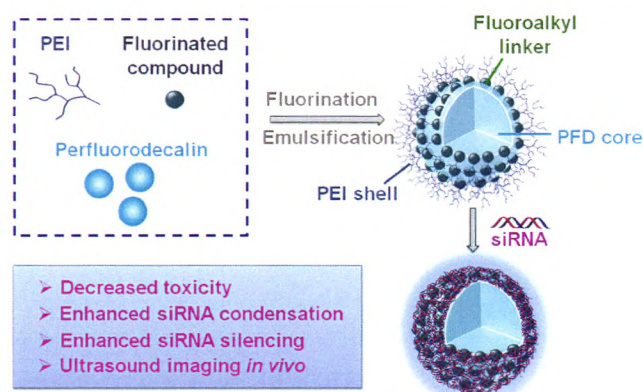
Development of fluorinated polyplex nanoemulsions for improved small interfering RNA delivery and cancer therapy

Gang Chen¹, Kaikai Wang¹, Pengkai Wu¹, Yixin Wang¹, Zhanwei Zhou¹, Lifang Yin¹, Minjie Sun¹, and David Oupický^{1,2,*}

¹ China Pharmaceutical University, China

² University of Nebraska Medical Center, USA

3746–3761



This study introduces fluorinated emulsion polyplexes as a safe and efficient method for small interfering RNA (siRNA) delivery.

Phytochemical-encapsulated nanoplatform for “on-demand” synergistic treatment of multidrug-resistant bacteria

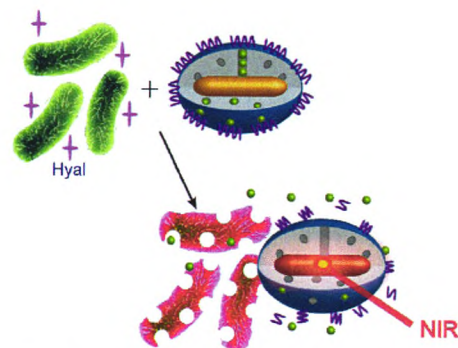
Panpan Sun^{1,3}, Yan Zhang¹, Xiang Ran¹, Chaoying Liu^{2,*}, Zhenzhen Wang¹, Jinsong Ren^{1,*}, and Xiaogang Qu^{1,*}

¹ Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, China

² Jilin University, China

³ University of Science and Technology of China, China

3762–3770



An “on-demand” delivery system was developed to enhance the bioavailability and selectivity of phytochemicals. The antimicrobial effect against multidrug-resistant strains was improved by the combination of chemo-photothermal therapy.

Self-powered nanofiber-based screen-print triboelectric sensors for respiratory monitoring

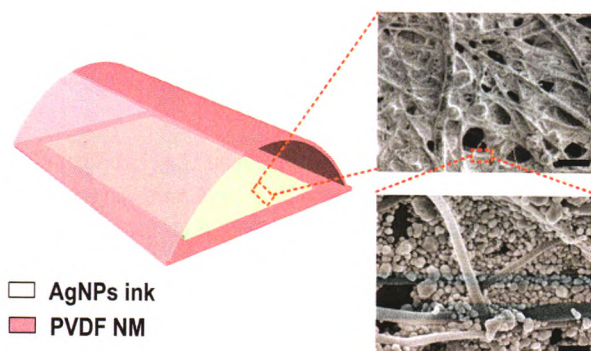
Ran Cao¹, Jiaona Wang², Shuyu Zhao¹, Wei Yang¹, Zuqing Yuan¹, Yingying Yin¹, Xinyu Du¹, Nian-Wu Li¹, Xiuling Zhang¹, Xiuyan Li², Zhong Lin Wang^{1,3}, and Congju Li^{1,*}

¹ National Center for Nanoscience and Technology(NCNST), China

² Beijing Institute of Fashion Technology, China

³ Georgia Institute of Technology, USA

3771–3779



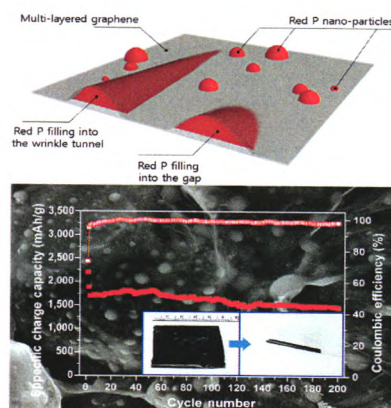
A self-powered and nanofiber-based triboelectric sensor (SNTS) is fabricated by batch-scale fabrication technologies using electrospinning and screen-printing for health monitoring via respiratory monitoring.

Single-step flash-heat synthesis of red phosphorus/graphene flame-retardant composite as flexible anodes for sodium-ion batteries

Yihang Liu, Anyi Zhang, Chenfei Shen, Qingzhou Liu, Jiansong Cai, Xuan Cao, and Chongwu Zhou*

University of Southern California, USA

3780–3790



Nanosized red phosphorus (RP) was deposited on the surface of reduced graphene oxide (rGO) and in the void spaces between rGO layers through a single-step flash-heat treatment coupled with simultaneous reduction of graphene oxide. The resulting RP/rGO flexible film exhibited excellent electrochemical performance toward sodium-ion storage, as well as superior flame retardancy, associated with the RP component.

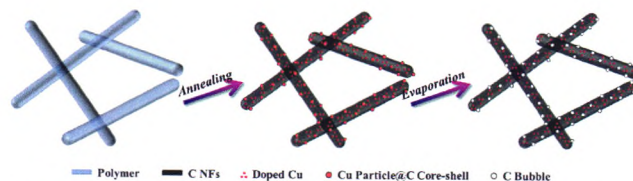
Osiers-sprout-like heteroatom-doped carbon nanofibers as ultrastable anodes for lithium/sodium ion storage

Hang Zhang¹, Guanhua Zhang^{1,*}, Zhiqin Li¹, Ke Qu², Huimin Shi¹, Qingfeng Zhang¹, Huigao Duan¹, and Jianhui Jiang^{1,*}

¹ Hunan University, China

² Massachusetts Institute of Technology, USA

3791–3801



We report an *in situ* carbothermic reduction process for preparing osiers-sprout-like heteroatom-doped carbon nanofibers as anode materials with ultrastable Li⁺/Na⁺ storage.

Metallized siligraphene nanosheets (SiC₇) as high capacity hydrogen storage materials

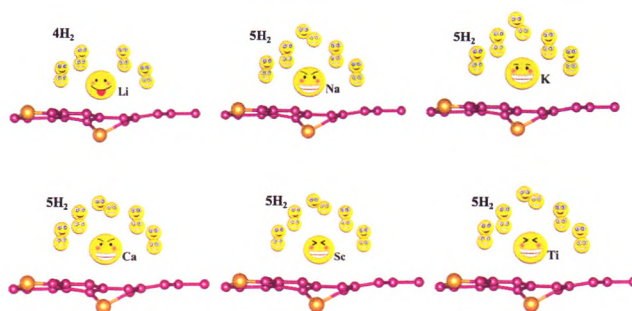
Syeda R. Naqvi¹, Tanveer Hussain^{3,*}, Wei Luo¹, and Rajeev Ahuja^{1,2}

¹ Uppsala University, Sweden

² Royal Institute of Technology (KTH), Sweden

³ The University of Queensland, Australia

3802–3813



Metal adatoms strongly bind to SiC₇ sheets and obtain partial positive charges upon adsorption. These positively charged species induce an electric field, which is responsible for the polarization and subsequent adsorption of H₂ molecules in the vicinity of the adatoms.

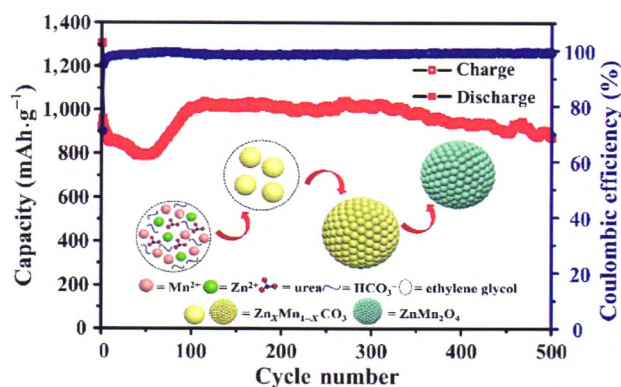
Ultrahigh-performance mesoporous ZnMn₂O₄ microspheres as anode materials for lithium-ion batteries and their *in situ* Raman investigation

Xiaobin Zhong¹, Xiaoxiao Wang¹, Huiyuan Wang^{2,*}, Zhizheng Yang², Yuxiong Jiang^{1,*}, Jianfeng Li^{1,*}, and Zhongqun Tian¹

¹ Xiamen University, China

² Jilin University, China

3814–3823



High-performance mesoporous ZnMn₂O₄ microspheres were fabricated using a solvothermal method to finely control the viscosity of the synthesis solution. We used *in situ* Raman spectroscopy to acquire insight into the electrochemical process for mesoporous ZnMn₂O₄.

In situ observation of atomic movement in a ferroelectric film under an external electric field and stress

Hyeon Jun Lee¹, Er-Jia Guo^{2,3}, Taewon Min⁴, Seung Hyun Hwang¹, Su Yong Lee⁵, Kathrin Dörr³, Jaekwang Lee⁴, and Ji Young Jo^{1,*}

¹ Gwangju Institute of Science and Technology, Republic of Korea

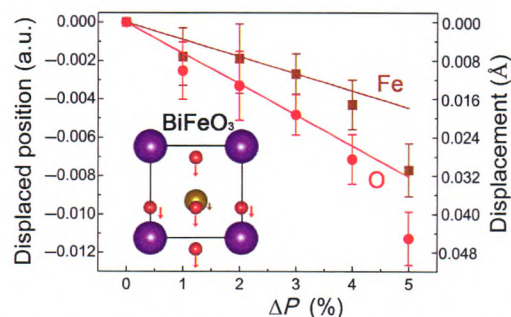
² Oak Ridge National Laboratory, USA

³ Martin-Luther-University, Germany

⁴ Pusan National University, Republic of Korea

⁵ Pohang Accelerator Laboratory, Republic of Korea

3824–3832



Atomic movement in a ferroelectric thin film under external electric field and stress was demonstrated for the first time using time-resolved X-ray diffraction. This study indicates that the distance between Fe and O atoms is a key factor determining the polarization in BiFeO₃ thin films, rather than the simple displacement of the center atom and/or tetragonality of the unit cell.

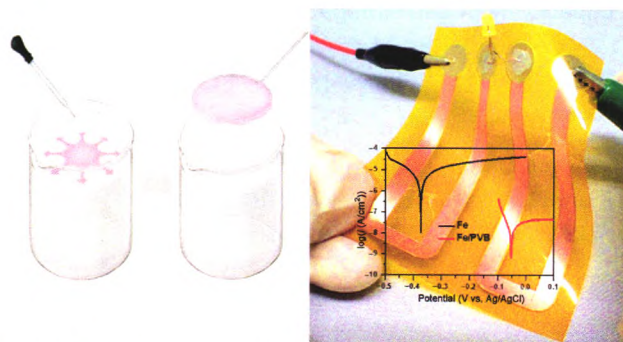
Large-area, transferable sub-10 nm polymer membranes at the air–water interface

Ya Huang^{1,2}, Kai Huang¹, Naveed Hussain¹, Hidetoshi Matsumoto^{2,*}, and Hui Wu^{1,*}

¹ Tsinghua University, China

² Tokyo Institute of Technology, Japan

3833–3843



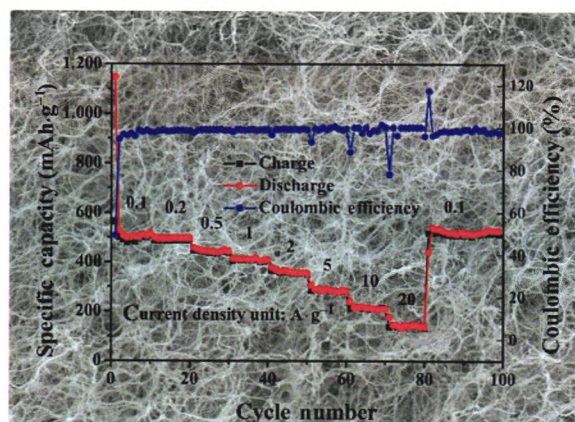
We report a facile and scalable method to obtain large-scale freestanding polymer membranes with thicknesses below 10 nm at an air–water interface. These polymer membranes exhibited effective anti-corrosion protection for flexible electronic circuits.

MoS₂ embedded in 3D interconnected carbon nanofiber film as a free-standing anode for sodium-ion batteries

Hai Yang, Min Wang, Xiaowu Liu, Yu Jiang, and Yan Yu*

University of Science and Technology of China, China

3844–3853



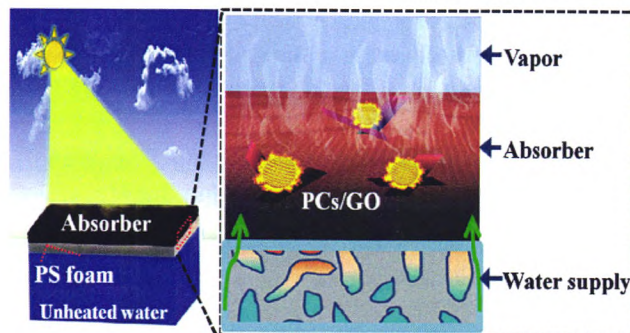
Nanosized MoS₂ embedded in a three-dimensional interconnected carbon nanofibers film was synthesized through a facile, scalable, and effective synthesis process. The synthesized material exhibits superior sodium storage performance.

Bifunctional plasmonic colloidosome/graphene oxide-based floating membranes for recyclable high-efficiency solar-driven clean water generation

Minmin Wang^{1,2}, Jie Zhang¹, Ping Wang¹, Chuanping Li^{1,2}, Xiaolong Xu¹, and Yongdong Jin^{1,*}

¹ Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, China

² University of Chinese Academy of Sciences, China



A high-efficiency solar steam generation membrane system (with a solar thermal conversion efficiency up to 92% at $10 \text{ kW} \cdot \text{m}^{-2}$) based on plasmonic colloidosome (PCs) and graphene oxide (GO) was developed and further exploited by modification with TiO_2 nanoparticles for solar-driven catalytic generation of clean water.

3854–3863

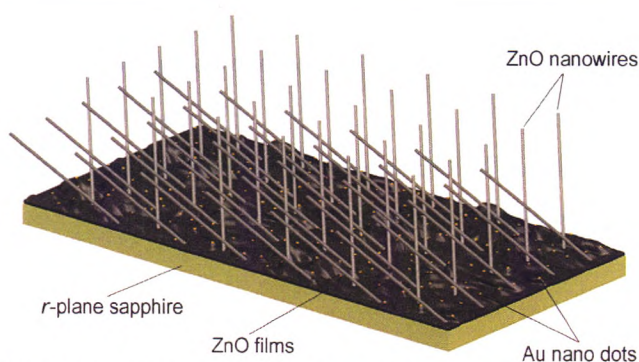
Growth modulation of simultaneous epitaxy of ZnO obliquely aligned nanowire arrays and film on *r*-plane sapphire substrate

Yongchun Xiao^{1,2}, Yaoyao Tian^{1,2}, Shujing Sun¹, Chenlong Chen^{1,*}, and Buguo Wang^{3,*}

¹ Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, China

² Fujian Normal University, China

³ Wright State University, USA



We report the successful simultaneous epitaxial growth of ZnO obliquely aligned nanowire arrays and film on *r*-plane sapphire substrate. We propose a simple approach for *in situ* building conductive connection between individually separated nanowires grown on an insulating substrate and describe the detailed synthesis strategy, mechanism, and material properties.

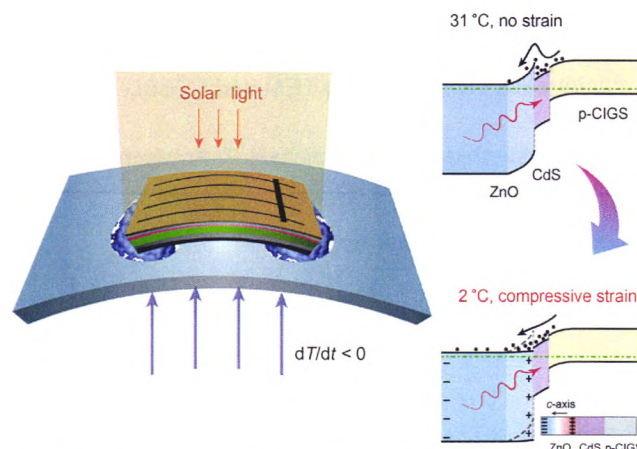
3864–3876

Piezo-phototronic and pyro-phototronic effects to enhance $\text{Cu}(\text{In}, \text{Ga})\text{Se}_2$ thin film solar cells

Laipan Zhu¹, Pei Lin¹, Baodong Chen¹, Longfei Wang¹, Libo Chen¹, Ding Li¹, and Zhong Lin Wang^{1,2,*}

¹ Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, China

² University of Chinese Academy of Sciences, China



Applying the piezo- and pyro-phototronic effects simultaneously offers a new opportunity for enhancing the output performance of commercial $\text{Cu}(\text{In}, \text{Ga})\text{Se}_2$ thin film solar cells.

3877–3885

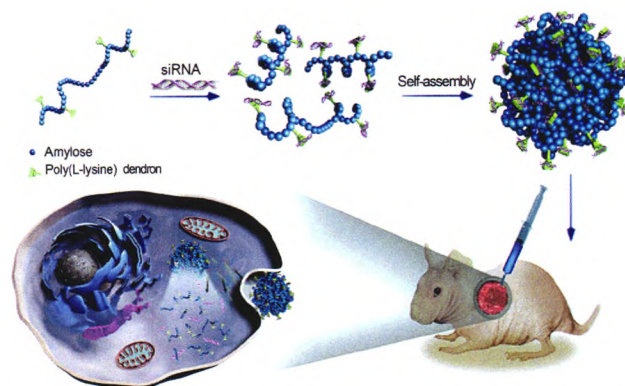
Inhibition of osteosarcoma growth and metastasis using a polysaccharide derivative of Amy-g-PLLD for the delivery of AEG-1 siRNA

Fen Wang¹, Jiadong Pang², Leilei Huang¹, Ran Wang¹, Qing Jiang², Liming Zhang^{2,*}, and Kang Sun^{2,*}

¹ The First Affiliated Hospital of Sun Yat-sen University, China

² Sun Yat-sen University, China

3886–3898



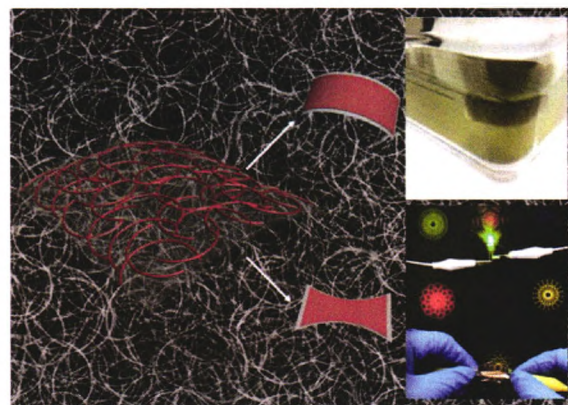
Amylose-derived cationic carrier was employed as a delivery reagent to study the interference of astrocyte elevated gene-1 (AEG-1) in osteosarcoma cells.

Synthesis of ultrathin semicircle-shaped copper nanowires in ethanol solution for low haze flexible transparent conductors

Ye Zhang, Jiangna Guo, Dan Xu, Yi Sun, and Feng Yan*

Soochow University, China

3899–3910



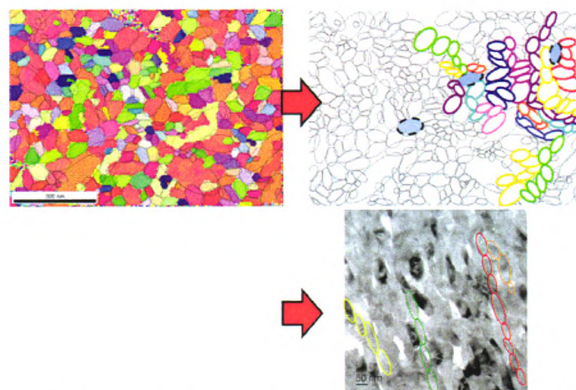
Ultrathin semicircle-shaped copper nanowires were synthesized in ethanol solution and were applied as flexible transparent conductors (FTCs). The fabricated FTCs show excellent optoelectrical performance during stretching indicating their enormous potential in flexible optical devices.

Human dental enamel: A natural nanotechnology masterpiece investigated by TEM and t-EBSD

Anjela Koblischka-Veneva*, Michael R. Koblischka, Jörg Schmauch, and Matthias Hannig

Saarland University, Germany

3911–3921



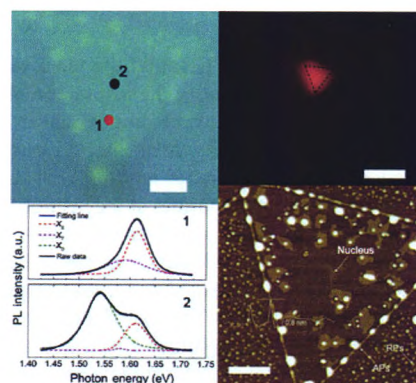
Herein, human dental enamel was studied using transmission electron microscopy (TEM) and electron backscatter diffraction (EBSD). The determination of apatite grain orientation enables the deduction of a chain formation mechanism of apatite grains with similar orientation, which can then be seen in the TEM images.

Strong room-temperature emission from defect states in CVD-grown WSe₂ nanosheets

Shudong Zhao, Lei Tao, Peng Miao, Xianjie Wang, Zhiguo Liu, Yi Wang, Bingsheng Li, Yu Sui*, and Yang Wang*

Harbin Institute of Technology, China

3922–3930



A strong and sharp defect-related photoluminescence (PL) peak detected at ambient conditions is reported in as-prepared chemical vapor deposition (CVD)-grown tungsten diselenide nanosheets.

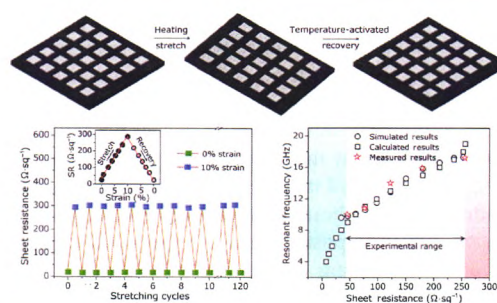
A temperature-activated nanocomposite metamaterial absorber with a wide tunability

Weiwei Li^{1,2}, Lingyu Zhao^{1,2}, Zhaohe Dai¹, Hao Jin^{1,*}, Feng Duan^{1,2}, Junchao Liu^{1,2}, Zhihui Zeng¹, Jun Zhao^{1,*}, and Zhong Zhang^{1,*}

¹ National Center for Nanoscience and Technology, China

² University of Chinese Academy of Sciences, China

3931–3942



Nanocomposite ink is applied to construct metamaterial structures on a flexible shape memory polymer composite. The composites effectively improve the repeatability, reliability, and tunability of sheet resistance because of the shape memory effect of the dielectric substrate and piezoresistive effect of the nanocomposite, and provide a new design concept of a microwave absorber and other electromagnetic devices.

Plasmon hybridization engineering in self-organized anisotropic metasurfaces

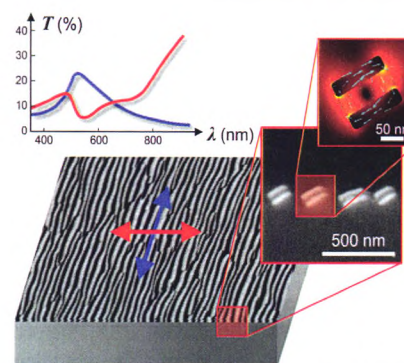
Maria C. Giordano^{1,†}, Stefano Longhi², Matteo Borelli¹, Andrea Mazzanti², Francesco Buatier de Mongeot^{1,*}, and Giuseppe Della Valle^{2,*}

¹ Università di Genova, Italy

² Politecnico di Milano, Italy

[†] Present address: Laboratorio NEST, Italy

3943–3956



The engineering of self-organized plasmonic metasurfaces is demonstrated using a maskless technique. The proposed nanofabrication approach enables gap-plasmon nanostrip dimer arrays providing optical dichroism and magnetic dipole resonance.

Erratum to: Charge transfer in graphene/polymer interfaces for CO₂ detection (<https://doi.org/10.1007/s12274-017-1857-z>)

3957

Erratum to: High-purity helical carbon nanotubes by trace-waterassisted chemical vapor deposition: Large-scale synthesis and growth mechanism (<https://doi.org/10.1007/s12274-017-1897-4>)

3958

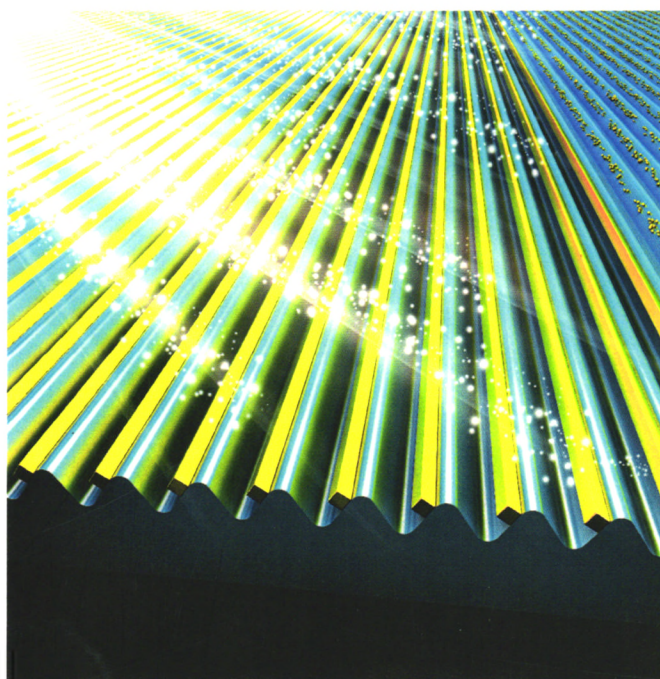
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