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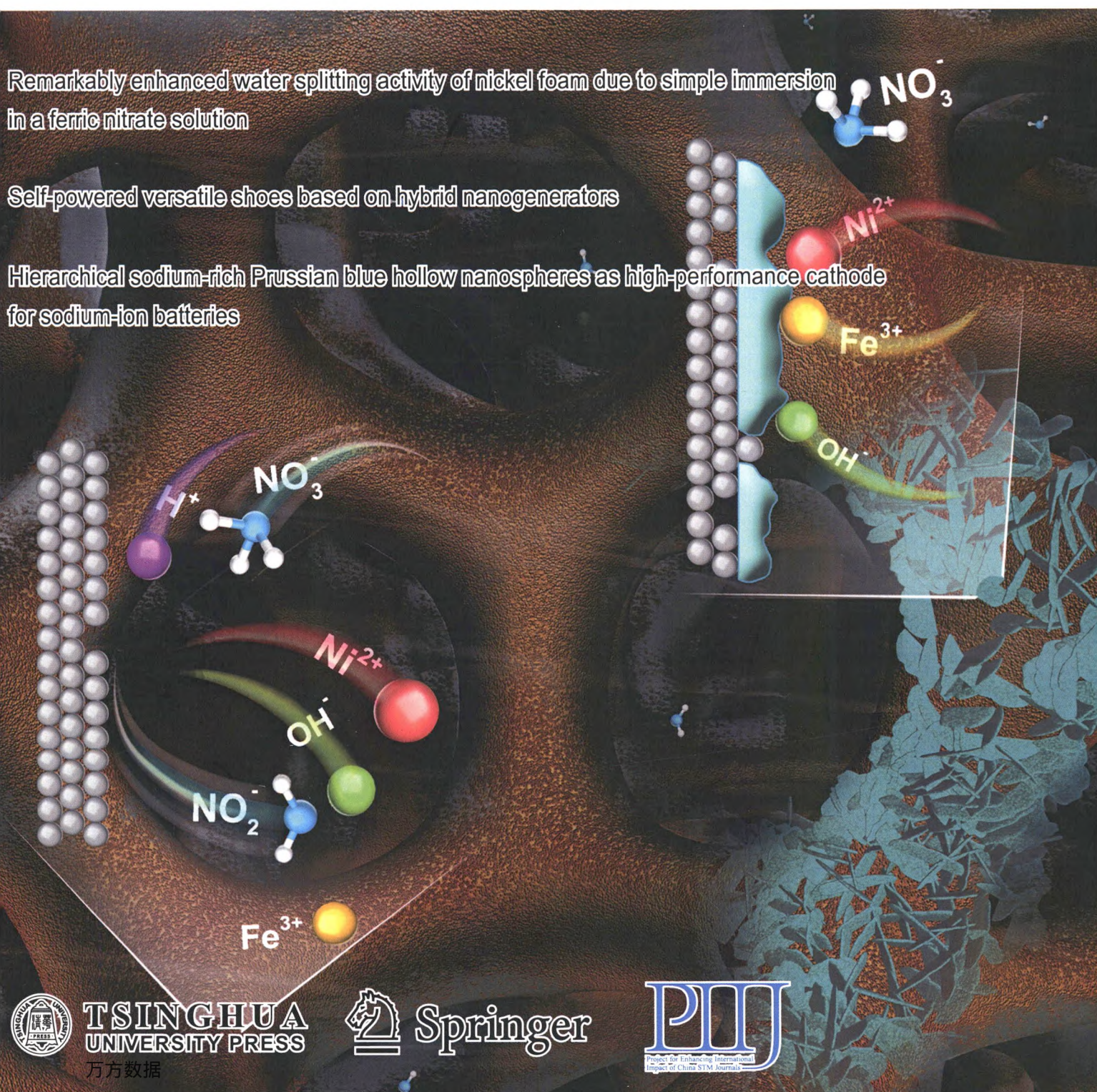


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Remarkably enhanced water splitting activity of nickel foam due to simple immersion in a ferric nitrate solution

Self-powered versatile shoes based on hybrid nanogenerators

Hierarchical sodium-rich Prussian blue hollow nanospheres as high-performance cathode for sodium-ion batteries



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Research Articles

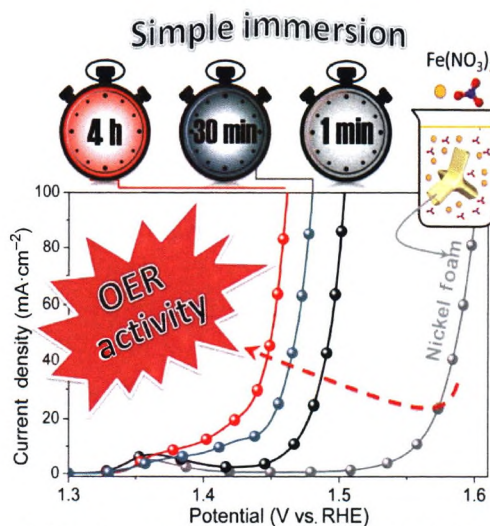
Remarkably enhanced water splitting activity of nickel foam due to simple immersion in a ferric nitrate solution

Huajie Yin¹, Lixue Jiang¹, Porun Liu¹, Mohammad Al-Mamun¹, Yun Wang¹, Yu Lin Zhong¹, Huagui Yang¹, Dan Wang¹, Zhiyong Tang¹, and Huijun Zhao^{1,2,*}

¹ Griffith University, Australia

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

3959–3971



We report that the oxygen evolution reaction activity of nickel foam can be enhanced remarkably via only simple immersion in a ferric nitrate solution at room temperature. We demonstrate that the oxidation of the nickel foam surface by nitrate ions can increase the near-surface concentrations of OH^- and Ni^{2+} ions, which results in the *in situ* deposition of a highly active amorphous Ni-Fe hydroxide layer.

Self-powered versatile shoes based on hybrid nanogenerators

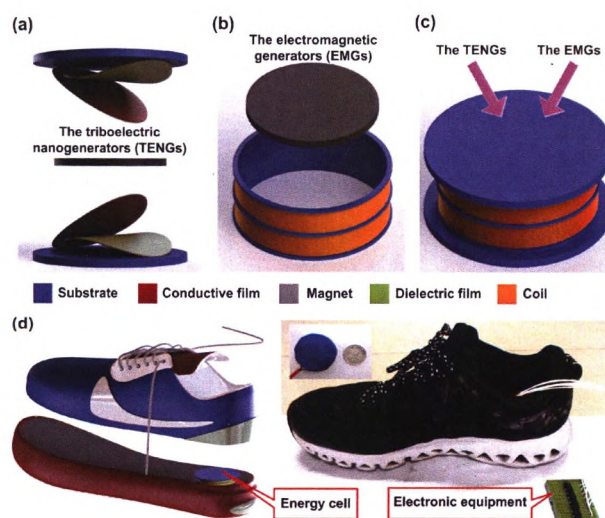
Long Liu^{1,2}, Wei Tang^{1,2}, Chaoran Deng^{1,2}, Baodong Chen^{1,2}, Kai Han^{1,2}, Wei Zhong^{1,2}, and Zhong Lin Wang^{1,2,3,*}

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

² University of Chinese Academy of Sciences, China

³ Georgia Institute of Technology, USA

3972–3978



An energy cell based on hybrid nanogenerators was developed and applied in self-powered versatile shoes.

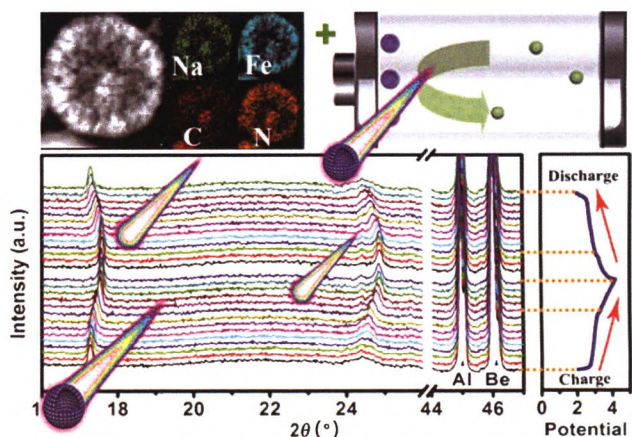
Hierarchical sodium-rich Prussian blue hollow nano-spheres as high-performance cathode for sodium-ion batteries

Xiao Tang¹, Hao Liu¹, Dawei Su¹, Peter H. L. Notten^{2,3}, and Guoxiu Wang^{1,*}

¹ University of Technology Sydney, Australia

² Eindhoven University of Technology, The Netherlands

³ Forschungszentrum Jülich, Germany



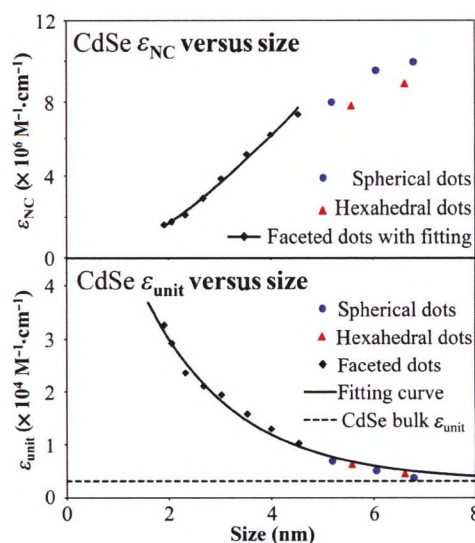
Novel Na-rich sodium iron hexacyanoferrate nanospheres with a hierarchical hollow architecture have been fabricated by a facile template method. Due to the unique hollow sphere morphology, sodium iron hexacyanoferrate nanospheres can achieve superior electrochemical performance as the cathode material for sodium-ion batteries.

3979–3990

Extinction coefficient per CdE (E = Se or S) unit for zinc-blende CdE nanocrystals

Jiongzhao Li, Jialiang Chen, Yongmiao Shen, and Xiaogang Peng*

Zhejiang University, China



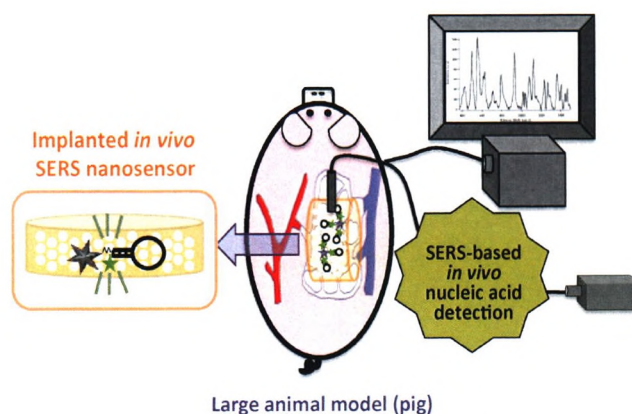
Unlike the extinction coefficient per nanocrystal (ϵ_{NC}), the extinction coefficient per CdE unit (ϵ_{unit}) is found to be insensitive to the shape and ligand coverage of the nanocrystals and can be determined accurately.

3991–4004

Surface-enhanced Raman scattering nanosensors for *in vivo* detection of nucleic acid targets in a large animal model

Hsin-Neng Wang, Janna K. Register, Andrew M. Fales, Naveen Gandra, Eugenia H. Cho, Alina Boico, Gregory M. Palmer, Bruce Klitzman, and Tuan Vo-Dinh*

Duke University, USA



Large animal model (pig)

We report the *in vivo* detection of nucleic acid targets using a promising type of surface-enhanced Raman scattering (SERS) nanosensor implanted in the skin of a large animal model (pig). The *in vivo* nanosensor used in this study involves an “inverse molecular sentinel” (iMS) detection scheme using plasmonics-active nanostars as an efficient *in vivo* sensing platform.

4005–4016

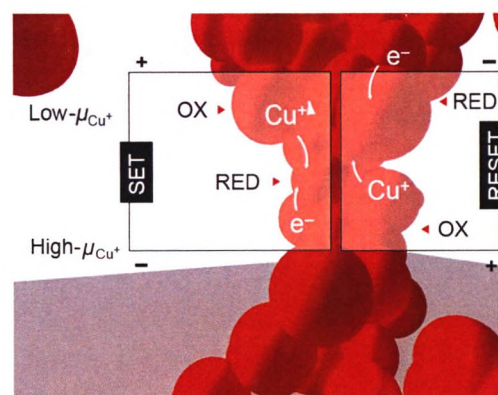
Voltage-controlled reverse filament growth boosts resistive switching memory

Attilio Belmonte^{1,*}, Umberto Celano^{1,*}, Zhe Chen^{1,2}, Janaki Radhaskrishnan^{1,3}, Augusto Redolfi¹, Sergiu Clima¹, Olivier Richard¹, Hugo Bender¹, Gouri Sankar Kar¹, Wilfried Vandervorst^{1,3}, and Ludovic Goux¹

¹ IMEC, Belgium

² Peking University, China

³ KU Leuven, Belgium



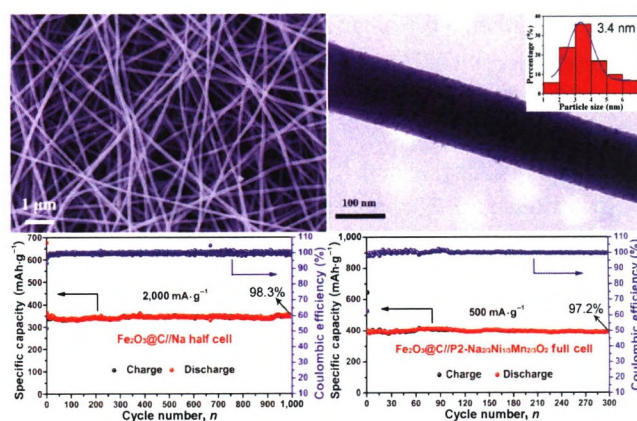
Reverse filament growth has proved to be key for obtaining a first-in-class Cu-based switching device with an endurance of up to 10^6 cycles with a 10^2 read window, low power (sub-10- μ A) switching operation, outstanding disturb immunity, and optimal stability of the filament over time.

4017–4025

Self-standing Na-storage anode of Fe_2O_3 nanodots encapsulated in porous N-doped carbon nanofibers with ultra-high cyclic stability

Yongchang Liu, Fanfan Wang, and Li-Zhen Fan*

University of Science and Technology Beijing, China



Self-standing anode materials of ultrasmall $\gamma\text{-Fe}_2\text{O}_3$ nanodots (~ 3.4 nm) homogeneously encapsulated in interlinked porous N-doped carbon nanofibers were prepared by an electrospinning technique, and exhibited unprecedentedly high cyclic stability in both half and full Na-ion batteries.

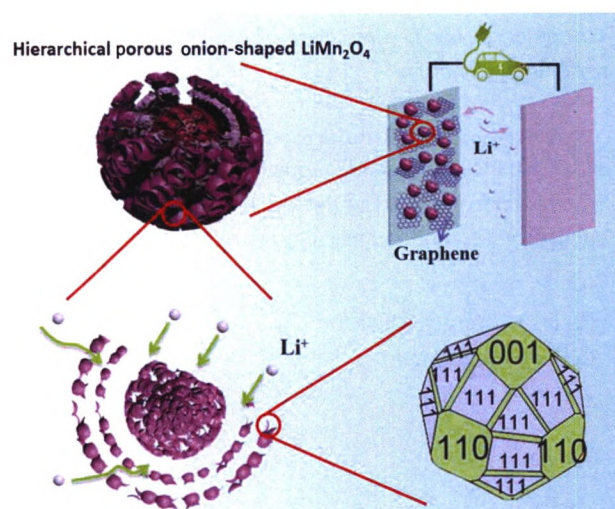
4026–4037

Hierarchical porous onion-shaped LiMn_2O_4 as ultrahigh-rate cathode material for lithium ion batteries

Zihe Li¹, Xiangming Feng^{1,*}, Liwei Mi², Jinyun Zheng¹, Xiaoyang Chen¹, and Weihua Chen^{1,*}

¹ Zhengzhou University, China

² Zhongyuan University of Technology, China



Hierarchical porous onion-shaped LiMn_2O_4 (LMO) is used as ultrahigh-rate cathode material for lithium ion batteries.

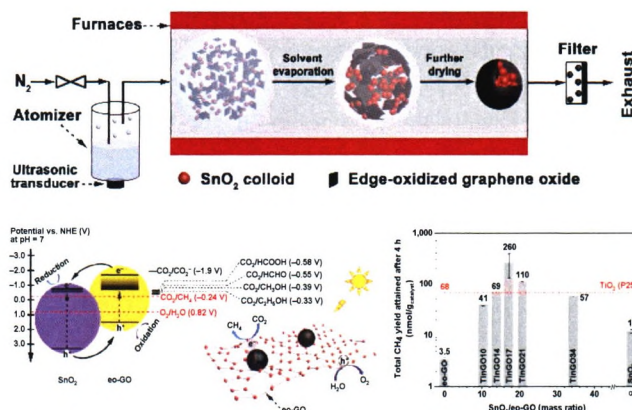
4038–4048

Scalable fabrication of $\text{SnO}_2/\text{eo-GO}$ nanocomposites for the photoreduction of CO_2 to CH_4

Yujia Liang¹, Wei Wu¹, Peng Wang¹, Sz-Chian Liou¹, Dongxia Liu^{1,*}, and Sheryl H. Ehrman^{1,2,*}

¹ University of Maryland, USA

² San Jose State University, USA



A simple, scalable, and commercially applicable process for the fabrication of high-performance photocatalysts is developed. Nanocomposites composed of SnO_2 colloids and edge-oxidized graphene-oxide sheets reduce CO_2 to CH_4 more efficiently than SnO_2 or commercialized TiO_2 .

4049–4061

Liquid-FEP-based U-tube triboelectric nanogenerator for harvesting water-wave energy

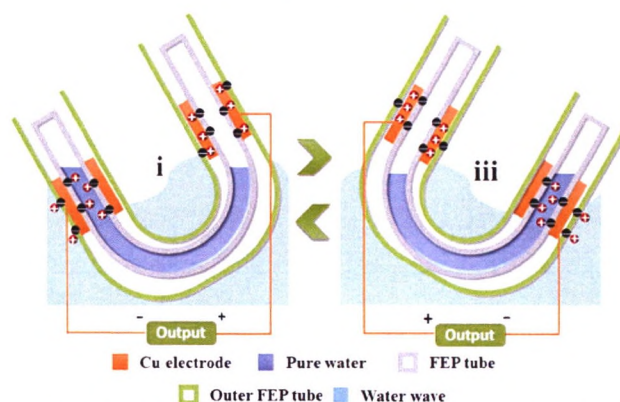
Lun Pan^{1,2,3}, Jiyu Wang¹, Peihong Wang¹, Ruijie Gao^{2,3}, Yi-Cheng Wang¹, Xiangwen Zhang^{2,3}, Ji-Jun Zou^{2,3}, and Zhong Lin Wang^{1,4,*}

¹ Georgia Institute of Technology, USA

² Tianjin University, China

³ Collaborative Innovative Center of Chemical Science and Engineering (Tianjin), China

⁴ Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, China



A U-tube triboelectric nanogenerator (TENG) based on a liquid–solid mode is assembled with optimal parameters to harvest water-wave energy, showing a high output with V_{oc} of 350 V, I_{sc} of 1.75 μA , and a power density of 2.04 W/m^3 .

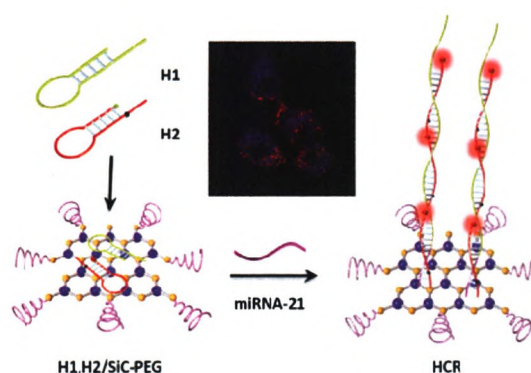
4062–4073

Photoluminescent two-dimensional SiC quantum dots for cellular imaging and transport

Yu Cao, Haifeng Dong*, Shaotao Pu, and Xueji Zhang*

University of Science & Technology Beijing, China

4074–4081



Ultrasmall two-dimensional (2D) SiC quantum dots (QDs) with a long fluorescence lifetime of 2.59 μ s were synthesized for the first time using a facile hydrothermal route. The prepared SiC QDs were used for efficient intracellular imaging and detection of intracellular low-abundance microRNA (miRNA).

Visualizing grain boundaries in monolayer MoSe₂ using mild H₂O vapor etching

Jinhuan Wang¹, Xiaozhi Xu², Ruixi Qiao², Jing Liang², Can Liu², Bohao Zheng², Lei Liu², Peng Gao², Qingze Jiao¹, Dapeng Yu³, Yun Zhao^{1,*}, and Kaihui Liu^{2,4,*}

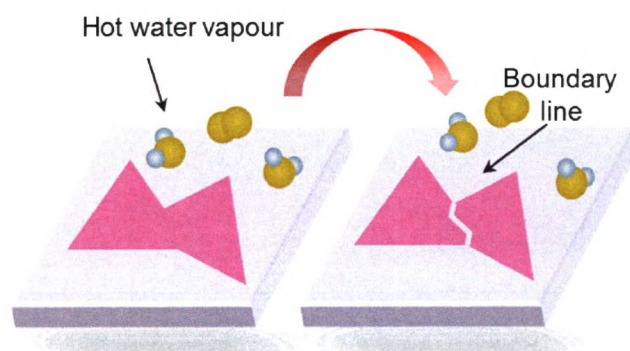
¹ Beijing Institute of Technology, China

² Peking University, China

³ South University of Science and Technology of China, China

⁴ Collaborative Innovation Centre of Quantum Matter, China

4082–4089



After exposure to hot water vapor, the grain boundaries of transition metal dichalcogenides are mildly oxidized with evident optical contrast, whereas the grain domains themselves maintain their intact lattice structure.

Triboelectric nanogenerator enhanced multilayered antibacterial nanofiber air filters for efficient removal of ultrafine particulate matter

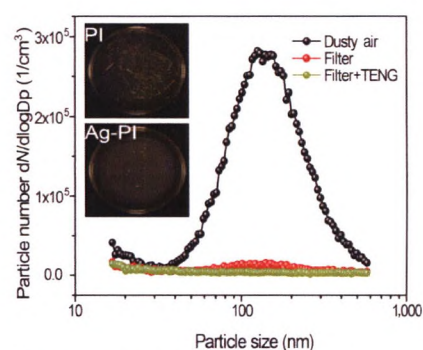
Guang Qin Gu^{1,2}, Chang Bao Han^{1,2}, Jing Jing Tian^{1,2}, Tao Jiang^{1,2}, Chuan He^{1,2}, Cun Xin Lu^{1,2}, Yu Bai^{1,2}, Jin Hui Nie^{1,2}, Zhou Li^{1,2,*}, and Zhong Lin Wang^{1,2,3,*}

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

² University of Chinese Academy of Sciences, China

³ Georgia Institute of Technology, USA

4090–4101



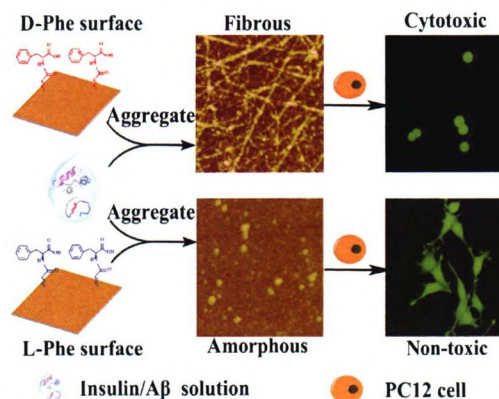
A rotating triboelectric nanogenerator (R-TENG) is used to charge multilayered silver nanoparticle-doped polyimide (Ag-PI) nanofiber films. After the charging of the multilayered Ag-PI nanofiber films, the filter could not only remove all particulate matter (PM) particles larger than 0.54 μ m, but also ultrafine particles smaller than 100 nm. The filter has excellent antibacterial property because of the doped Ag nanoparticles.

Cross-fibrillation of insulin and amyloid β on chiral surfaces: Chirality affects aggregation kinetics and cytotoxicity

Zhi Du^{1,2}, Yijia Guan^{1,2}, Chao Ding^{1,2}, Nan Gao^{1,*}, Jinsong Ren¹, and Xiaogang Qu^{1,*}

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

² University of Chinese Academy of Sciences, China



Surface chirality profoundly affects the aggregation kinetics, structure, morphology, and cellular responses of the cross-aggregates of amyloid- β peptide (A β) and insulin.

4102–4110

Low-dose exposure to graphene oxide significantly increases the metal toxicity to macrophages by altering their cellular priming state

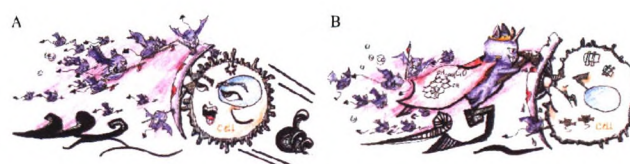
Jianqiang Zhu^{1,2}, Ming Xu^{1,3}, Fanfan Wang⁴, Ming Gao^{1,3}, Zhihong Zhang², Yong Xu², Wei Chen^{4,*}, and Sijin Liu^{1,3,*}

¹ Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China

² Tianjin Institute of Urology, China

³ University of Chinese Academy of Sciences, China

⁴ Nankai University, China



While intact cells could robustly defend heavy metal invasion, low-dose graphene oxide (GO) pre-treatment remarkably enhances the cellular uptake of cadmium (Cd) and other non-essential metal ions, by impairing the plasma membrane integrity and cytoskeletal meshwork in macrophages, resulting in cell injuries.

4111–4122

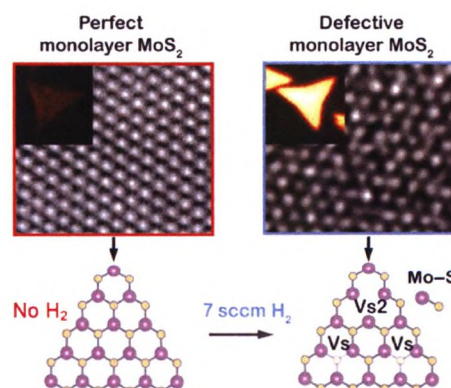
Controllable defects implantation in MoS₂ grown by chemical vapor deposition for photoluminescence enhancement

Ke Wu¹, Zhe Li², Jibo Tang², Xianglong Lv¹, Hailing Wang¹, Ruichun Luo³, Pan Liu³, Lihua Qian^{1,*}, Shunping Zhang^{2,*}, and Songliu Yuan¹

¹ Huazhong University of Science and Technology, China

² Wuhan University, China

³ Shanghai Jiaotong University, China



A controllable level of defects can be introduced into the MoS₂ monolayers by adding a hydrogen flow during chemical vapor deposition. By increasing the intensity of defects, the photoluminescence (PL) intensity of the defective MoS₂ can be enhanced by a factor of three compared to that of the perfect single crystal sample at atmospheric conditions.

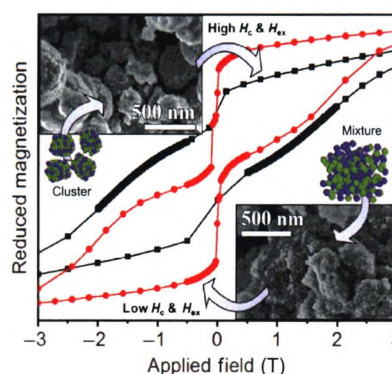
4123–4132

Strengthening nanocomposite magnetism through microemulsion synthesis

Yijun Xie, Alexandre H. Vincent, Haeun Chang, and Jeffrey D. Rinehart*

University of California, San Diego, USA

4133–4141



An exchange bias field of 0.32 T is achieved with minimal coercivity loss via annealing nanoparticles that are pre-arranged through a bottom-up microstructuring method. This microemulsion approach offers a simple and material-independent route to new heterostructured magnets.

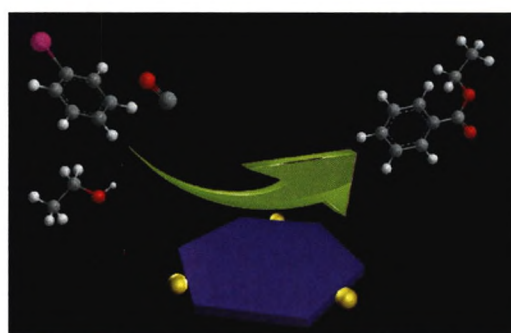
Preparation of freestanding palladium nanosheets modified with gold nanoparticles at edges

Xiangbo Zhang¹, Chao Lian², Zheng Chen^{1,*}, Chen Chen^{1,*}, and Yadong Li¹

¹ Tsinghua University, China

² Beijing Jiaotong University, China

4142–4148



Hexagonal ultrathin palladium nanosheets with edges modified by gold nanoparticles (Au@Pd nanosheets) were prepared using the galvanic replacement method. By virtue of the electronic interactions between the Pd nanosheets and Au nanoparticles, the Au@Pd nanosheets exhibited excellent catalytic performances in the formylation of iodobenzene by carbon monoxide. The novel nanocomposites could be applied as model catalysts to explore electronic effects in catalysis.

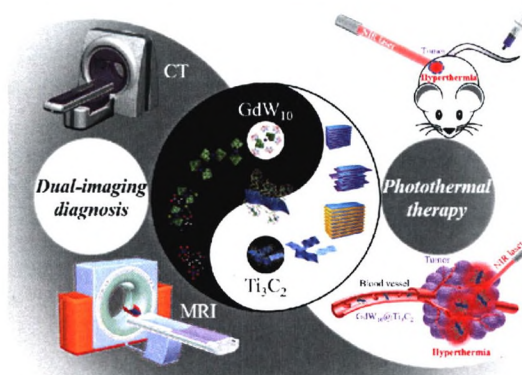
A polyoxometalate-functionalized two-dimensional titanium carbide composite MXene for effective cancer theranostics

Luyan Zong¹, Huixia Wu^{1,*}, Han Lin², and Yu Chen^{2,*}

¹ Shanghai Normal University, China

² Shanghai Institute of Ceramics, Chinese Academy of Sciences, China

4149–4168



GdW₁₀-integrated Ti₃C₂ MXene-based composite nanoplateforms enabled effective photothermal therapy with magnetic resonance (MR)/computed tomography (CT) imaging guidance toward tumor xenografts, resulting in effective tumor eradication without reoccurrence or adverse effects; these data are expected to promote the biomedical applications of MXenes in nanotheranostics.

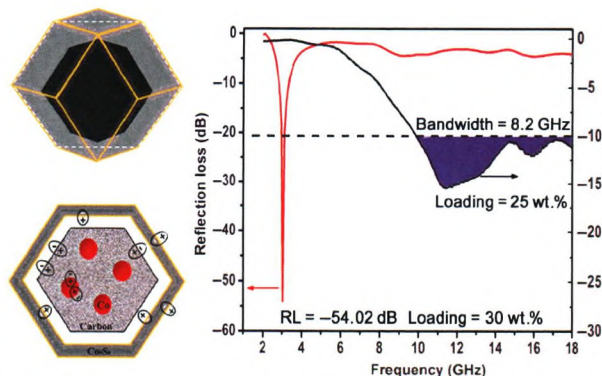
Yolk-shell structured Co-C/Void/Co₉S₈ composites with a tunable cavity for ultrabroadband and efficient low-frequency microwave absorption

Xiaofang Liu^{1,*}, Chengcheng Hao¹, Lihua He^{2,1}, Cheng Yang², Yubin Chen², Chengbao Jiang¹, and Ronghai Yu¹

¹ Beihang University, China

² Beijing Institute of Aeronautical Materials, China

4169–4182



A thin lightweight yolk-shell structured Co-C/Void/Co₉S₈ composite exhibited an ultrabroad absorption bandwidth at high frequencies and a strong microwave absorption at low frequencies.

Simultaneous elimination of cancer stem cells and bulk cancer cells by cationic-lipid-assisted nanoparticles for cancer therapy

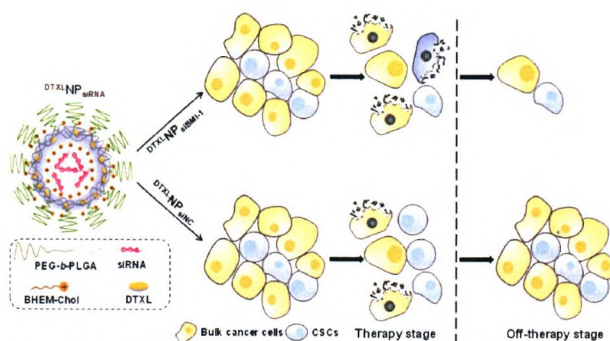
Kaige Chen¹, Song Shen^{2,3}, Gui Zhao¹, Zhiting Cao¹, Xianzhu Yang^{2,3,*}, and Jun Wang^{1,2,3,*}

¹ University of Science and Technology of China, China

² South China University of Technology, China

³ National Engineering Research Center for Tissue Restoration and Reconstruction, China

4183–4198



Treatment with DTXLNP_{siBMI-1} reduces the stemness of cancer stem cells (CSCs) and elevates chemosensitivity by downregulating BMI-1. Then, the encapsulated docetaxel (DTXL) destroys the CSCs and bulk cancer cells, achieving synergistic inhibition of tumor growth.

Extreme biomimetics: A carbonized 3D spongin scaffold as a novel support for nanostructured manganese oxide(IV) and its electrochemical applications

Tomasz Szatkowski¹, Kacper Kopczyński¹, Mykhailo Motylenko², Horst Borrmann³, Beata Mania¹, Małgorzata Graś¹, Grzegorz Lota¹, Vasilii V. Bazhenov^{2,4}, David Rafaja², Friedrich Roth², Juliane Weise², Enrico Langer⁵, Marcin Wysokowski¹, Sonia Żółtowska-Aksamitowska¹, Iaroslav Petrenko², Serguei L. Molodtsov^{2,4,6}, Jana Hubáľková⁷, Christos G. Aneziris⁷, Yvonne Joseph², Allison L. Stelling⁸, Hermann Ehrlich^{2,*}, and Teofil Jesionowski^{1,*}

¹ Poznan University of Technology, Poland

² TU Bergakademie Freiberg, Germany

³ Max Planck Institute for Chemical Physics of Solids, Germany

⁴ European X-Ray Free-Electron Laser Facility (XFEL) GmbH, Germany

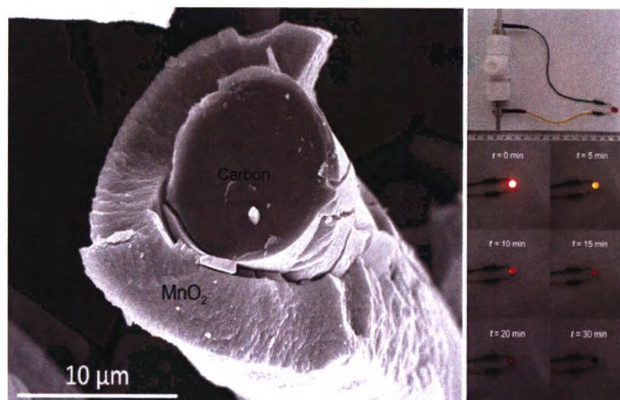
⁵ TU Dresden, Germany

⁶ ITMO University, Russia

⁷ TU Bergakademie, Germany

⁸ Duke University Medical School, USA

4199–4214



A novel three-dimensional (3D) nanostructured MnO₂-based electrochemically active composite was developed using a carbonized proteinaceous spongin template. The potential of extreme biomimetics for developing a new generation of nanostructured materials with 3D centimeter-scale architecture for energy storage and conversion generated from renewable natural sources is demonstrated.

Ultrasensitive H₂S gas sensors based on p-type WS₂ hybrid materials

Georgies Alene Asres¹, José J. Baldoví^{2,3}, Aron Dombovari¹, Topias Järvinen¹, Gabriela Simone Lorite¹, Melinda Mohl¹, Andrey Shchukarev⁴, Alejandro Pérez Paz^{3,5}, Lede Xian^{2,3}, Jyri-Pekka Mikkola^{4,6}, Anita Lloyd Spetz^{1,7}, Heli Jantunen¹, Ángel Rubio^{2,3,*}, and Krisztian Kordas^{1,*}

¹ University of Oulu, Finland

² Max Planck Institute for the Structure and Dynamics of Matter, Germany

³ Universidad del País Vasco, Spain

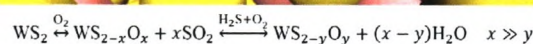
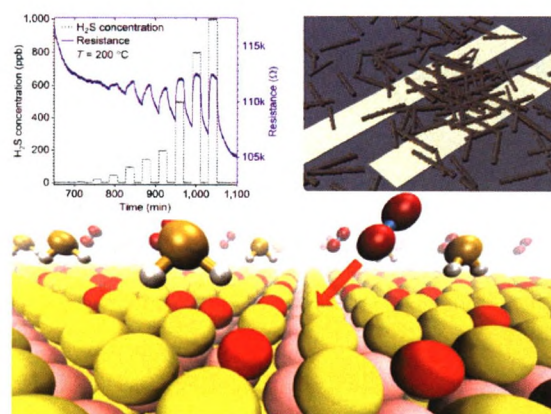
⁴ Umeå University, Sweden

⁵ Yachay Tech University, Ecuador

⁶ Åbo Akademi University, Finland

⁷ Linköping University, Sweden

4215–4224



WS₂ nanowire-nanoflake hybrids show excellent response to H₂S gas, with a sensitivity of 0.043 ppm⁻¹ and a detection limit of 20 ppm. The sensing mechanism is governed not only by the charge transfer/localization of the adsorbed gas but also by the competitive access of O and S to the anionic sites of the WS₂ lattice, which control the electrical behavior of the hybrid material.

Electrochemical behaviors of hierarchical copper nano-dendrites in alkaline media

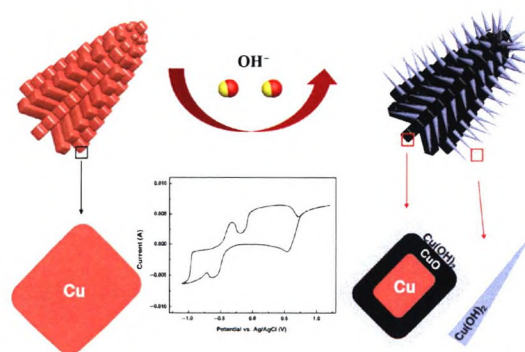
Bowei Zhang¹, Guang Yang¹, Chaojiang Li², Kang Huang³, Junsheng Wu^{3,*}, Shiji Hao¹, and Yizhong Huang^{1,*}

¹ Nanyang Technological University, Singapore

² National University of Singapore, Singapore

³ University of Science and Technology Beijing, China

4225–4231



In this study, hierarchical copper nano-dendrites (CuNDs) are fabricated via the electrodeposition method. A non-equilibrium oxidation process occurs on the as-obtained hierarchical CuNDs when they are subjected to electrochemical treatment in 0.1 M NaOH aqueous solution.

Imaging resolution of biocatalytic activity using nanoscale scanning electrochemical microscopy

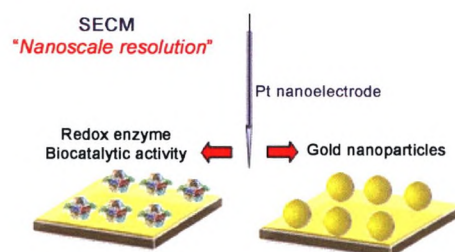
José M. Abad¹, Alvaro Y. Tesio^{2,*}, Emiliano Martínez-Periñán¹, Félix Pariente¹, and Encarnación Lorenzo^{1,3,*}

¹ Universidad Autónoma de Madrid, Spain

² Centro de Desarrollo Tecnológico General Savio, Argentina

³ Campus UAM, Spain

4232–4244



We studied nanoscale imaging of the distribution of gold nanoparticles (AuNPs) and the biocatalytic activity of a redox-active enzyme immobilized on gold surfaces.

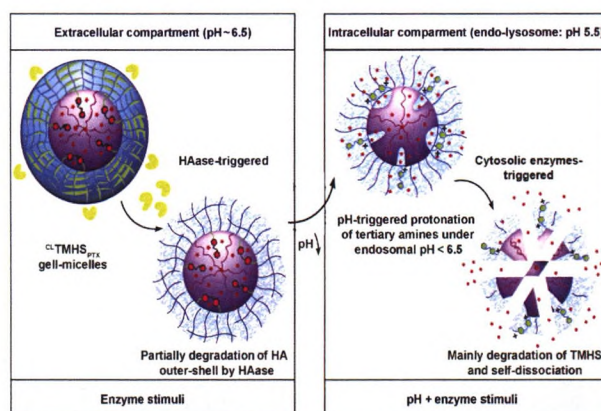
Stimuli-responsive gel-micelles with flexible modulation of drug release for maximized antitumor efficacy

Djamila Aouameur¹, Hao Cheng¹, Yaw Opoku-Damoah¹, Bo Sun², Qiuling Dong¹, Yue Han¹, Jianping Zhou^{1,*}, and Yang Ding^{1,*}

¹ China Pharmaceutical University, China

² University of North Carolina at Chapel Hill, USA

4245–4264



A novel stably cross-linked and pH-sensitive biodegradable gel-micelle was constructed with amphiphilic conjugates of trimethylene dipiperidine-methacrylic anhydride-hyaluronic acid-stearylamine (TMDP-MA-HA-SA, TMHS), in order to facilitate tumor-targeting and flexible intracellular delivery of paclitaxel.

Natural polypeptides treat pollution complex: Moisture-resistant multi-functional protein nanofabrics for sustainable air filtration

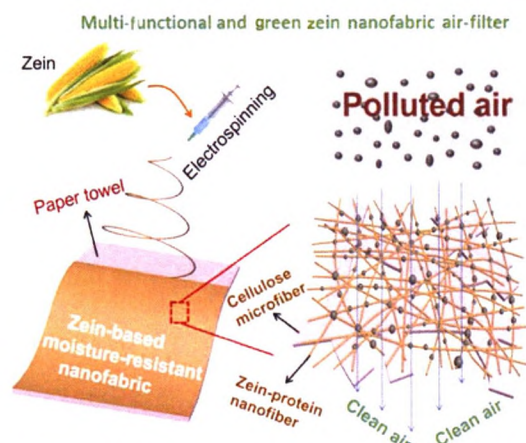
Huafeng Tian¹, Xuewei Fu², Min Zheng², Yu Wang^{2,*}, Yichao Li³, Aimin Xiang¹, and Wei-Hong Zhong^{2,*}

¹ Beijing Technology and Business University, China

² Washington State University, USA

³ Huazhong University of Science and Technology, China

4265–4277



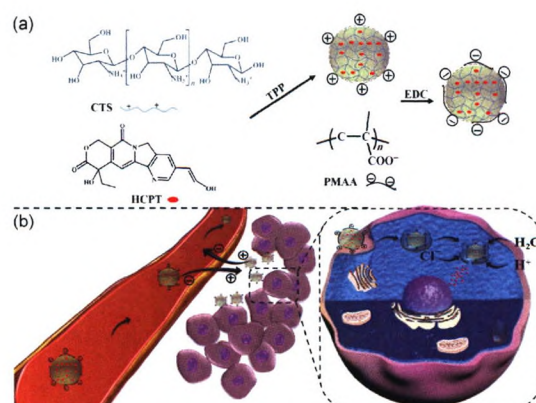
A “green” multifunctional zein nanofabric is fabricated for highly efficient filtration of particulates and chemical gases from air. The zein air filter shows good moisture-resistance, mechanical flexibility, and strong adhesion to a cellulose substrate.

Convenient preparation of charge-adaptive chitosan nanomedicines for extended blood circulation and accelerated endosomal escape

Yapei Zhang, Yingying Li, Jinlong Ma, Xinyu Wang, Zhi Yuan*, and Wei Wang

Nankai University, China

4278–4292



This paper developed a coating of poly(methacrylic acid) (PMAA) for effectively improving the longevity of chitosan nanoparticles (NPs) in the blood as well as the cellular uptake and endosomal escape.

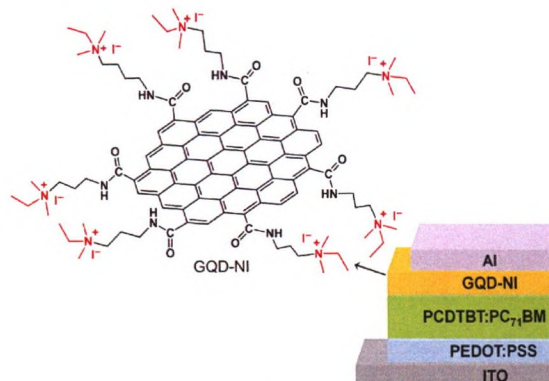
Edge-functionalized graphene quantum dots as a thickness-insensitive cathode interlayer for polymer solar cells

Han Xu^{1,2}, Lu Zhang², Zicheng Ding², Junli Hu^{1,*}, Jun Liu^{2,*}, and Yichun Liu^{1,*}

¹ Northeast Normal University, China

² Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, China

4293–4301



Graphene quantum dots functionalized with ammonium iodide at the edge (GQD-NI) were used as a thickness-insensitive cathode interlayer for polymer solar cells (PSCs). The GQD-NI demonstrated good conductivity and high optical transparency, and formed an interfacial dipole with the cathode to decrease the work function.

Titanium nitride hollow nanospheres with strong lithium polysulfide chemisorption as sulfur hosts for advanced lithium-sulfur batteries

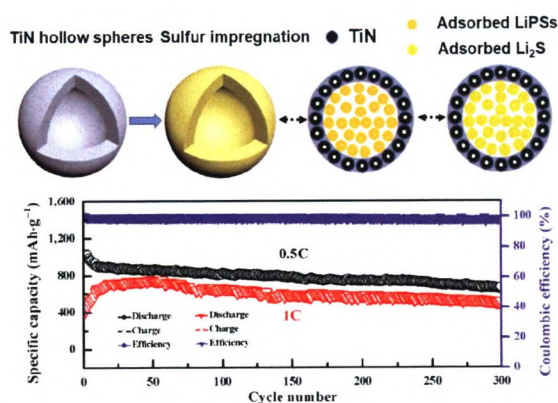
Chuanchuan Li¹, Jingjing Shi³, Lin Zhu¹, Yingyue Zhao¹, Jun Lu^{3,*}, and Liqiang Xu^{1,2,*}

¹ Shandong University, China

² Nankai University, China

³ Beijing University of Chemical Technology, China

4302–4312



TiN hollow nanospheres are highly efficient lithium polysulfide reservoirs that exhibit dual effects of physical confinement and chemical trapping. With a 70 wt.% sulfur content in the composite, highly-stable, high-sulfur-loading lithium-sulfur batteries were prepared.

Flexible self-charging power units for portable electronics based on folded carbon paper

Changjie Zhou¹, Yanqin Yang^{1,2}, Na Sun^{1,2}, Zhen Wen^{1,2,*}, Ping Cheng^{1,3,4}, Xinkai Xie¹, Huiyun Shao¹, Qingqing Shen¹, Xiaoping Chen^{1,2}, Yina Liu⁶, Zhong Lin Wang^{3,4,5,*}, and Xuhui Sun^{1,*}

¹ Soochow University, China

² Jiangsu Industrial Technology Research Institute of Textile & Silk, China

³ Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, China

⁴ University of Chinese Academy of Sciences, China

⁵ Georgia Institute of Technology, USA

⁶ Xi'an Jiaotong-Liverpool University, China

4313–4322



A flexible self-charging power unit based on folded carbon paper has been developed for harvesting mechanical energy from human motion, to power portable electronics. The favorable geometric design imparts excellent stretchability to the high Young's modulus carbon paper and enables it to work as stretchable electrode in triboelectric nanogenerators and supercapacitors, even under severe deformations.

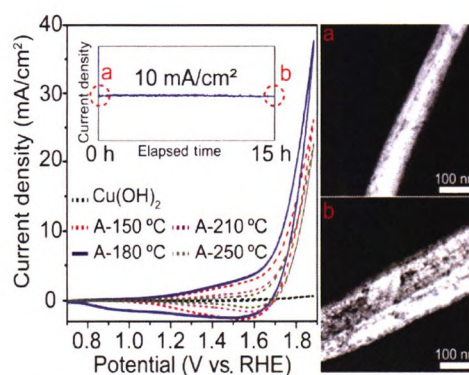
Insights into the efficiency and stability of Cu-based nanowires for electrocatalytic oxygen evolution

Jun Yu¹, Qi Cao¹, Bin Feng¹, Changli Li², Jingyuan Liu¹, J. Kenji Clark¹, and Jean-Jacques Delaunay^{1,*}

¹ The University of Tokyo, Japan

² Tsinghua University, China

4323–4332



Crystalline CuO is proved to be the active species for water oxidation with an overpotential of approximately 500 mV at $\sim 10 \text{ mA/cm}^2$ in a weakly basic solution. The current of CuO remains constant for longer than 15 h as the total electrochemically active surface area is maintained.

A chemophotothermal and targeting multifunctional nanoprobe with a tumor-diagnosing ability

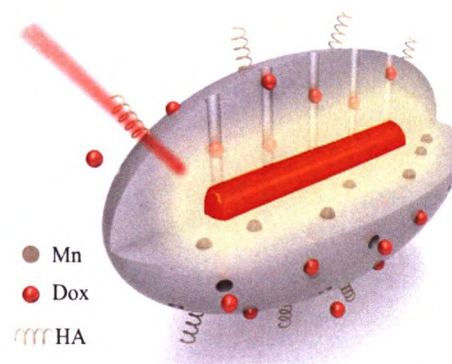
Niannian Li¹, Jiejun Cheng¹, Ying Zhang¹, Jie Wang¹, Gang Huang^{2,*}, Jun Zhu^{3,*}, and Dannong He^{1,3,*}

¹ Shanghai Jiao Tong University, China

² Shanghai University of Medicine & Health Sciences, China

³ National Engineering Research Center for Nanotechnology, China

4333–4347



The newly developed nanoparticles were verified to have excellent biocompatibility and a notable imaging function, which can be well used for tumor diagnosis as well as chemophotothermal therapy and targeting localization.

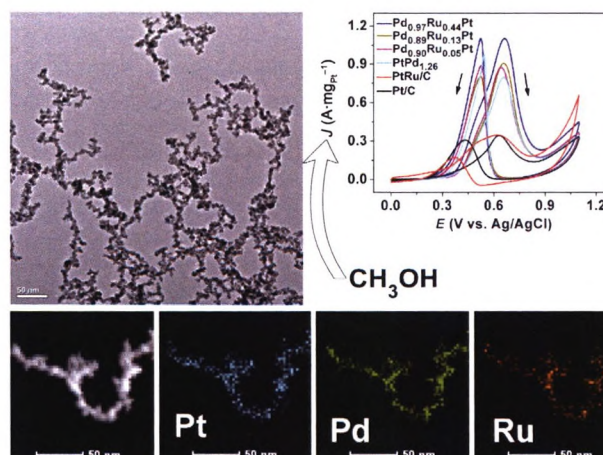
Facile fabrication of PdRuPt nanowire networks with tunable compositions as efficient methanol electrooxidation catalysts

Changshuai Shang^{1,2}, Yaxiao Guo^{1,2}, and Erkang Wang^{1,2,*}

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

² University of Chinese Academy of Sciences, China

4348–4355



PdRuPt nanowire networks with tunable compositions were directly prepared and exhibited enhanced catalytic performance for methanol electrooxidation.

Large-area and highly uniform carbon nanotube film for high-performance thin film transistors

Guodong Dong¹, Jie Zhao¹, Lijun Shen^{2,3,*}, Jiye Xia¹, Hu Meng⁴, Wenhuan Yu^{2,3}, Qi Huang¹, Hua Han^{2,3}, Xuelei Liang^{1,*}, and Lianmao Peng¹

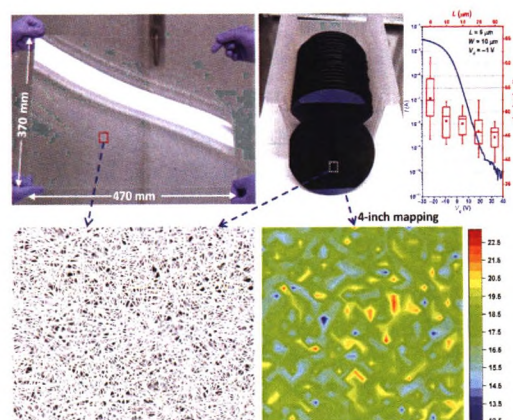
¹ Peking University, China

² Institute of Automation, Chinese Academy of Sciences, China

³ University of Chinese Academy of Sciences, China

⁴ BOE Technology Group Co., Ltd., China

4356–4367



A highly uniform, semiconducting, single-walled carbon nanotube (SWCNT) thin film was fabricated on 4-inch silicon wafers and 2.5th generation backplane glasses (370 mm × 470 mm) with high efficiency. The carbon nanotube thin film transistors fabricated using this film show a high performance and high performance uniformity.

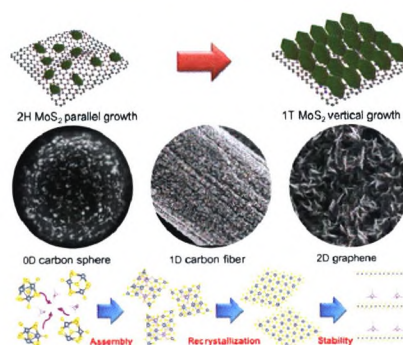
Targeted bottom-up synthesis of 1T-phase MoS₂ arrays with high electrocatalytic hydrogen evolution activity by simultaneous structure and morphology engineering

Kaian Sun¹, Yunqi Liu^{1,*}, Yuan Pan^{1,2,*}, Houyu Zhu¹, Jinchong Zhao¹, Lingyou Zeng¹, Zhi Liu¹, and Chenguang Liu^{1,*}

¹ China University of Petroleum (East China), China

² Tsinghua University, China

4368–4379



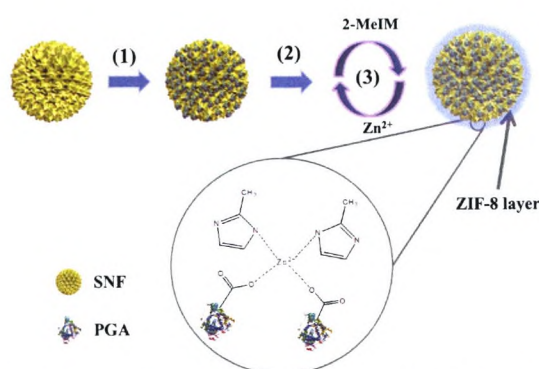
We present a simultaneous structure and morphology engineering approach for the targeted synthesis of 1T-phase MoS₂ arrays. The analysis reveals that the oriented growth of 1T-phase MoS₂ is controlled by a process involving ammonia-assisted assembly, recrystallization, and stabilization steps. The superior hydrogen evolution reaction (HER) performance observed for this system has its origin in its unique array structure with well-dispersed, edge-terminated, and high-purity 1T-phase MoS₂ nanosheets.

Enzyme@silica nanoflower@metal-organic framework hybrids: A novel type of integrated nanobiocatalysts with improved stability

Yingjie Du, Jing Gao, Huajiao Liu, Liya Zhou, Li Ma, Ying He, Zhihong Huang, and Yanjun Jiang*

Hebei University of Technology, China

4380–4389



A novel integrated nanobiocatalyst system based on a hybrid enzyme@silica nanoflower@metal-organic framework (enzyme@SNF@ZIF-8) structure with improved stability was fabricated for the first time. The versatility of this system was validated using penicillin G acylase (PGA) and catalase (CAT) as model enzymes.

Soft and transient magnesium plasmonics for environmental and biomedical sensing

Ruomu Li¹, Suxia Xie², Labao Zhang³, Liqiang Li⁴, Deying Kong⁵, Qiang Wang⁶, Run Xin³, Xing Sheng⁵, Lan Yin⁵, Cunjiang Yu⁶, Zongfu Yu⁷, Xinran Wang^{3,*}, and Li Gao^{1,*}

¹ Nanjing University of Science and Technology, China

² Hunan University of Science and Technology, China

³ Nanjing University, China

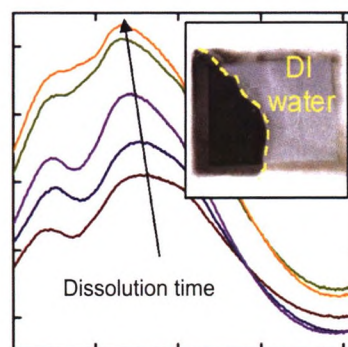
⁴ Suzhou Institute of Nano-Tech and Nano-Bionics, China

⁵ Tsinghua University, China

⁶ University of Houston, USA

⁷ University of Wisconsin-Madison, USA

4390–4400



Transmission characteristics of magnesium plasmonics can be tuned by controlling their dissolution time in water. Such optical properties are ideal for environmental and biomedical sensing.

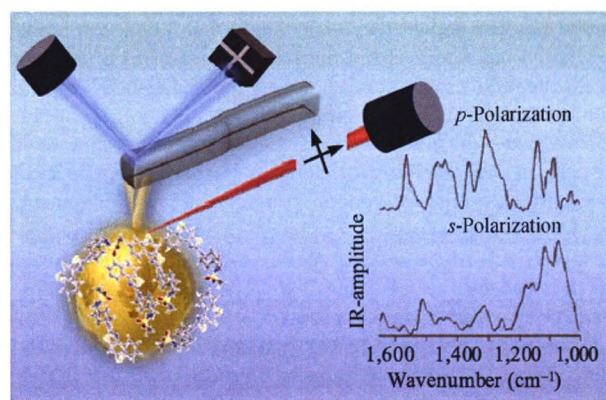
Polarization effect in tip-enhanced infrared nanospectroscopy studies of the selective Y5 receptor antagonist Lu AA33810

Natalia Piergies^{1,*}, Ewa Pięta^{1,*}, Czesława Paluszkievicz¹, Helena Domin², and Wojciech M. Kwiatek¹

¹ Institute of Nuclear Physics, Polish Academy of Sciences, Poland

² Institute of Pharmacology, Polish Academy of Sciences, Poland

4401–4411



This study concerns the application of tip-enhanced infrared nanospectroscopy (TEIRA) with a polarized incident field, to elucidate drug behavior on a metal nanosurface. A strong dependence of the employed polarization modulation on the observed spectral band intensities is observed.

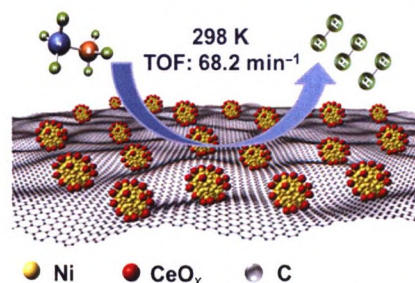
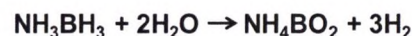
Facile synthesis of graphene-supported Ni-CeO_x nanocomposites as highly efficient catalysts for hydrolytic dehydrogenation of ammonia borane

Qilu Yao¹, Zhang-Hui Lu^{1,*}, Yuwen Yang¹, Yuzhen Chen², Xiangshu Chen^{1,*}, and Hai-Long Jiang^{2,*}

¹ Jiangxi Normal University, China

² University of Science and Technology of China, China

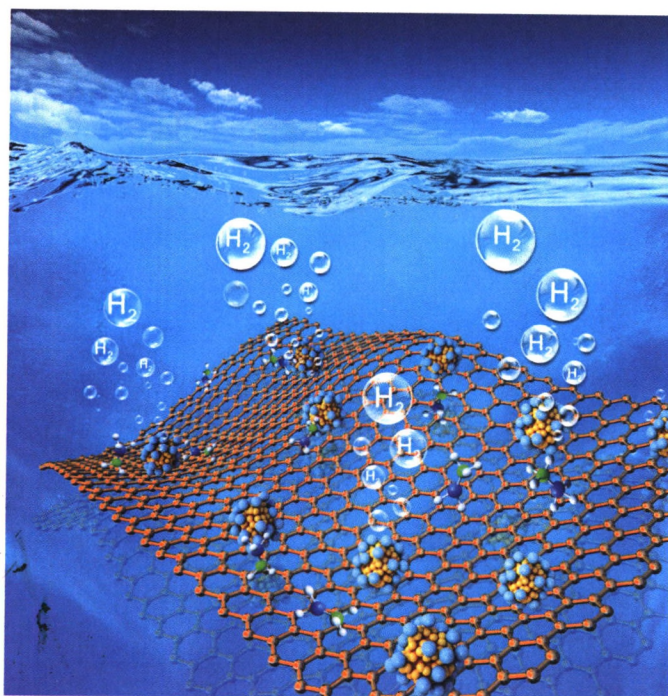
4412–4422



A facile and green strategy was developed for the fabrication of Ni-CeO_x/graphene nanocomposites, which exhibit excellent catalytic performance in the hydrolytic dehydrogenation of ammonia borane at room temperature.

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