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Aqueous and mechanical exfoliation, unique properties, and theoretical understanding of MoO_3 nanosheets made from free-standing $\alpha\text{-MoO}_3$ crystals: Raman mode softening and absorption edge blue shift



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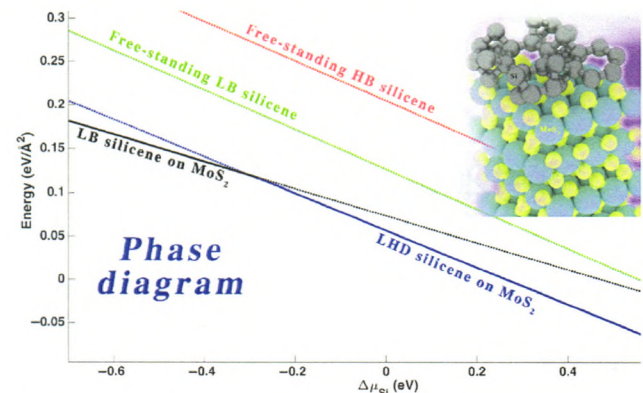
Silicene on non-metallic substrates: Recent theoretical and experimental advances

Emilio Scalise^{1,*}, Kostantina Iordanidou², Valeri V. Afanas'ev²,
André Stesmans², and Michel Houssa^{2,*}

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² University of Leuven, Belgium

1169–1182



A review of recent theoretical and experimental works on the possible growth of silicene on non-metallic surfaces, and a theoretical approach toward the systematic study of the stability of silicene on substrates are presented.

Research Articles

Flexible memristors as electronic synapses for neuro-inspired computation based on scotch tape-exfoliated mica substrates

Xiaobing Yan^{1,3,*}, Zhenyu Zhou¹, Jianhui Zhao¹, Qi Liu^{2,*},
Hong Wang¹, Guoliang Yuan³, and Jingsheng Chen⁴

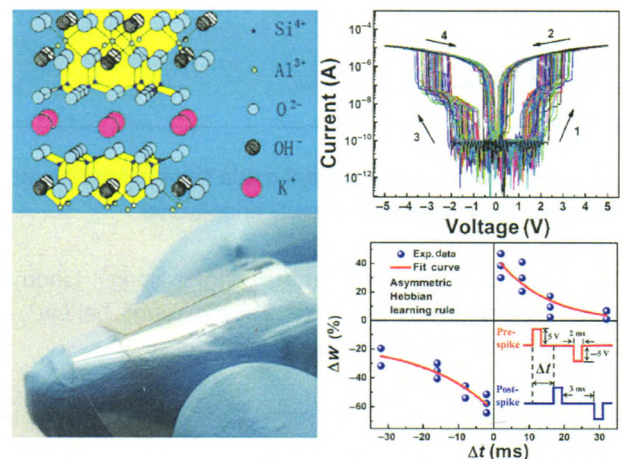
¹ Hebei University, China

² Institute of Microelectronics, Chinese Academy of Sciences, China

³ Nanjing University of Science and Technology, China

⁴ National University of Singapore, Singapore

1183–1192



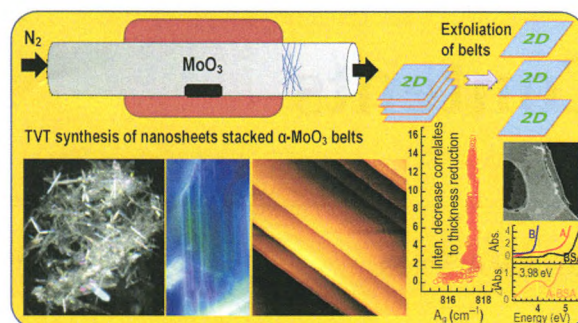
In this work, we explore the use of mica as a substrate for flexible memristor devices. We employ the scotch tape exfoliation technique to peel the mica, which is made possible due to its perfect cleavage along the basal plane. The mica substrate allows for memristor devices with superior flexibility and thermostability, which may potentially lead to the realization of high-temperature memristors for application in biologically-inspired computing systems.

Aqueous and mechanical exfoliation, unique properties, and theoretical understanding of MoO_3 nanosheets made from free-standing $\alpha\text{-MoO}_3$ crystals: Raman mode softening and absorption edge blue shift

Hongfei Liu*, Yongqing Cai, Mingyong Han, Shifeng Guo, Ming Lin, Meng Zhao, Yongwei Zhang, and Dongzhi Chi

A*STAR (Agency for Science, Technology and Research), Singapore

1193–1203



$\alpha\text{-MoO}_3$ belt crystals consisting of nanosheets stacked along their [010]-axes have been synthesized (without intentional use of a substrate) and further exfoliated to form two-dimensional (2D) nanosheets. Raman mode softening of A_g ($\sim 818\text{ cm}^{-1}$) was observed from the thinner layers and theoretically validated for the first time. Aqueous exfoliation induces a blue shift in the $\alpha\text{-MoO}_3$ nanosheet absorption edge.

Multivalent interacting glycodendrimer to prevent amyloid-peptide fibril formation induced by Cu(II) : A multidisciplinary approach

Anna Janaszewska¹, Barbara Klajnert-Maculewicz^{1,*}, Monika Marcinkowska¹, Piotr Duchnowicz¹, Dietmar Appelhans², Gianvito Grasso³, Marco A. Deriu³, Andrea Danani^{3,*}, Michela Cangini⁴, and Maria Francesca Ottaviani^{4,1,*}

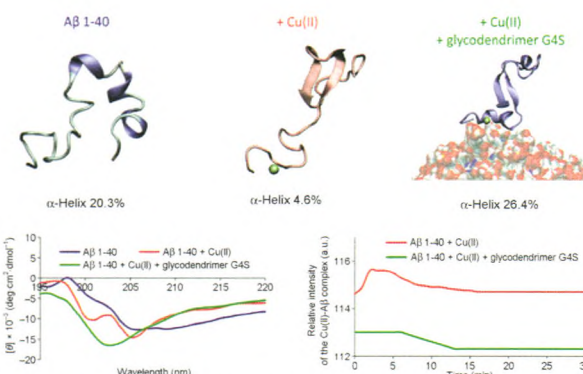
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² Leibniz Institute of Polymer Research, Germany

³ SUPSI-DTI IDSIA-Dalle Molle Institute for Artificial Intelligence, Switzerland

⁴ University of Urbino, Italy

1204–1226



Fibrillation of the amyloid peptide $\text{A}\beta$ 1-40 induced by Cu(II) is prevented by the non-toxic glycodendrimer G4S. A multidisciplinary dynamic light scattering (DLS), circular dichroism (CD), fluorescence, electron paramagnetic resonance (EPR), and molecular modeling study elucidating the interactions into binary and ternary systems constituted by $\text{A}\beta$ 1-40, Cu(II) , and glycodendrimer G4S.

High-performance enhancement-mode thin-film transistors based on Mg -doped In_2O_3 nanofiber networks

Hongchao Zhang¹, You Meng¹, Longfei Song¹, Linqi Luo¹, Yuanbin Qin², Ning Han³, Zaixing Yang⁴, Lei Liu¹, Johnny C. Ho^{5,*}, and Fengyun Wang^{1,*}

¹ Qingdao University, China

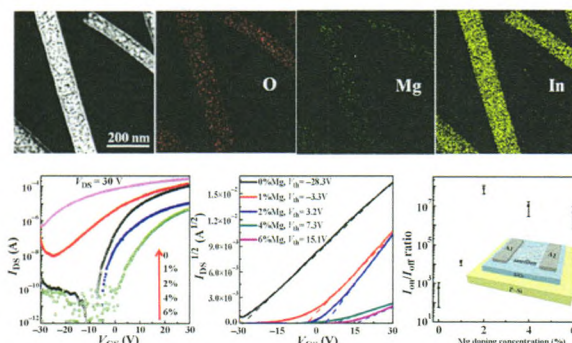
² Xi'an Jiaotong University, China

³ Institute of Process Engineering, Chinese Academy of Sciences, China

⁴ Shandong University, China

⁵ City University of Hong Kong, Hong Kong, China

1227–1237



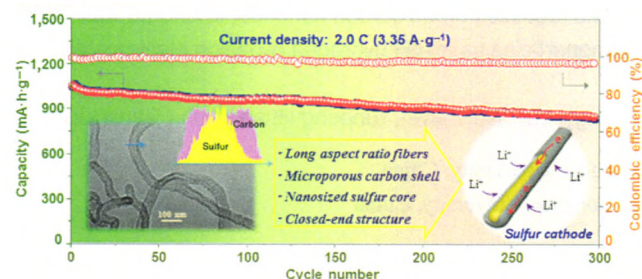
A simple one-step electrospinning technique is developed to modulate the electrical properties, especially the threshold voltage, of In_2O_3 nanofiber field-effect transistors by doping with different Mg concentrations. By integrating with a high- κ dielectric layer, the device performance of the nanofiber transistors can be further improved, indicating the technological potency of this simple doping scheme for high-performance, low-operating-power, and large-scale nanoelectronics.

Hollow carbon nanofibers with dynamic adjustable pore sizes and closed ends as hosts for high-rate lithium-sulfur battery cathodes

Xiang-Qian Zhang, Bin He, Wen-Cui Li, and An-Hui Lu*

Dalian University of Technology, China

1238–1246



Hollow carbon nanofibers (HCFs) that combine the features of adjustable pore sizes, closed ends, and thin carbon shells are prepared for the first time as hosts for Li-S battery cathodes. The unique structures lead to high rate capacities (e.g., 860 mA·h·g⁻¹ at 4.0 C (1 C = 1.675 A·g⁻¹)) and stable cyclability over 500 cycles for S@HCF.

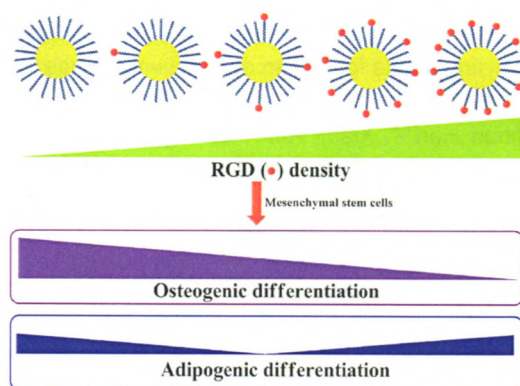
Ligand density-dependent influence of arginine-glycine-aspartate functionalized gold nanoparticles on osteogenic and adipogenic differentiation of mesenchymal stem cells

Jingchao Li^{1,2}, Ying Chen^{1,2}, Naoki Kawazoe¹, and Guoping Chen^{1,2,*}

¹ National Institute for Materials Science, Japan

² University of Tsukuba, Japan

1247–1261



Biomimetic gold nanoparticles with tunable surface arginine-glycine-aspartate (RGD) density were prepared for the regulation of osteogenic and adipogenic differentiation of human mesenchymal stem cells.

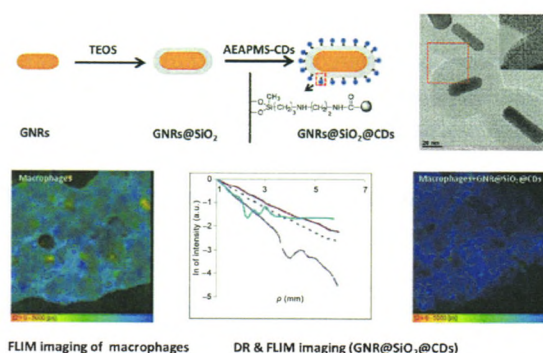
Multimodal bioimaging based on gold nanorod and carbon dot nanohybrids as a novel tool for atherosclerosis detection

Xiaojing Liu¹, Luting Liu¹, Xiujie Hu¹, Shuyun Zhou¹, Rinat Ankri², Dror Fixler^{2,*}, and Zheng Xie^{1,*}

¹ Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, China

² Bar-Ilan University, Israel

1262–1273



A multimodal contrast agent achieves diffusion reflection and fluorescence lifetime imaging microscopy multimodal imaging of macrophages *in vitro*. The new contrast agent is based on gold nanorods@silica@carbon dots core-shell. This system will potentially enhance detection sensitivity compared to the current far-field imaging technique, and will also establish a new method to quantitatively and noninvasively detect targeted nanoparticles *in vivo*, affording a promising theranostics tool.

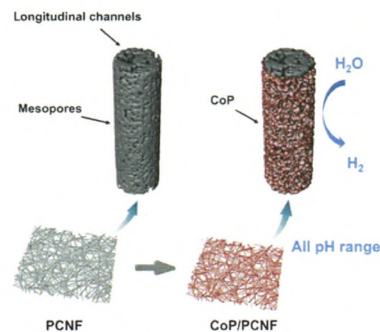
Lotus root-like porous carbon nanofiber anchored with CoP nanoparticles as all-pH hydrogen evolution electrocatalysts

Hengyi Lu¹, Wei Fan^{2,*}, Yunpeng Huang¹, and Tianxi Liu^{1,2,*}

¹ Fudan University, China

² Donghua University, China

1274–1284



Self-standing lotus root-like porous carbon nanofibers (PCNFs) are developed and utilized as supporting materials for anchoring electroactive CoP nanoparticles. These unique PCNFs have longitudinal channels and mesopores on the outer and inner carbon walls, which enhances the contact between the electrolyte and catalyst. This endows the CoP/PCNF composites with excellent hydrogen evolution reaction (HER) performance at an all-pH range.

Graphene oxide-decorated $\text{Fe}_2(\text{MoO}_4)_3$ microflowers as a promising anode for lithium and sodium storage

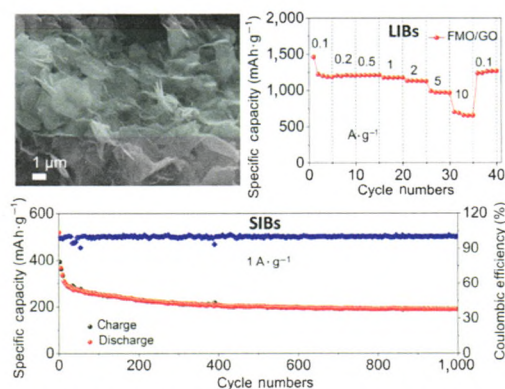
Chunhua Han^{1,*}, Xiaoji Ren¹, Qidong Li¹, Wen Luo^{1,2}, Lei Huang¹, Liang Zhou¹, and Liqiang Mai^{1,†,*}

¹ Wuhan University of Technology, China

² Université de Lorraine, France

[†] Present address: University of California, Berkeley, USA

1285–1293



Graphene oxide-decorated $\text{Fe}_2(\text{MoO}_4)_3$ microflower composite was fabricated via a facile one-step water-bath method, in which the $\text{Fe}_2(\text{MoO}_4)_3$ was constructed by numerous nanosheets. The composite demonstrates a high specific capacity, excellent rate capability, and stable cycling performance when used as the anode for lithium and sodium storage.

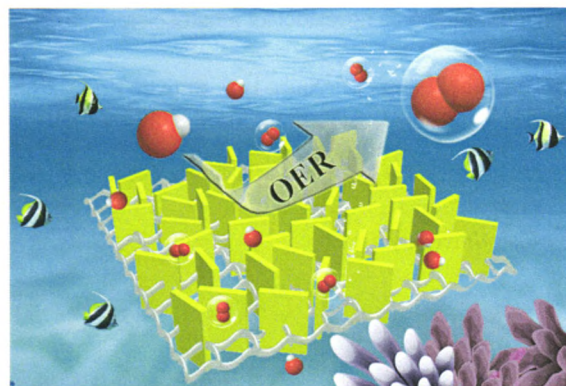
Three-dimensional interconnected $\text{Ni}(\text{Fe})\text{O}_x\text{H}_y$ nanosheets on stainless steel mesh as a robust integrated oxygen evolution electrode

Qi Zhang^{1,2}, Haixia Zhong², Fanlu Meng², Di Bao², Xinbo Zhang², and Xiaolin Wei^{1,*}

¹ Xiangtan University, China

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

1294–1300



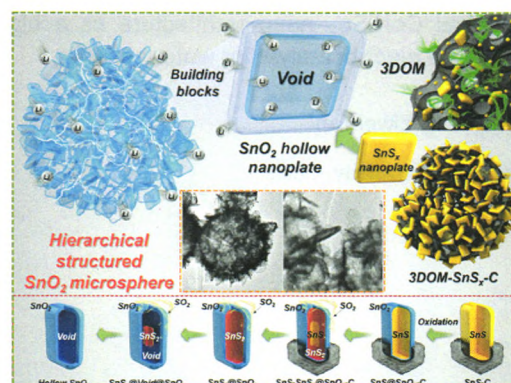
As a robust integrated oxygen evolution reaction (OER) electrode, an interconnected $\text{Ni}(\text{Fe})\text{O}_x\text{H}_y$ nanosheet array on stainless steel mesh was prepared by a facile hydrothermal method without using any polymeric binder, and exhibits excellent OER performance with low overpotential, small Tafel slope and long-term durability.

Rational design and synthesis of hierarchically structured SnO_2 microspheres assembled from hollow porous nanoplates as superior anode materials for lithium-ion batteries

Gi Dae Park and Yun Chan Kang*

Korea University, Republic of Korea

1301–1312



In this study, hierarchically structured metal oxide microspheres formed from building blocks of hollow nanoplates were designed as efficient anode materials for lithium-ion batteries.

Improved peroxidase-mimic property: Sustainable, high-efficiency interfacial catalysis with H_2O_2 on the surface of vesicles of hexavanadate-organic hybrid surfactants

Kun Chen^{1,2}, Aruahan Bayaguud¹, Hui Li², Yang Chu², Haochen Zhang¹, Hongli Jia¹, Baofang Zhang², Zicheng Xiao³, Pingfan Wu^{3,*}, Tianbo Liu^{2,*}, and Yongge Wei^{1,4,*}

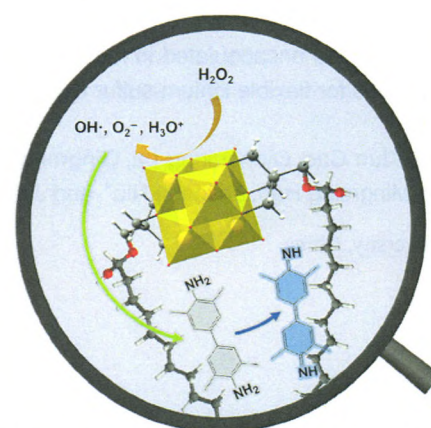
¹ Tsinghua University, China

² University of Akron, USA

³ Hubei University of Technology, China

⁴ Peking University, China

1313–1321



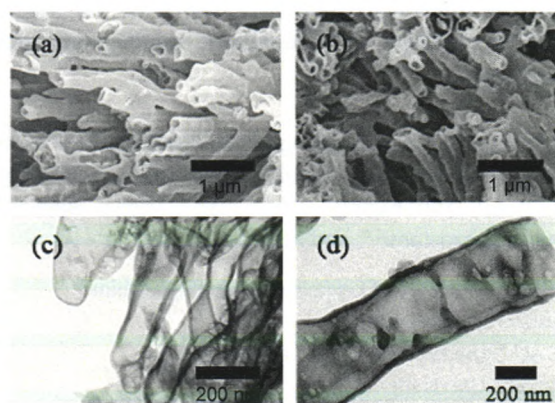
We demonstrate that bilayer vesicles formed by a hexavanadate cluster functionalized with two alkyl chains are highly efficient catalysts for the oxidation of 3,3',5,5'-tetramethylbenzidine (TMB) with H_2O_2 at room temperature, a reaction mimicking the peroxidase activity in biological catalytic oxidation processes.

One-dimension carbon self-doping g- C_3N_4 nanotubes: Synthesis and application in dye-sensitized solar cells

Xue Li, Kai Pan, Yang Qu*, and Guofeng Wang*

Heilongjiang University, China

1322–1330



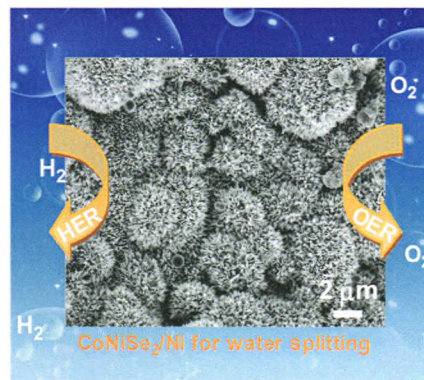
One-dimensional carbon self-doping g- C_3N_4 nanotubes were synthesized for the first time. They boost the light harvesting ability of the photovoltaic devices by enhancing the visible light absorption as well as the charge separation and transfer.

Hierarchical CoNiSe₂ nano-architecture as a high-performance electrocatalyst for water splitting

Tao Chen and Yiwei Tan*

Nanjing Tech University, China

1331–1344



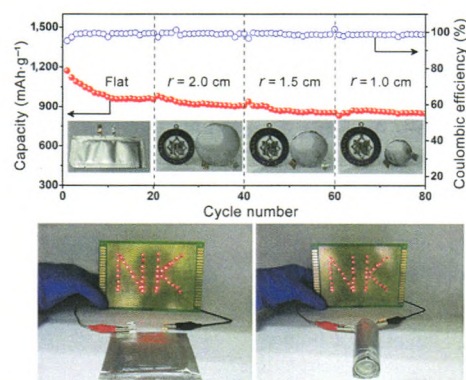
A new integrated bifunctional catalyst, hierarchical CoNiSe₂ nanorod arrays supported on Ni foam, has been fabricated by a one step solvothermal reaction, showing exquisitely high activity toward the oxygen and hydrogen evolution reactions (OER and HER, respectively) and outstanding long-term stability.

Sulfur nanoparticles encapsulated in reduced graphene oxide nanotubes for flexible lithium-sulfur batteries

Kena Chen, Jun Cao, Qiongqiong Lu, Qingrong Wang, Minjie Yao, Mingming Han, Zhiqiang Niu*, and Jun Chen

Nankai University, China

1345–1357



Three-dimensional reduced graphene oxide foams composed of interconnected nanotube-like reduced graphene oxide were fabricated as an efficient scaffold for sulfur. Lithium-sulfur batteries based on flexible reduced graphene oxide nanotubes wrapped sulfur composite film maintain electrochemical stability even when bent.

Effects of redox-active interlayer anions on the oxygen evolution reactivity of NiFe-layered double hydroxide nanosheets

Daojin Zhou¹, Zhao Cai¹, Yongmin Bi¹, Weiliang Tian^{1,2}, Ma Luo¹, Qian Zhang¹, Qian Zhang¹, Qixian Xie¹, Jindi Wang¹, Yaping Li¹, Yun Kuang¹, Xue Duan¹, Michal Bajdich³, Samira Siahrostami^{4,*}, and Xiaoming Sun^{1,*}

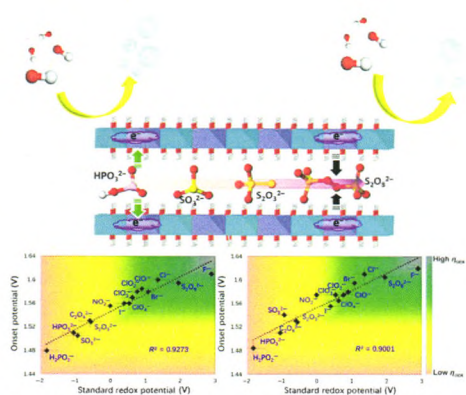
¹ Beijing University of Chemical Technology, China

² Tarim University, China

³ SLAC National Accelerator Laboratory, USA

⁴ Stanford University, USA

1358–1368



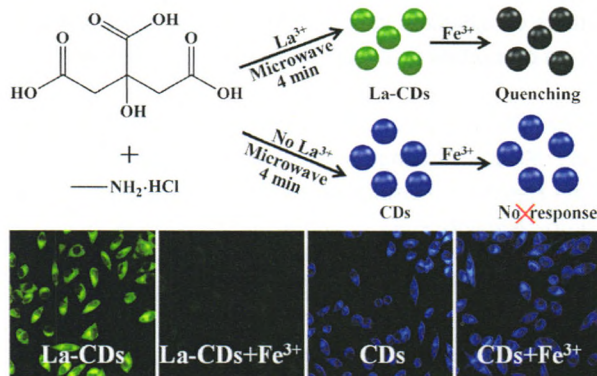
The reducing ability of anions intercalated in the interlayer of nickel-iron layered double hydroxides (NiFe-LDHs) has an important impact on the catalytic activity of these compounds for the oxygen evolution reaction (OER). Anions with low standard redox potential and strong reducing ability transfer more electrons to the hydroxide layers. The resulting electron-rich metal sites can thus enhance the OER performance of the NiFe-LDHs.

Anomalous enhancement of fluorescence of carbon dots through lanthanum doping and potential application in intracellular imaging of ferric ion

Shenghong Yang¹, Xiaohan Sun¹, Zhaoyan Wang¹, Xiayan Wang^{2,*}, Guangsheng Guo², and Qiaosheng Pu^{1,*}

¹ Lanzhou University, China

² Beijing University of Technology, China



Through La^{3+} doping, the emission band of carbon dots shifted from blue to green with an apparent improvement in the quantum yield and fluorescence lifetime although La^{3+} is non-fluorescent. The as-prepared material can be used to visualize intracellular Fe^{3+} in live HeLa cells.

1369–1378

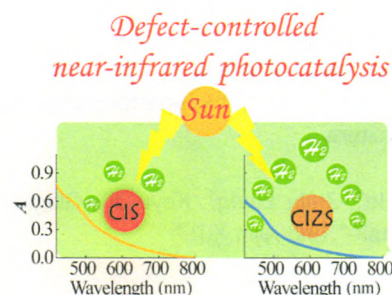
Efficient defect-controlled photocatalytic hydrogen generation based on near-infrared Cu-In-Zn-S quantum dots

Xiao-Yuan Liu^{1,2}, Guozhen Zhang³, Hao Chen¹, Haowen Li², Jun Jiang³, Yi-Tao Long^{2,*}, and Zhijun Ning^{1,*}

¹ ShanghaiTech University, China

² East China University of Science and Technology, China

³ University of Science and Technology of China (USTC), China



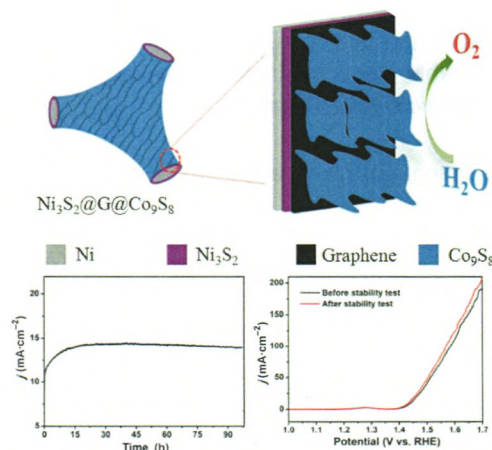
Defect-controlled, stable, and water soluble CuInS_2 and Cu-In-Zn-S quantum dots are synthesized and investigated for highly efficient co-catalyst free photocatalytic hydrogen generation under visible to near-infrared light irradiation.

1379–1388

Graphene as an intermediary for enhancing the electron transfer rate: A free-standing $\text{Ni}_3\text{S}_2@\text{graphene}@\text{Co}_9\text{S}_8$ electrocatalytic electrode for oxygen evolution reaction

Qiuchun Dong, Yizhou Zhang, Ziyang Dai, Peng Wang, Min Zhao, Jinjun Shao^{*}, Wei Huang^{*}, and Xiaochen Dong^{*}

Nanjing Tech University, China



Graphene was introduced into three-dimensionally structured composites as an intermediary for enhancing the electron transfer rate and stability. It greatly improves the catalytic performance.

1389–1398

Effects of dielectric stoichiometry on the photoluminescence properties of encapsulated WSe₂ monolayers

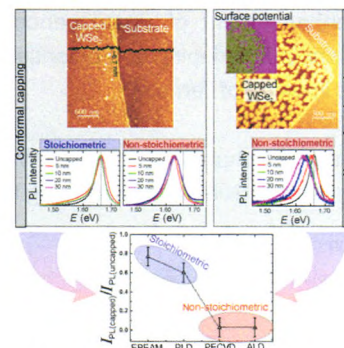
Javier Martín-Sánchez^{1,*}, Antonio Mariscal², Marta De Luca³, Aitana Tarazaga Martín-Luengo¹, Georg Gramse¹, Alma Halilovic¹, Rosalía Serna², Alberta Bonanni¹, Ilaria Zardo³, Rinaldo Trotta^{1,*}, and Armando Rastelli¹

¹ Johannes Kepler University Linz, Austria

² CSIC, Spain

³ University of Basel, Switzerland

1399–1414



In this work, the photoluminescence emission of encapsulated WSe₂ monolayers with SiO_x and Al_xO_y dielectric oxide layers—deposited by means of different physical and chemical deposition techniques—is demonstrated to be strongly influenced by the oxides stoichiometry quality. A nearly unchanged optical emission is found when the encapsulation is carried out with stoichiometric oxides, whereas a strong photoluminescence decrease accompanied by a dominant trion (charged exciton) emission is observed for sub-stoichiometric encapsulating oxides.

Hierarchical Ni-Co-S@Ni-W-O core-shell nanosheet arrays on nickel foam for high-performance asymmetric supercapacitors

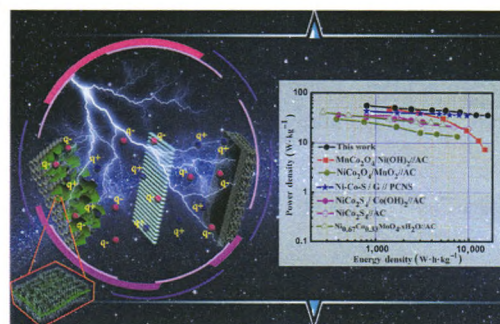
Weidong He¹, Zhifu Liang¹, Keyu Ji¹, Qingfeng Sun^{3,*}, Tianyou Zhai^{2,*}, and Xijin Xu^{1,*}

¹ University of Jinan, China

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

³ Zhejiang A & F University, China

1415–1425



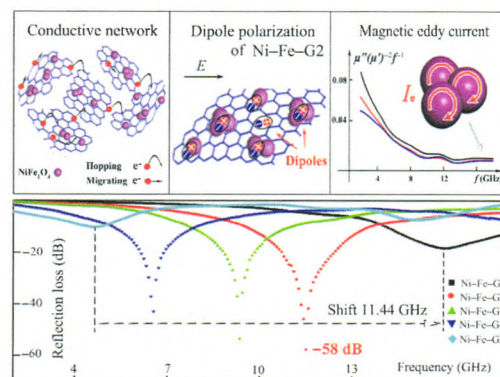
Free-standing, three-dimensional (3D), hierarchical Ni-Co-S@Ni-W-O core-shell hybrid structures on Ni foam were successfully designed and synthesized. Using these 3D-networks as the positive electrode, we further demonstrated the excellent stability, large specific capacitance, and high energy density of asymmetrical supercapacitors.

Confinedly implanted NiFe₂O₄-rGO: Cluster tailoring and highly tunable electromagnetic properties for selective-frequency microwave absorption

Yanlan Zhang, Xixi Wang, and Maosheng Cao*

Beijing Institute of Technology, China

1426–1436



A facial strategy of confined implantation is demonstrated for small NiFe₂O₄ clusters-reduced graphene oxide nanohybrids. Properly tailoring the magnetic clusters can realize synergistic effect of dielectric loss and magnetic loss for highly-tunable and selective-frequency microwave absorption.

Hierarchical three-dimensional flower-like Co_3O_4 architectures with a mesocrystal structure as high capacity anode materials for long-lived lithium-ion batteries

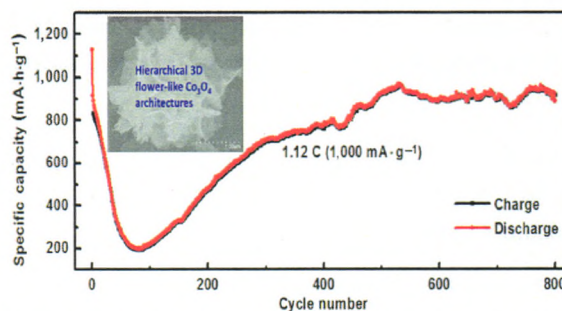
Wenqiang Cao¹, Wenzhong Wang^{1,*}, Honglong Shi¹, Jun Wang², Maosheng Cao³, Yujie Liang¹, and Min Zhu¹

¹ Minzu University of China, China

² Ningbo University, China

³ Beijing Institute of Technology, China

1437–1446



We rationally design a high-capacity electrode based on three-dimensional (3D) hierarchical Co_3O_4 flower-like architectures with a mesocrystal nanostructure. The achieved hierarchical 3D Co_3O_4 flower-like architectures with a mesocrystal nanostructure exhibit a high reversible capacity of $920 \text{ mA}\cdot\text{h}\cdot\text{g}^{-1}$ after 800 cycles at 1.12 C ($1 \text{ C} = 890 \text{ mA}\cdot\text{h}\cdot\text{g}^{-1}$), excellent rate performance, and cycling stability when applied as the anode for lithium storage.

Colloidal CsPbBr_3 perovskite nanocrystal films as electrochemiluminescence emitters in aqueous solutions

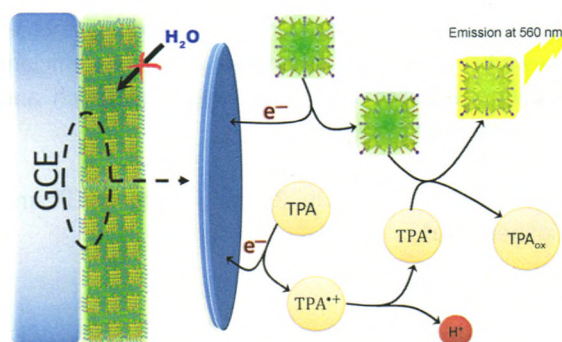
Zhixiong Cai¹, Feiming Li¹, Wei Xu¹, Shujun Xia¹, Jingbin Zeng², Shaogui He³, and Xi Chen^{1,*}

¹ Xiamen University, China

² China University of Petroleum (East China), China

³ Xiamen Huaxia University, China

1447–1455



A perovskite nanocrystal (NC) film is demonstrated to be a promising electrochemiluminescence (ECL) emitter. Self-assembled films of the CsPbBr_3 NCs show relatively stable emission in aqueous solutions due to the cross-linking of oleic acid/oleylamine on the surface of the CsPbBr_3 NCs.

Formation of plasmon quenching dips greatly enhances $^1\text{O}_2$ generation in a chlorin e6–gold nanorod coupled system

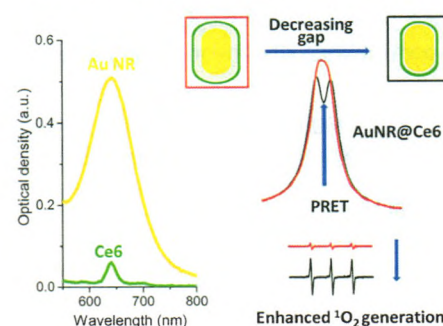
Hui Zhang^{1,2}, Haiyun Li^{1,2}, Huizhen Fan^{1,2}, Jiao Yan^{1,2}, Dejing Meng^{1,2}, Shuai Hou¹, Yinglu Ji¹, and Xiaochun Wu^{1,*}

¹ National Center for Nanoscience and Technology, China

² University of the Chinese Academy of Sciences, China

1456–1469

Plasmon resonance energy transfer (PRET)



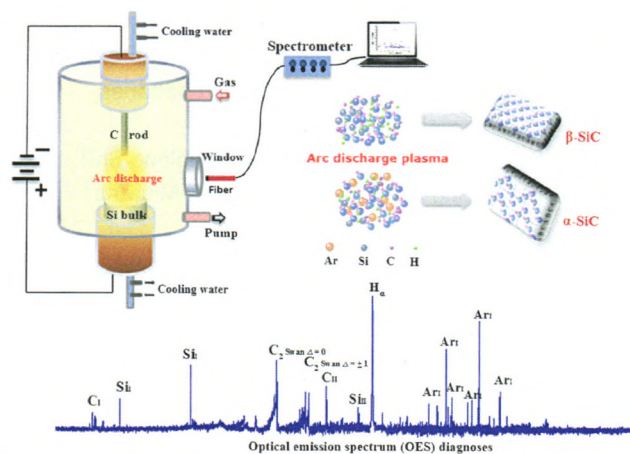
Formation of plasmon quenching dips is effective in enhancing singlet oxygen ($^1\text{O}_2$) generation via the plasmon resonance energy transfer (PRET) effect.

Optical emission spectroscopy diagnosis of energetic Ar ions in synthesis of SiC polytypes by DC arc discharge plasma

Jian Gao, Lei Zhou, Jingshuang Liang, Ziming Wang, Yue Wu, Javid Muhammad, Xinglong Dong*, Shouzhe Li, Hongtao Yu, and Xie Quan*

Dalian University of Technology, China

1470–1481



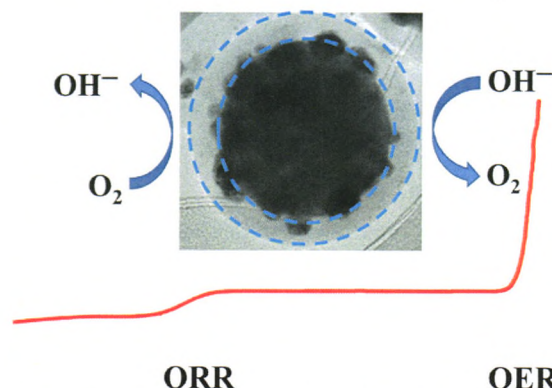
Nanocrystal SiC polytypes were induced by energetic Ar ions from direct current (DC) arc discharge plasma, diagnosed by optical emission spectroscopy (OES).

Cobalt-based hydroxide nanoparticles @ N-doping carbonic frameworks core-shell structures as highly efficient bifunctional electrocatalysts for oxygen evolution and oxygen reduction reactions

Shiqiang Feng, Cheng Liu, Zhigang Chai, Qi Li*, and Dongsheng Xu*

Peking University, China

1482–1489



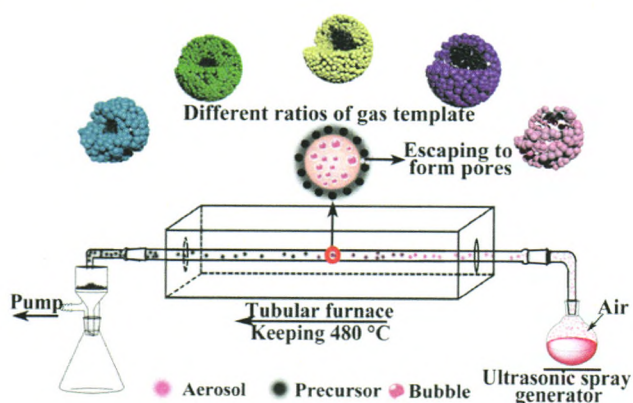
A rational design of a core-shell structure to enhance oxygen evolution reaction/oxygen reduction reaction performance and stability has been described.

Gas template-assisted spray pyrolysis: A facile strategy to produce porous hollow Co_3O_4 with tunable porosity for high-performance lithium-ion battery anode materials

Haoran Du, Kuangfu Huang, Min Li, Yuanyuan Xia, Yixuan Sun, Mengkang Yu, and Baoyou Geng*

Anhui Normal University, China

1490–1499

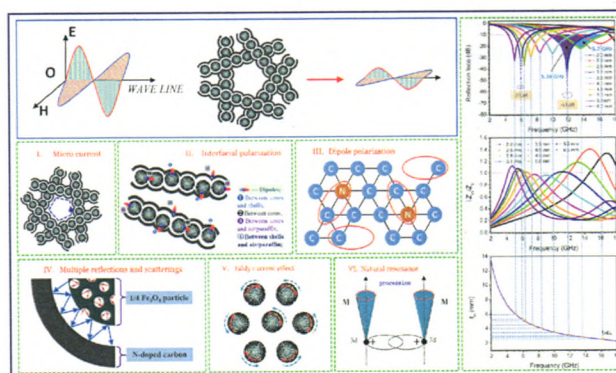


Urea was used as gaseous template to synthesize porous hollow Co_3O_4 with controlled porosity. The optimized product delivers a high reversible charge capacity of $1,012.7 \text{ mAh}\cdot\text{g}^{-1}$ after 100 cycles at 0.2C ($1\text{C} = 890 \text{ mA}\cdot\text{g}^{-1}$) and satisfactory rate performance of $881.3 \text{ mAh}\cdot\text{g}^{-1}$ at 2C after 300 cycles.

Application of yolk-shell $\text{Fe}_3\text{O}_4@\text{N}$ -doped carbon nanochains as highly effective microwave-absorption material

Mingtao Qiao, Xingfeng Lei, Yong Ma, Lidong Tian, Xiaowei He, Kehe Su, and Qiuyu Zhang*

Northwestern Polytechnical University, China



Yolk-shell porous $\text{Fe}_3\text{O}_4@\text{N}$ -doped carbon nanochains have been developed as novel microwave-absorption materials. Because of the high aspect ratio, the yolk-shell structure, and numerous pores and spaces, $\text{Fe}_3\text{O}_4@\text{N}$ -doped carbon nanochains offer superior microwave absorption performance. A detailed microwave absorption mechanism has been proposed.

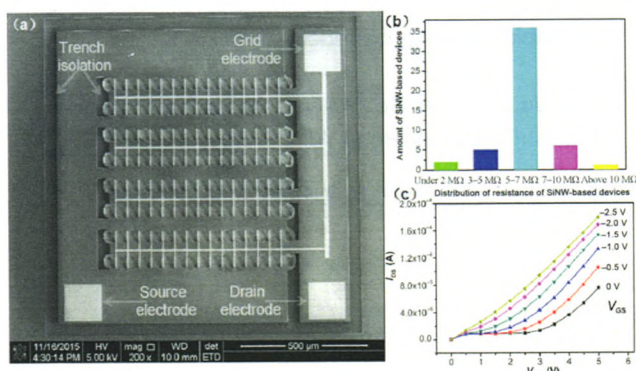
1500–1519

Wafer-level and highly controllable fabricated silicon nanowire transistor arrays on (111) silicon-on-insulator (SOI) wafers for highly sensitive detection in liquid and gaseous environments

Xun Yang^{1,2}, Anran Gao¹, Yuelin Wang¹, and Tie Li^{1,*}

¹ Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China

² University of Chinese Academy of Sciences, China



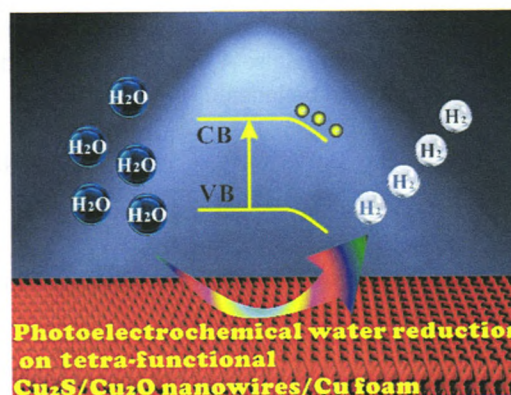
Wafer-level and highly controllable fabrication technology of silicon nanowire arrays is presented in this study. A material with excellent electrical properties for the highly sensitive determination of pH and nitrogen dioxide is shown in this paper.

1520–1529

Tetrafunctional Cu_2S thin layers on Cu_2O nanowires for efficient photoelectrochemical water splitting

Zhenzhen Li and Zhonghai Zhang*

East China Normal University, China



A tetrafunctional Cu_2S thin layer with sensitizing, electron trapping, electrocatalytic, and protecting functions is generated *in situ* on the surface of Cu_2O nanowires on three-dimensional porous copper foam, to fabricate an effective and highly stable photocathode for photoelectrochemical water reduction.

1530–1540

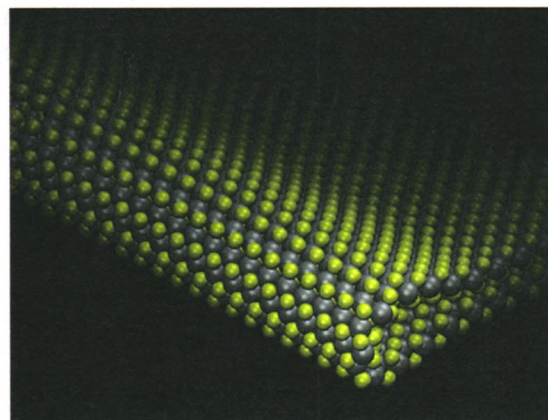
Tunable electron and phonon properties of folded single-layer molybdenum disulfide

Jie Peng¹, Peter W. Chung^{1,*}, Madan Dubey², and Raju R. Namburu²

¹ University of Maryland, USA

² U.S. Army Research Laboratory, USA

1541–1553



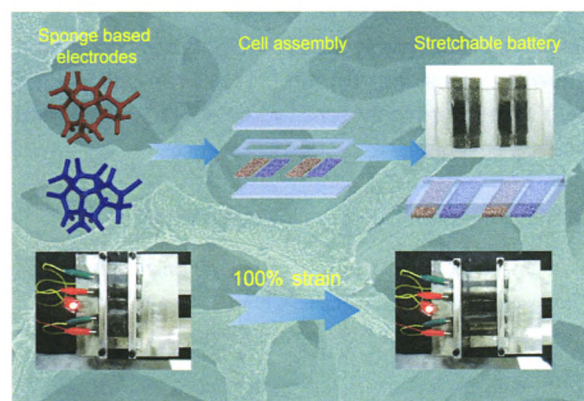
The length of the sheet used to form a folded structure in single-layer MoS₂ has a very different influence on the electronic and thermal properties of these materials.

Dip-coating processed sponge-based electrodes for stretchable Zn-MnO₂ batteries

Hong-Wu Zhu, Jin Ge, Yu-Can Peng, Hao-Yu Zhao, Lu-An Shi, and Shu-Hong Yu*

University of Science and Technology of China, China

1554–1562



A polyurethane (PU) sponge coated with silver nanowires was used as a stretchable current collector and combined with electrode materials via a facile dip-coating method. A stretchable Zn-MnO₂ full battery was prepared, which provided a stable power supply even under 100% strain.

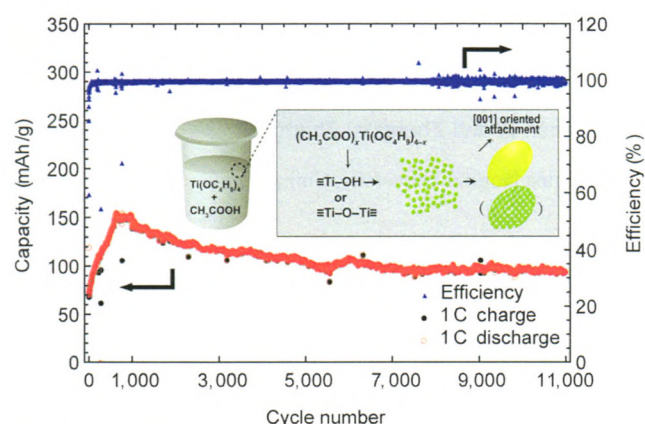
Mesoporous TiO₂ microparticles formed by the oriented attachment of nanocrystals: A super-durable anode material for sodium-ion batteries

Liming Ling¹, Ying Bai^{1,2,*}, Huali Wang¹, Qiao Ni¹, Jiatao Zhang¹, Feng Wu^{1,2}, and Chuan Wu^{1,2,*}

¹ Beijing Institute of Technology, China

² Collaborative Innovation Center of Electric Vehicles in Beijing, China

1563–1574



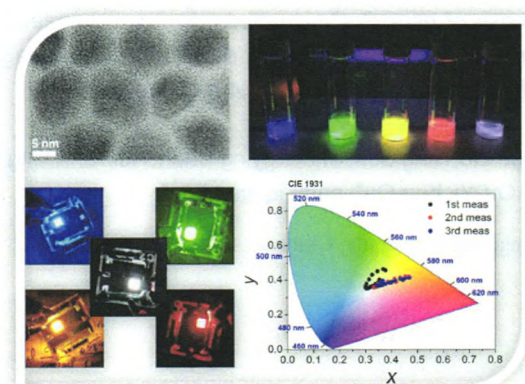
Mesoporous TiO₂ microparticles with a unique combination of nanocrystals and uniform nanopores were prepared and applied as a super-durable anode material for advanced sodium-ion batteries.

Device performance and light characteristics stability of quantum-dot-based white-light-emitting diodes

Bruno Clasen Hames, Iván Mora-Seró, and Rafael S. Sánchez^{†,*}

Universitat Jaume I, Spain

[†] Present address: University of Liverpool, UK



Preparation and electro-optical characterization of quantum-dot-based light-emitting diodes are described, and the evolution of their white light characteristics is studied.

1575–1588

Size contrast of Pt nanoparticles formed on neighboring domains within suspended and supported graphene

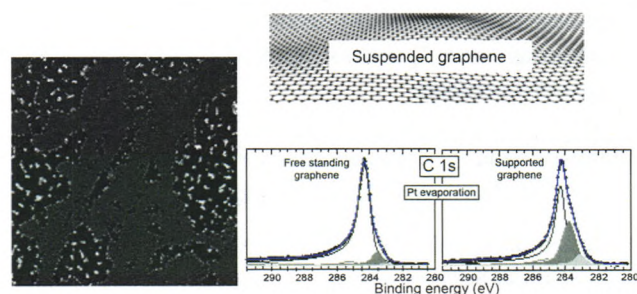
Dario Roccella¹, Matteo Amati², Hikmet Sezen^{2,†}, Rosaria Brescia³, and Luca Gregoratti^{2,*}

¹ Università degli Studi di Genova - Facoltà di Scienze Matematiche, Italy

² Elettra – Sincrotrone Trieste S.C.p.A. in Area Science Park, Italy

³ Istituto Italiano di Tecnologia (IIT), Italy

[†] Present address: Helmholtz-Zentrum Berlin GmbH, Germany



Herein, we exploited the capability of spatially resolved photoemission in combination with high resolution transmission electron microscopy to investigate the interactions of thermally evaporated Pt atoms on suspended and supported graphene.

1589–1598

A systematic theoretical study on FeO_x-supported single-atom catalysts: M₁/FeO_x for CO oxidation

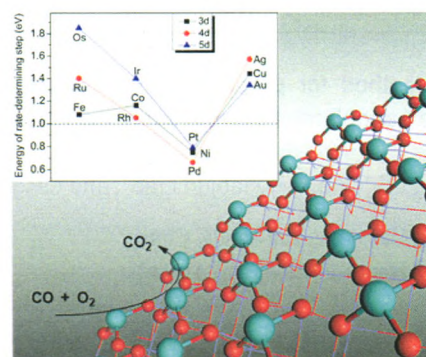
Jinxia Liang^{1,2,3}, Qi Yu², Xiaofeng Yang^{4,*}, Tao Zhang⁴, and Jun Li^{3,*}

¹ Guizhou Education University, China

² Shaanxi University of Technology, China

³ Tsinghua University, China

⁴ Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China



A comprehensive theoretical investigation of the CO oxidation activity and stability of FeO_x-supported metal single-atom active sites was conducted with density functional theory (DFT). The metals considered included all of the 3d, 4d, and 5d metals from group VIII to IB. The theoretical analyses revealed the fundamental mechanisms of the interactions between the atomically dispersed single metal atoms on the FeO_x substrate and aid in the design of highly active FeO_x-supported single-atom catalysts (SACs).

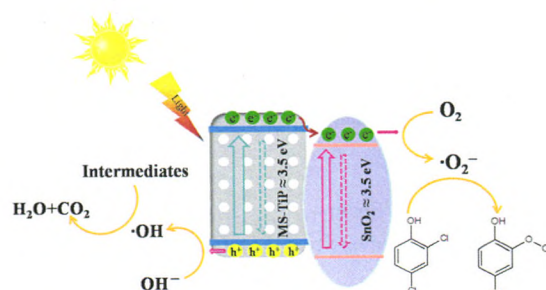
1599–1611

Synthesis of nano SnO₂-coupled mesoporous molecular sieve titanium phosphate as a recyclable photocatalyst for efficient decomposition of 2,4-dichlorophenol

Yanduo Liu, Ning Sun, Shuangying Chen, Rui Yan, Peng Li, Yang Qu, Yichun Qu*, and Liqiang Jing*

Heilongjiang University, China

1612–1624



Specific surface, lifetime, and separation of photogenerated charges in molecular sieve titanium phosphate increased after introducing a mesoporous structure and coupling a proper amount of SnO₂, greatly improving the photoactivities for 2,4-dichlorophenol degradation and CO oxidation. ·O₂⁻ is formed by transferring electrons to SnO₂ and then by reacting with O₂ as the dominant active species to induce the degradation of 2,4-dichlorophenol.

Cell-assembled (Gd-DOTA)₇-triphenylphosphonium (TPP) nanoclusters as a T₂ contrast agent reveal *in vivo* fates of stem cell transplants

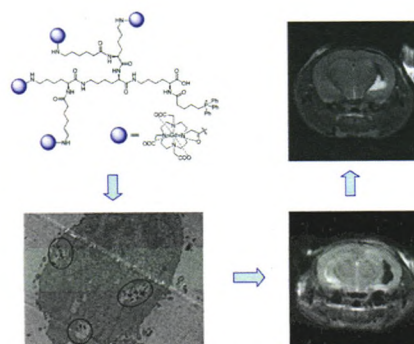
Yanhui Zhang^{1,2}, Hongyan Zhang^{1,2}, Binbin Li^{1,3}, Hailu Zhang¹, Bo Tan^{1,*}, and Zongwu Deng^{1,*}

¹ Suzhou Institute of Nano-tech and Nano-bionics, Chinese Academy of Sciences, China

² Shanghai University, China

³ University of Science and Technology of China, China

1625–1641



Labeling cells with (Gd-DOTA)₇-triphenylphosphonium (TPP) via electroporation results in two distinct cellular distributions of (Gd-DOTA)₇-TPP: freely and evenly distributed in the cytosol or cell-assembled nanoclusters in the cytoplasm. The (Gd-DOTA)₇-TPP nanoclusters not only promote its intracellular retention time but also induce a significant magnetic resonance imaging (MRI) signal reduction, which act as an excellent T₂ contrast agent and allows for unambiguous reporting of *in vivo* viability and migration of cell transplants under T₂-weighted MRIs over a long period.

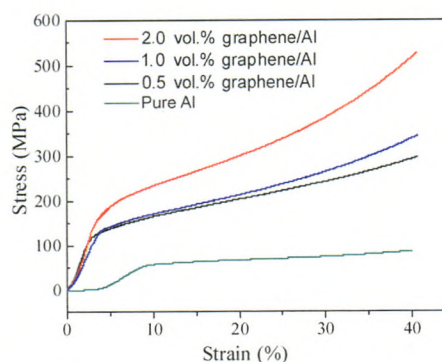
A novel method for preparing and characterizing graphene nanoplatelets/aluminum nanocomposites

Duosheng Li^{1,*}, Yin Ye¹, Xiaojun Liao¹, and Qing H. Qin²

¹ Nanchang Hangkong University, China

² Australian National University, Australia

1642–1650



The mechanical properties of graphene nanoplatelets/aluminum (Al) nanocomposites containing a low volume fraction of GNPs were significantly improved. When 0.5 vol.%, 1.0 vol.%, and 2.0 vol.% GNPs were added to the aluminum matrix, the average compressive strength of the GNPs/Al nanocomposites increased remarkably from 330% to 586%.

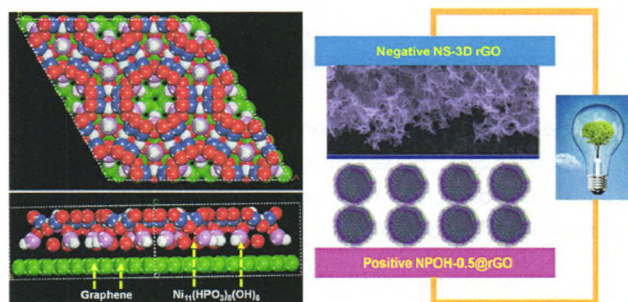
High-performance asymmetrical supercapacitor composed of rGO-enveloped nickel phosphite hollow spheres and N/S co-doped rGO aerogel

Deyang Zhang¹, Yihe Zhang^{1,*}, Yongsong Luo², Yu Zhang¹, Xiaowei Li¹, Xuelian Yu¹, Hao Ding¹, Paul K. Chu³, and Li Sun^{1,*}

¹ China University of Geosciences, China

² Xinyang Normal University, China

³ City University of Hong Kong, Hong Kong, China



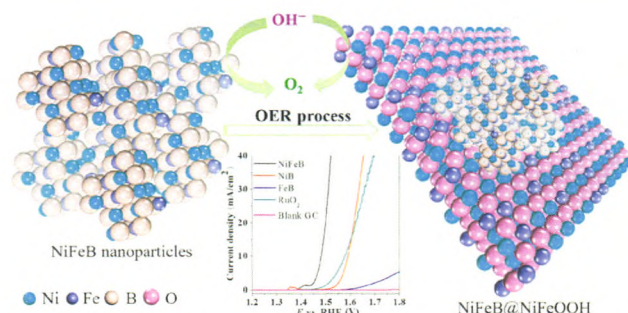
An asymmetrical supercapacitor composed of reduced graphene oxide (rGO)-enveloped nickel phosphite hollow spheres and N/S co-doped rGO aerogel has been fabricated, which exhibits outstanding cycling and rate capability.

1651–1663

Amorphous NiFeB nanoparticles realizing highly active and stable oxygen evolving reaction for water splitting

Guang Liu, Dongying He, Rui Yao, Yong Zhao, and Jinping Li*

Taiyuan University of Technology, China



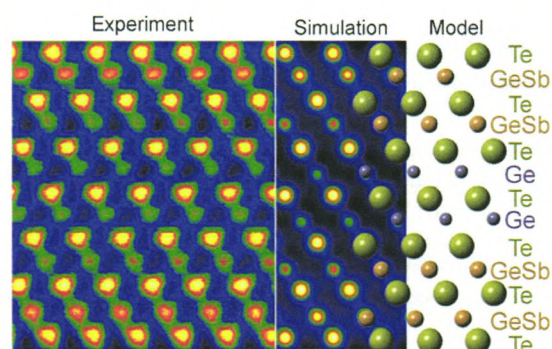
With the advantages of amorphous characteristics, optimal Fe doping contents, and *in situ* formation of active borate-enriched NiFeOOH layers during water oxidation, ultrafine amorphous NiFeB nanoparticles proved to be highly efficient oxygen-evolving catalysts for water splitting at a wide range of pH values (7–14).

1664–1675

Van der Waals interfacial bonding and intermixing in GeTe-Sb₂Te₃-based superlattices

Andriy Lotnyk*, Isom Hilmi, Ulrich Ross, and Bernd Rauschenbach

Leibniz Institute of Surface Modification (IOM), Germany



In this work, GeTe-Sb₂Te₃-based superlattices (SLs) are produced by pulsed laser deposition (PLD) and characterized by advanced scanning transmission electron microscopy. The results shed new light on the possible configurations of interfacial phase change memory (iPCM) building units that can be formed during the synthesis of GeTe-Sb₂Te₃-based SLs.

1676–1686

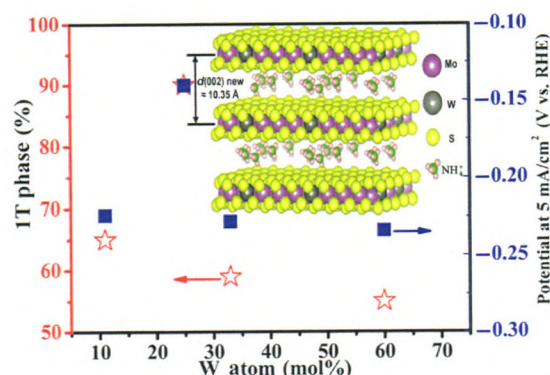
High-metallic-phase-concentration $\text{Mo}_{1-x}\text{W}_x\text{S}_2$ nanosheets with expanded interlayers as efficient electrocatalysts

Qun He¹, Yangyang Wan¹, Hongliang Jiang¹, Chuanqiang Wu¹, Zhongti Sun¹, Shuangming Chen^{1,*}, Yu Zhou¹, Haiping Chen¹, Daobin Liu¹, Yasir A. Haleem¹, Binghui Ge², Xiaojun Wu^{1,*}, and Li Song^{1,*}

¹ University of Science and Technology of China, China

² Institute of Physics, Chinese Academy of Sciences, China

1687–1698



High metallic phase concentration ultrathin ternary $\text{Mo}_{1-x}\text{W}_x\text{S}_2$ nanosheets were successfully synthesized for the first time. The metallic phase concentration, together with the enlarged and distinct interlayer spacing, can be regulated by using different Mo/W atomic ratios, and the optimized catalyst shows obvious advantage in the electrochemical water splitting reaction.

Mechanically robust antireflective coatings

Sadaf Bashir Khan, Hui Wu, Xiaochen Huai, Sumeng Zou, Yuehua Liu, and Zhengjun Zhang*

Tsinghua University, China

1699–1713



We established a simple strategy to fabricate mechanically robust and thermally stable, hierarchically lotus-like super-hydrophobic nanostructures showing omnidirectional antireflective (AR) performance with tunability in the desired wavelength range. This approach is practically applicable in different optic and optoelectronic devices including windshields, display panels, eyeglasses, solar cells, and windows of high rise buildings.

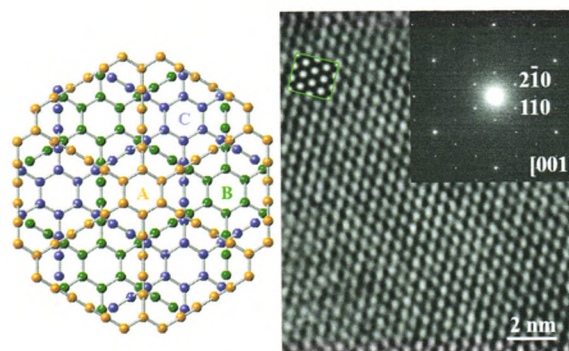
Direct imaging and determination of the crystal structure of six-layered graphdiyne

Chao Li¹, Xiuli Lu¹, Yingying Han¹, Shangfeng Tang¹, Yi Ding¹, Ruirui Liu¹, Haihong Bao¹, Yuliang Li², Jun Luo^{1,*}, and Tongbu Lu^{1,*}

¹ Tianjin University of Technology, China

² Institute of Chemistry, Chinese Academy of Sciences, China

1714–1721



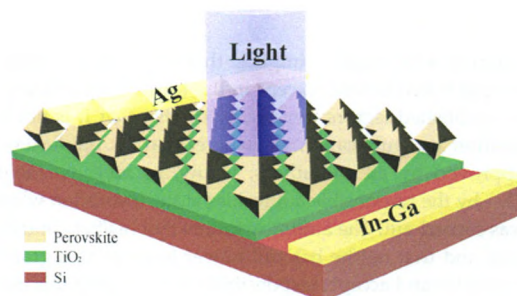
Since its discovery, the direct imaging and determination of the crystal structure of few-layer graphdiyne has proven difficult. In this work, we successfully employed low-voltage transmission electron microscopy with low current density to realize the direct imaging of graphdiyne and confirmed that the structure of an as-synthesized graphdiyne nanosheet is crystalline, with six-layer thickness and ABC stacking.

Novel perovskite/TiO₂/Si trilayer heterojunctions for high-performance self-powered ultraviolet-visible-near infrared (UV-Vis-NIR) photodetectors

Fengren Cao¹, Qingliang Liao², Kaimo Deng¹, Liang Chen¹, Liang Li^{1,*}, and Yue Zhang^{2,*}

¹ Soochow University, China

² University of Science and Technology Beijing, China



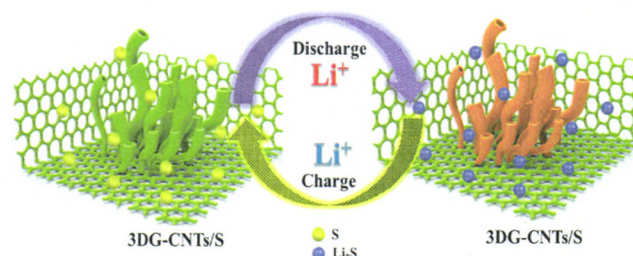
Novel trilayer hybrid photodetectors comprising *n*-type Si wafer, TiO₂ interlayer, and perovskite film are demonstrated. The heterojunction photodetectors exhibit broad photoresponse, high response speed, and a higher on/off ratio, when compared to pristine Si and perovskite based devices.

1722–1730

In situ carbon nanotube clusters grown from three-dimensional porous graphene networks as efficient sulfur hosts for high-rate ultra-stable Li–S batteries

Shizhi Huang, Lingli Zhang, Jingyan Wang, Jinliang Zhu*, and Pei Kang Shen*

Guangxi University, China



Capillary-like carbon nanotube clusters grown *in situ* from three-dimensional porous graphene networks (3DG-CNTs) show excellent performance as sulfur hosts for lithium–sulfur batteries.

1731–1743

Tunable excitonic emission of monolayer WS₂ for the optical detection of DNA nucleobases

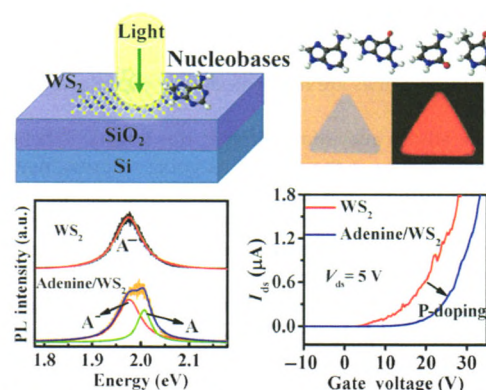
Shun Feng¹, Chunxiao Cong^{2,*}, Namphung Peimyo^{1,†}, Yu Chen¹, Jingzhi Shang¹, Chenji Zou¹, Bingchen Cao¹, Lishu Wu¹, Jing Zhang¹, Mustafa Eginligil³, Xingzhi Wang¹, Qihua Xiong¹, Arundithi Ananthanarayanan¹, Peng Chen¹, Baile Zhang¹, and Ting Yu^{1,*}

¹ Nanyang Technological University, Singapore

² Fudan University, China

³ Nanjing Tech University (NanjingTech), China

[†] Present address: University of Exeter, UK



The effects of DNA nucleobases on the photoluminescence (PL) emission of monolayer WS₂ (1L WS₂) grown by chemical vapor deposition are revealed. The PL modulation is attributed to the p-type doping of WS₂ via charge transfer, and this was confirmed using both optical and electrical measurements.

1744–1754

Erratum to: Silicene on non-metallic substrates: Recent theoretical and experimental advances

(<https://doi.org/10.1007/s12274-017-1777-y>)

1755

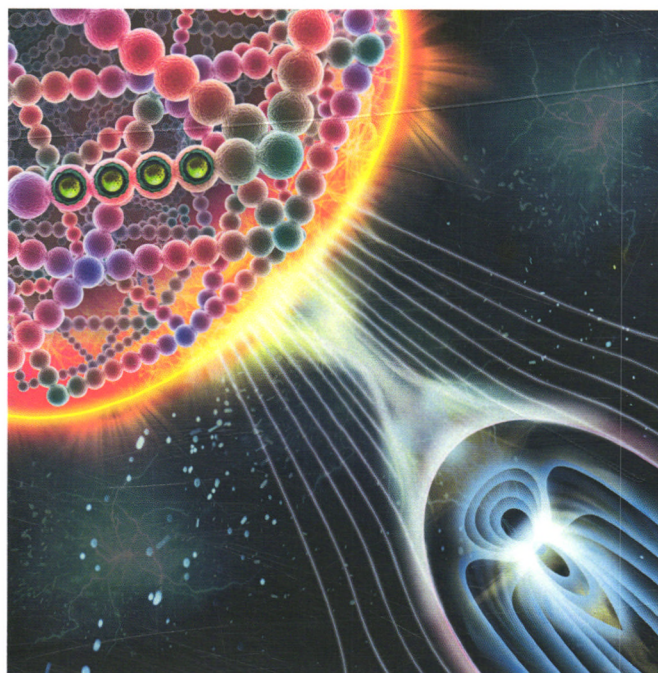
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