

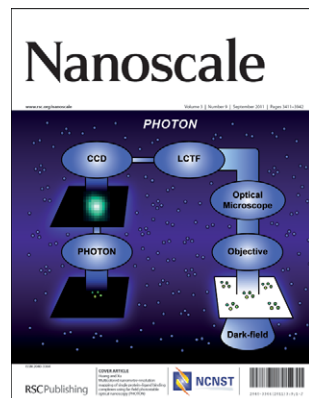
Nanoscale

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ISSN 2040-3364 CODEN NANOHL 3(9) 3411–3942 (2011)



Cover

See Huang and Xu, pp. 3567–3572.
Design of PHOTON mapping of single ligand molecules in single protein–ligand complexes.
Image reproduced by permission of Prof Xiao-Hong Nancy Xu from *Nanoscale*, 2011, **3**, 3567.



Inside cover

See Cademartiri and Kitaev, pp. 3435–3446.
The cover highlights the poorly understood (yet exceedingly interesting) transition between atomically-defined compounds (the small, perfect cubes) and polydisperse nanoscale species (the defective, bigger cubes).
Image reproduced by permission of Dr Vladimir Kitaev from *Nanoscale*, 2011, **3**, 3435.

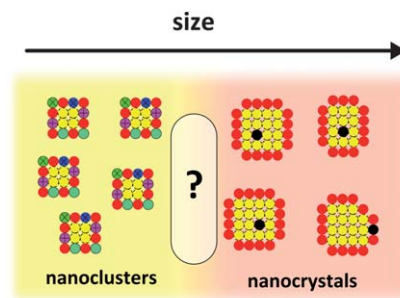
REVIEWS

3435

On the nature and importance of the transition between molecules and nanocrystals: towards a chemistry of “nanoscale perfection”

Ludovico Cademartiri* and Vladimir Kitaev*

A discussion of the transition between atomically defined compounds (molecules, clusters) and polydisperse species (nanocrystals, nanowires) for different classes of materials.

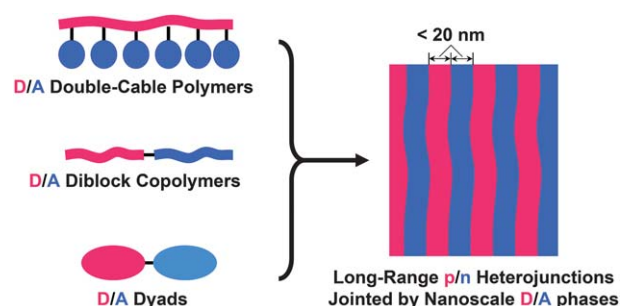


3447

Construction of a long range p/n heterojunction with a pair of nanometre-wide continuous D/A phases

Lei Dong, Wen Li* and Wei-Shi Li*

This review article summarizes the present approaches including donor–acceptor (D–A) double cables, diblock copolymers, and small molecular dyads or multiads for construction of long range p/n heterojunctions having D and A bicontinuous nanophases.



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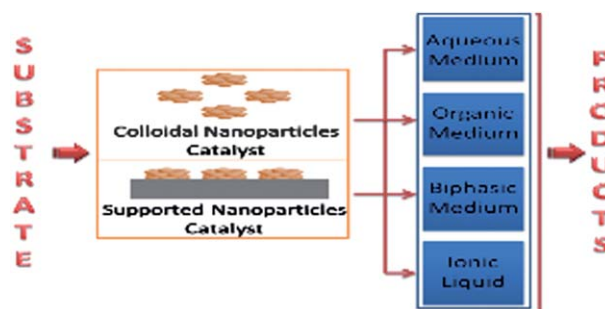
REVIEWS

3462

Metal nanoparticles in liquid phase catalysis; from recent advances to future goals

Mehmet Zahmakıran and Saim Özkar*

Metal(0) nanoparticles stabilized by ligands, surfactants or solid supports are highly active catalysts for liquid phase reactions.

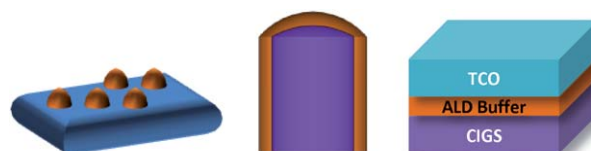


3482

Nanoengineering and interfacial engineering of photovoltaics by atomic layer deposition

Jonathan R. Bakke, Katie L. Pickrahn, Thomas P. Brennan and Stacey F. Bent*

Primary uses of ALD for PV include formation of absorbing QDs at low cycle number (left), coatings on nanostructured substrates (middle), and growth of thin films (right).

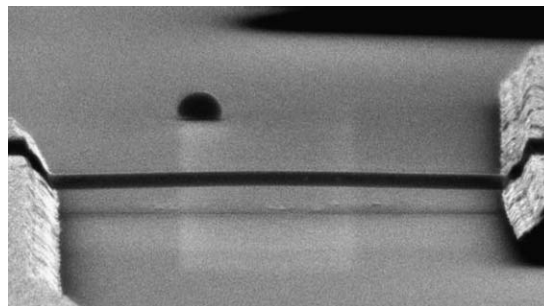


3509

Nanostructure studies of strongly correlated materials

Jiang Wei* and Douglas Natelson*

This review examines recent progress in the use of nanostructure techniques to explore and understand the physics and properties of strongly correlated materials.

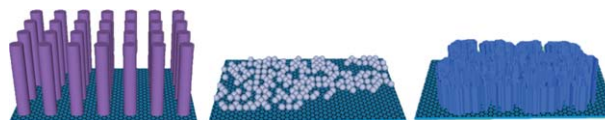


3522

Inorganic nanostructures grown on graphene layers

Won Il Park,* Chul-Ho Lee, Jung Min Lee, Nam-Jung Kim and Gyu-Chul Yi*

We review recent research activities on the preparation methods and characteristics of the inorganic nanostructures grown on graphene layers and their device applications.



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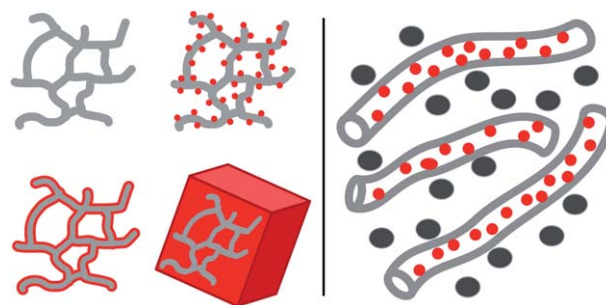
FEATURE ARTICLES

3534

Safer energetic materials by a nanotechnological approach

Benny Siegert,* Marc Comet and Denis Spitzer

We review how nanomaterials engineering can help to create safer energetic materials (explosives and thermites).

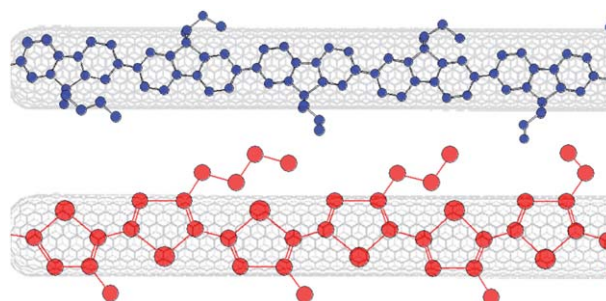


3545

Non-covalent interactions between carbon nanotubes and conjugated polymers

Dönüs Tuncel*

The aim of this feature article is to review the recent results on the conjugated polymer-based non-covalent functionalization of carbon nanotubes.

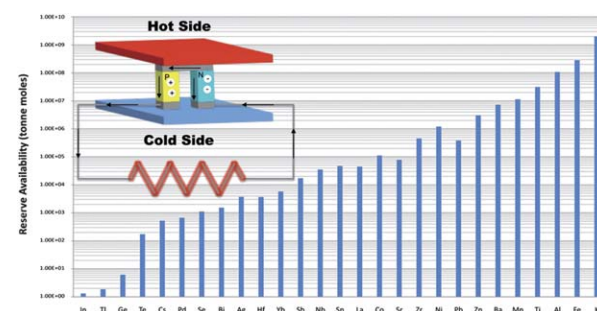


3555

Nanostructure-based thermoelectric conversion: an insight into the feasibility and sustainability for large-scale deployment

Gautam G. Yadav, Joseph A. Susoreny, Genqiang Zhang, Haoran Yang and Yue Wu*

An analysis to determine the appropriate thermoelectric nanomaterials for the future large-scale manufacture and deployment.



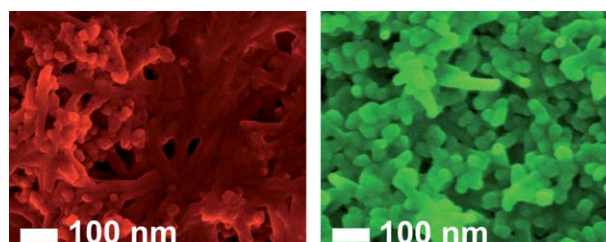
COMMUNICATIONS

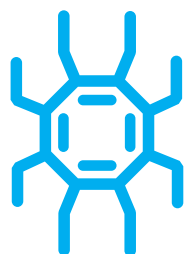
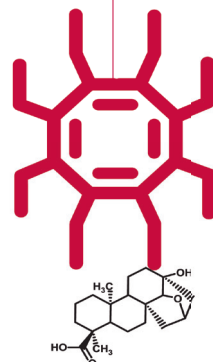
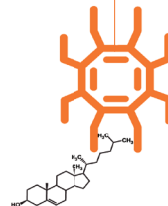
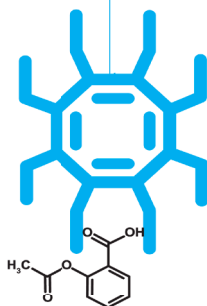
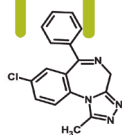
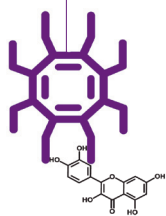
3563

A transparent hybrid of nanocrystalline cellulose and amorphous calcium carbonate nanoparticles

Denis Gebauer, Vitaliy Oliynyk, Michaela Salajkova, Jordi Sort, Qi Zhou, Lennart Bergström and German Salazar-Alvarez

Transparent tough hybrids composed of nanocrystalline cellulose and amorphous calcium carbonate nanoparticles are promising candidates for functional biodegradable materials.





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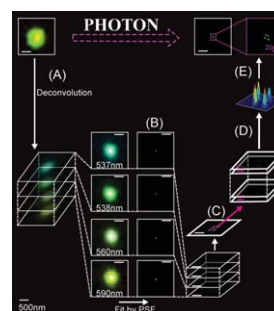
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Multicolored nanometre-resolution mapping of single protein–ligand binding complexes using far-field photostable optical nanoscopy (PHOTON)

Tao Huang and Xiao-Hong Nancy Xu*

Design of PHOTON for mapping of single ligand molecules in single protein–ligand complexes.

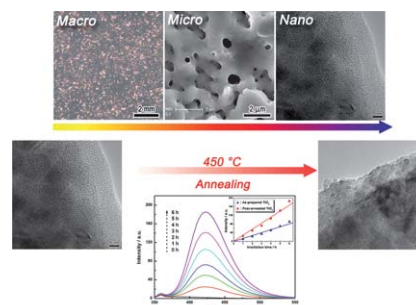


3573

Effect of surface microstructure of TiO₂ film from micro-arc oxidation on its photocatalytic activity: a HRTEM study

Xudong Jiang, Anqi Shi, Yongqian Wang, Yuanzhi Li and Chunxu Pan*

The TiO₂ surface amorphous layer was crystallized into anatase nano-grains and photocatalytic activity was enhanced remarkably after annealing.

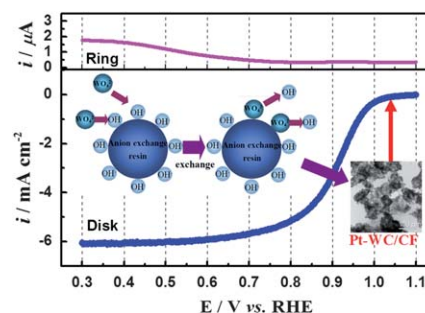


3578

A universal method to synthesize nanoscale carbides as electrocatalyst supports towards oxygen reduction reaction

Guoqiang He, Zaoxue Yan, Xueming Ma, Hui Meng, Pei Kang Shen* and Chengxin Wang*

The nanoarchitectures of Pt nanoparticles on carbide nanoparticles/carbon foam show enhanced activity for oxygen reduction reaction.

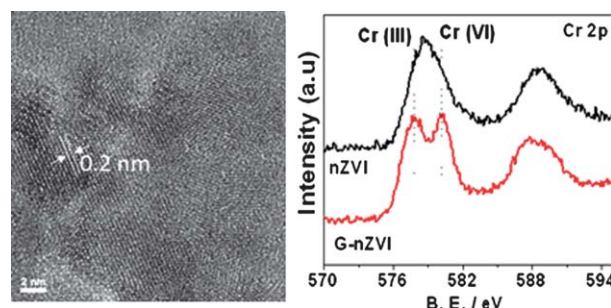


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Enhanced Cr(VI) removal using iron nanoparticle decorated graphene

Humera Jabeen, Vimlesh Chandra, Sehoon Jung, Jung Woo Lee, Kwang S. Kim* and Seung Bin Kim*

Iron nanoparticles decorated graphene sheets shows enhanced chromium(VI) adsorption compared to bare iron nanoparticles.



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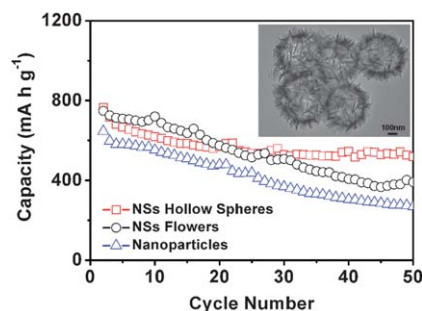
COMMUNICATIONS

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SnO₂ nanosheet hollow spheres with improved lithium storage capabilities

Shujiang Ding and Xiong Wen (David) Lou*

Hierarchical hollow spheres assembled from SnO₂ nanosheets can be fabricated by employing new chemistry. In virtue of the porous shell structure and internal voids, these SnO₂ hierarchical nanosheet hollow spheres exhibit improved lithium storage capability.

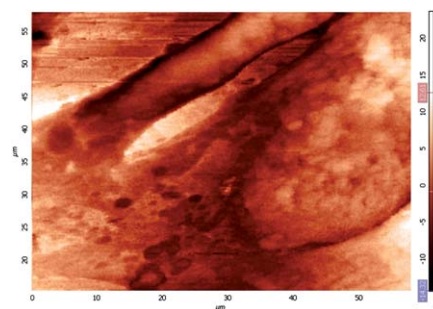


3589

Disentangling time in a near-field approach to scanning probe microscopy

Marco Farina,* Agnese Lucesoli, Tiziana Pietrangelo, Andrea di Donato, Silvia Fabiani, Giuseppe Venanzoni, Davide Mencarelli, Tullio Rozzi and Antonio Morini

Observing the time evolution of the microwave signals discloses unexpected developments for the near-field microwave microscopy.

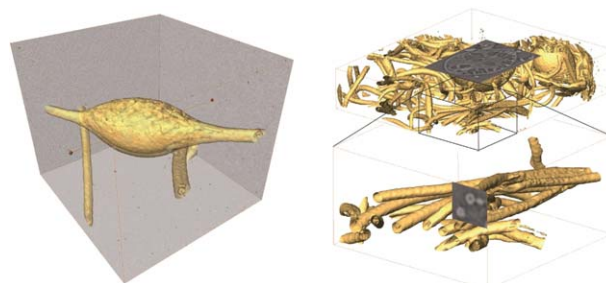


3594

Characterisation of internal morphologies in electrospun fibers by X-ray tomographic microscopy

Jens Vinge Nygaard,* Tamer Uyar,* Menglin Chen, Peter Cloetens, Peter Kingshott and Flemming Besenbacher

Internal morphologies in electrospun fibers and beads have been investigated for the first time by synchrotron based X-ray tomographic microscopy (XTM).

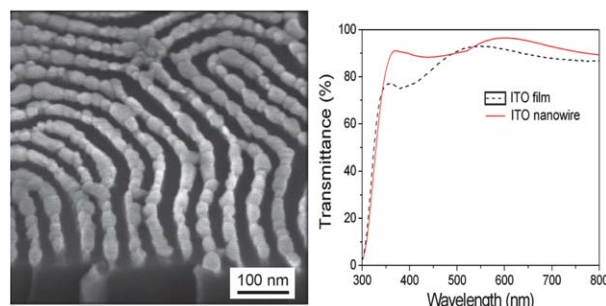


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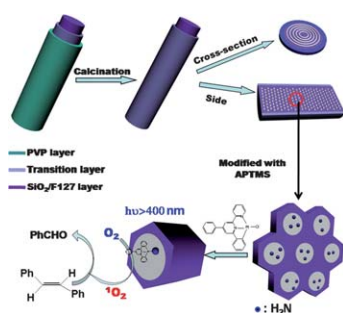
Solution patterning of ultrafine ITO and ZnRh₂O₄ nanowire array below 20 nm without etching process

Guodong Xia* and Sumei Wang

Transparent conductive nanopatterns with feature size below 20 nm are fabricated through simple solution self-assembly without lithographic or etching process.



3601

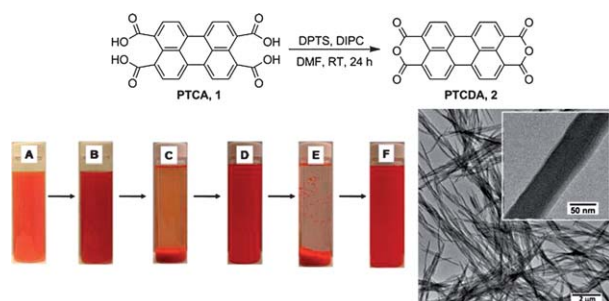


Fabrication of continuous highly ordered mesoporous silica nanofibre with core/sheath structure and its application as catalyst carrier

Haiyan Wang, Dayong Wu,* Dongzhou Li, Zhongwei Niu, Yuzhe Chen, Daihua Tang, Min Wu, Jianhua Cao and Yong Huang

Continuous highly ordered mesoporous silica nanofibres with core/sheath structure were prepared by coaxial electrospinning and used as a catalyst carrier.

3605

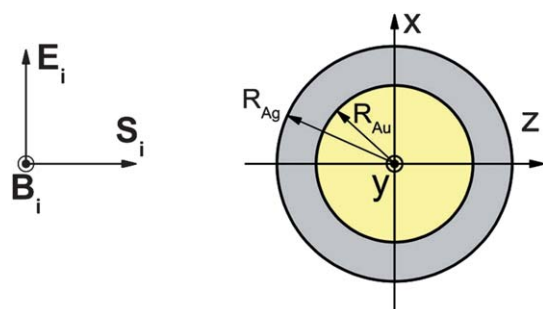


Chemical reaction mediated self-assembly of PTCDA into nanofibers

Arshad S. Sayyad, Kaushik Balakrishnan* and Pulickel M. Ajayan*

Highly crystalline nanofibers of PTCDA have been synthesized by chemically converting an appropriately designed soluble precursor.

3609

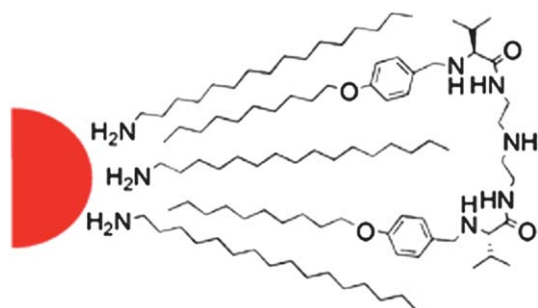


Au@Ag core-shell nanoparticles: efficient all-plasmonic Fano-resonance generators

Ovidio Peña-Rodríguez* and Umapada Pal

Intense Fano resonances in simple Au@Ag core-shell nanoparticles.

3613



Photoluminescence of CdSe/ZnS core-shell quantum dots stabilized in water with a pseudopeptidic gemini surfactant

Jenifer Rubio, M. Angeles Izquierdo, M. Isabel Burguete, Francisco Galindo* and Santiago V. Luis*

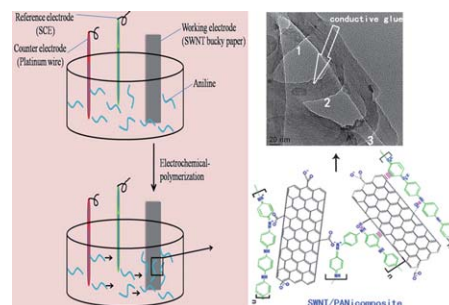
Pseudopeptidic gemini compounds act as intercalators with hydrophobic ligands of QDs transferring them to water.

3616

Flexible single-walled carbon nanotubes/polyaniline composite films and their enhanced thermoelectric properties

Jilei Liu, Jing Sun* and Lian Gao

A three-electrode system was adopted to prepare flexible single-walled carbon nanotubes/polyaniline (SWNT/ PANi) composite films. The formation process and the possible formation mechanism involved in interaction between PANi and SWNT are illustrated. In composite films, PANi works as “conductive glue” to bring the SWNTs together, which was verified by the TEM image.

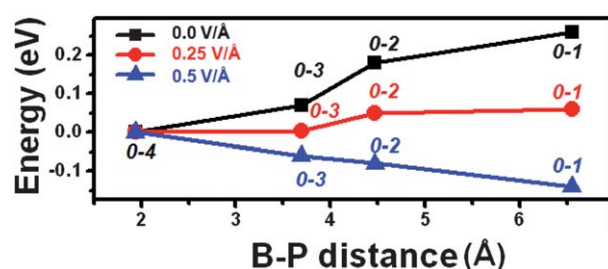


3620

Site-selected doping in silicon nanowires by an external electric field

Fang Wu, Erjun Kan* and Xiaojun Wu*

The dopant-related selection of sites shows p-n junctions can be spontaneously formed in silicon nanowires with electric field.

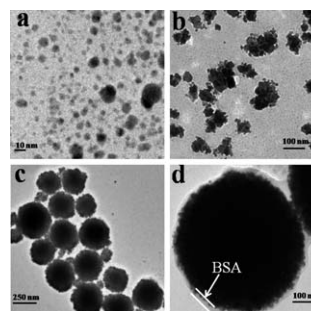


3623

Protein-directed one-pot synthesis of Ag microspheres with good biocompatibility and enhancement of radiation effects on gastric cancer cells

Peng Huang, Da-Peng Yang, Chunlei Zhang, Jing Lin, Meng He, Le Bao and Daxiang Cui*

Biocompatible Ag@BSA microspheres/assemblies as an effective radiation enhancer were successfully synthesized *via* a protein-directed one-pot method.

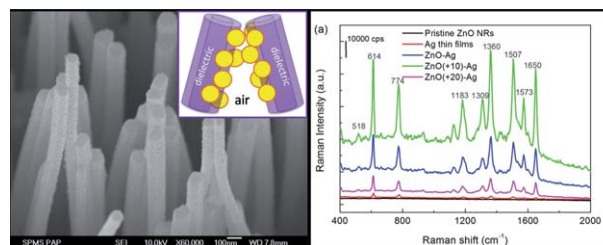


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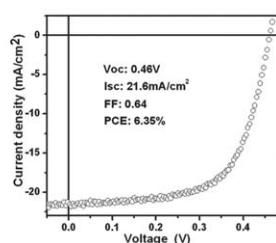
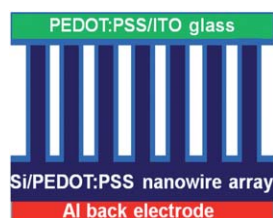
Highly effective SERS substrates based on an atomic-layer-deposition-tailored nanorod array scaffold

Monan Liu, Li Sun, Chuanwei Cheng, Hailong Hu, Zexiang Shen and Hong Jin Fan*

Atomic layer deposition is applied to fine tune the metal nanogaps formed on a nanorod scaffold, which is a sensitive SERS substrate.



3631

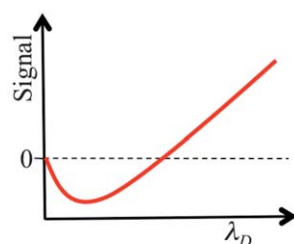
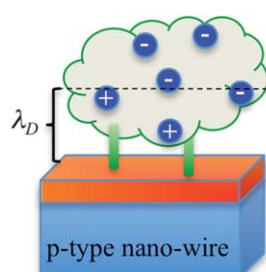


Si/PEDOT:PSS core/shell nanowire arrays for efficient hybrid solar cells

Wenhui Lu, Chengwei Wang, Wei Yue and Liwei Chen*

Schematics of Si/PEDOT:PSS core/shell nanowire array based hybrid solar cells and the corresponding current density–voltage (J – V) characteristics.

3635

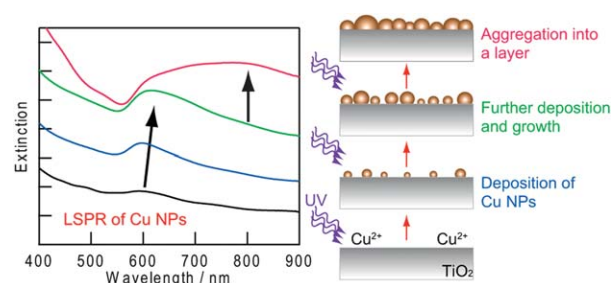


Predicting and rationalizing the effect of surface charge distribution and orientation on nano-wire based FET bio-sensors

Luca De Vico,* Lars Iversen, Martin H. Sørensen, Mads Brandbyge, Jesper Nygård, Karen L. Martinez and Jan H. Jensen*

We analyze how appropriate combinations of buffer conditions and charge distributions and orientation may lead to a counter-intuitive signal in BioFETs.

3641

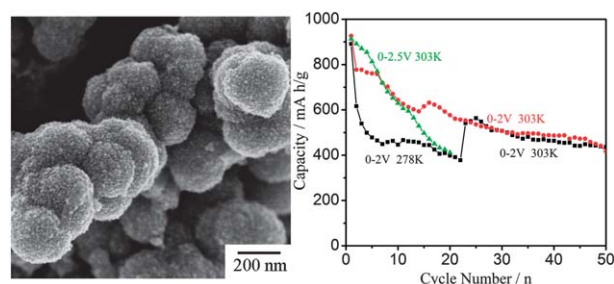


Growth behaviour and plasmon resonance properties of photocatalytically deposited Cu nanoparticles

Emiko Kazuma, Taishi Yamaguchi, Nobuyuki Sakai and Tetsu Tatsuma*

Cu nanoparticles are easily prepared on TiO_2 by photocatalytic reactions. Although the nanoparticles exhibit plasmon resonance-based optical properties, excessive deposition gives aggregates exhibiting a spectrum characteristic of a Cu layer.

3646



Facile solvothermal synthesis of mesoporous Cu_2SnS_3 spheres and their application in lithium-ion batteries

Baihua Qu, Ming Zhang, Danni Lei, Yaping Zeng, Yuejiao Chen, Libao Chen, Qihong Li, Yanguo Wang* and Taihong Wang*

Three dimensional (3D) mesoporous Cu_2SnS_3 spheres as anode materials for lithium-ion batteries with remarkably enhanced cycling performances have been investigated.

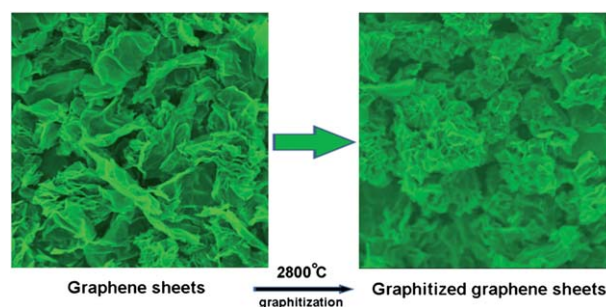
PAPERS

3652

Graphitization behaviour of chemically derived graphene sheets

Donghui Long,* Wei Li, Wenming Qiao, Jin Miyawaki, Seong-Ho Yoon, Isao Mochida and Licheng Ling*

The graphitization behaviour of chemically derived graphene sheets was studied by structure characterization and morphological observation, which provided some implications for understanding of the thermodynamic behaviour of 2D crystals at very high temperature.

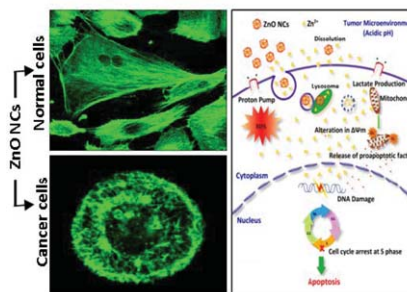


3657

Rapid dissolution of ZnO nanocrystals in acidic cancer microenvironment leading to preferential apoptosis

Abhilash Sasidharan, Parwathy Chandran, Deepthy Menon, Sreerakha Raman, Shantikumar Nair* and Manzoor Koyakutty*

We report an interesting, acidic cancer microenvironment-mediated dissolution-induced preferential toxicity of ZnO nanocrystals against cancer cells while leaving primary cells unaffected.

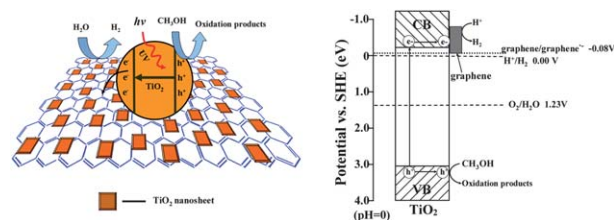


3670

Enhanced photocatalytic H₂-production activity of graphene-modified titania nanosheets

Quanjun Xiang, Jiaguo Yu* and Mietek Jaroniec*

Graphene-modified TiO₂ nanosheet composites with 0.2–2.0 wt% graphene, prepared by a microwave-hydrothermal method, exhibit an enhanced photocatalytic H₂-production activity.

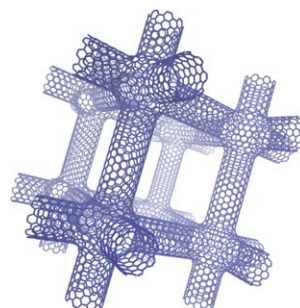


3679

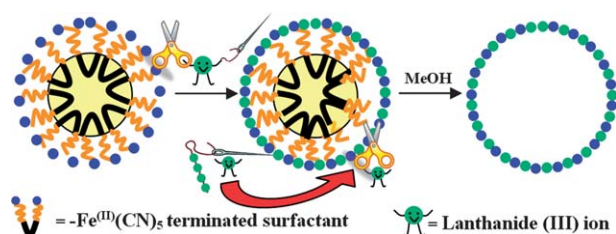
Molecular dynamics simulations of thermal transport in porous nanotube network structures

Vikas Varshney,* Ajit K. Roy,* George Froudakis and Barry L. Farmer

Non-equilibrium molecular dynamics simulations are employed to identify crucial design parameters for tailoring thermal conduction in porous nanotube network structures.



3685

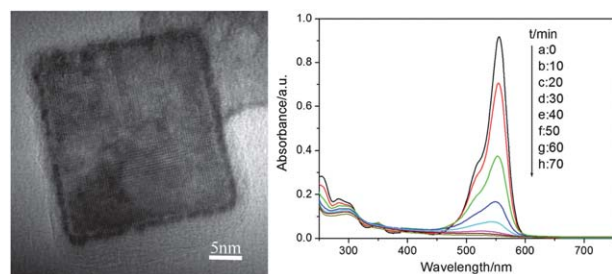


Dual lanthanide role in the designed synthesis of hollow metal coordination (Prussian Blue analogue) nanocages with large internal cavity and mesoporous cage

Ronan McHale, Yibo Liu, Negar Ghasdian, Nicole S. Hondow, Sunjie Ye, Yun Lu, Rik Brydson and Xiaosong Wang*

In a sequential, one-pot dual role, lanthanide ions initially crosslink outer nanoshell *via* metal-coordination polymerization and then promote removal of templating organic surfactants *via* metal-assisted ester hydrolysis to reveal nanocage.

3695

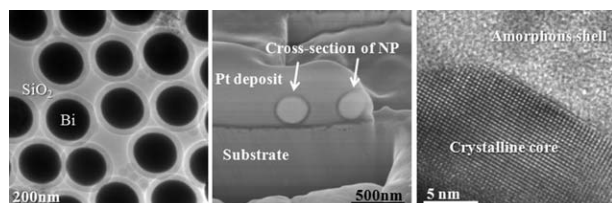


Ti(IV) doped WO_3 nanocuboids: fabrication and enhanced visible-light-driven photocatalytic performance

Chengxin Feng, Shaozhen Wang and Baoyou Geng*

Ti(IV) doped WO_3 nanocuboids are successfully fabricated through an aqueous-phase route. The obtained photocatalyst shows excellent visible-light-driven photocatalytic performance.

3700

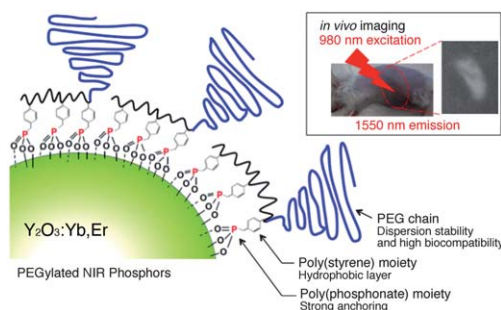


In situ transmission electron microscopy of solid-liquid phase transition of silica encapsulated bismuth nanoparticles

Jianjun Hu,* Yan Hong, Chris Muratore, Ming Su and Andrey A. Voevodin

The silica encapsulation of bismuth nanoparticles prevented agglomeration and allowed the particles to preserve their original volume upon melting.

3705



Near-infrared (1550 nm) *in vivo* bioimaging based on rare-earth doped ceramic nanophosphors modified with PEG-*b*-poly(4-vinylbenzylphosphonate)

Masao Kamimura, Naoki Kanayama, Kimikazu Tokuzen, Kohei Soga and Yukio Nagasaki*

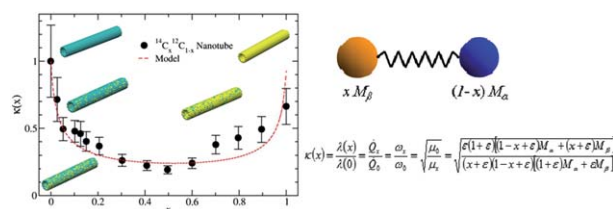
Hydrophobic layer prevents erosion of nanophosphors. Multi-point anchoring is important to stabilize particles *in vivo*.

3714

Thermal conductivity reduction through isotope substitution in nanomaterials: predictions from an analytical classical model and nonequilibrium molecular dynamics simulations

Ganesh Balasubramanian,* Ishwar K. Puri, Michael C. Böhm and Frédéric Leroy*

A classical analytical model based on mean-field approximations, which depends only on masses of different atoms, is introduced to estimate the thermal conductivity reduction due to mass disorder in nanomaterials.

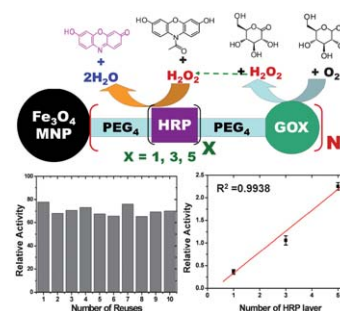


3721

Multilayer enzyme-coupled magnetic nanoparticles as efficient, reusable biocatalysts and biosensors

Josep Garcia, Yue Zhang, Hannah Taylor, Oscar Cespedes, Michael E. Webb and Dejian Zhou*

Multilayer enzyme-coupled magnetic nanoparticles capable of maintaining solution enzyme activities were developed as efficient, reusable biocatalysts and colorimetric biosensors.

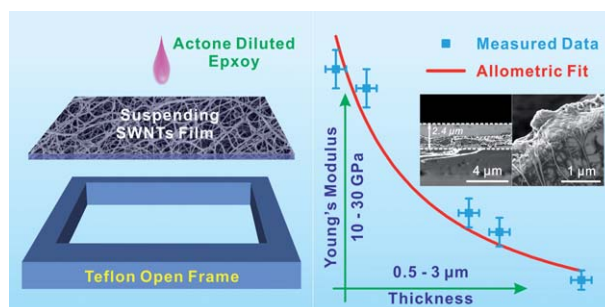


3731

High performance, freestanding and superthin carbon nanotube/epoxy nanocomposite films

Jinzu Li, Yun Gao, Wenjun Ma, Luqi Liu, Zhong Zhang, Zhiqiang Niu, Yan Ren, Xiaoxian Zhang, Qingshen Zeng, Haibo Dong, Duan Zhao, Le Cai, Weiya Zhou and Sishen Xie*

Superthin nanocomposite films fabricated *via* infiltrating carbon nanotube film skeleton with epoxy show tunable high mechanical and electrical performances.

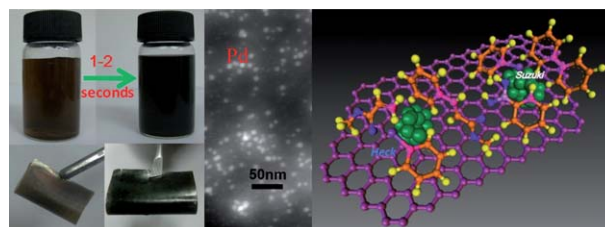


3737

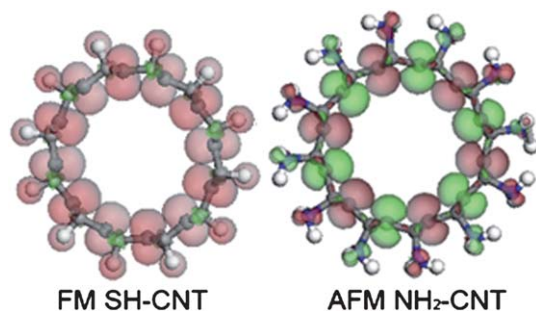
Rapid preparation of noble metal nanocrystals *via* facile coreduction with graphene oxide and their enhanced catalytic properties

Guolei Xiang, Jie He, Tianyang Li, Jing Zhuang and Xun Wang*

Noble metal nanocrystals are prepared based on a rapid coreduction process with graphene oxide by Ti^{3+} , including Rh, Au and Rh-Pt nanodendrites and Pd nanoparticles. Palladium nanocrystals show high catalytic activity and selectivity in Suzuki and Heck coupling reactions.



3743

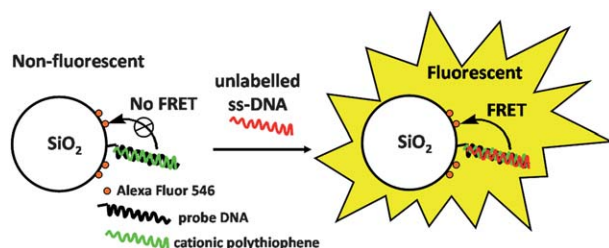


Ferromagnetism/antiferromagnetism transition between semihydrogenated and fully-aminated single-wall carbon nanotubes

Qingming Deng, Lina Zhao,* Youhua Luo,* Meng Zhang, Long Jing and Yuliang Zhao*

The competition and transition of ferromagnetism/antiferromagnetism can be controlled in semihydrogenated and full-aminated single-wall carbon nanotubes.

3747

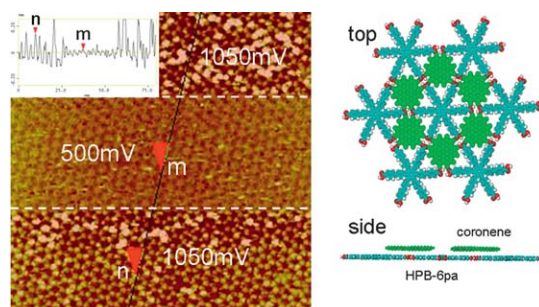


The development of a silica nanoparticle-based label-free DNA biosensor

Arnold J. Kell,* Lilianne Pagé, Sophie Tan, Isabelle Charlebois, Maurice Boissinot, Mario LeClerc and Benoit Simard

Surface-modified silica nanoparticle biosensors can detect unlabelled ss-oligonucleotides through a “turn-on” of fluorescence.

3755

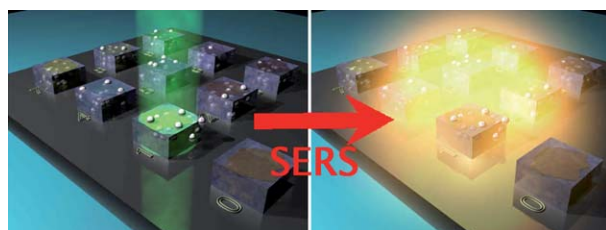


Heterogeneous bilayer molecular structure at a liquid-solid interface

Rui Zhang, Lian-cheng Wang, Min Li, Xue-mei Zhang, Yi-bao Li, Yong-tao Shen, Qi-yu Zheng,* Qing-dao Zeng* and Chen Wang*

A kind of heterogeneous bilayer structure is formed by HPB-6pa and coronene at the octanoic acid/graphite interface.

3760



Nanocomposite mesoporous ordered films for lab-on-chip intrinsic surface enhanced Raman scattering detection

Luca Malfatti, Paolo Falcaro, Benedetta Marmiroli, Heinz Amenitsch, Massimo Piccinini, Andrea Falqui and Plinio Innocenzi*

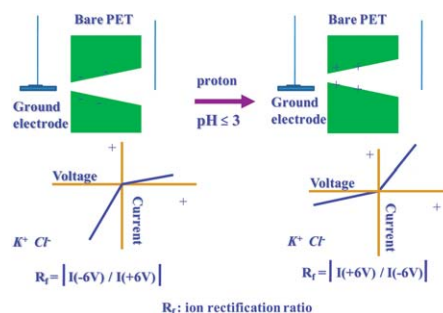
A combination of evaporation-induced self-assembly and deep X-ray lithography has been used to fabricate mesoporous nanocomposite materials as a lab-on-chip for surface enhanced Raman scattering detection.

3767

pH-Reversed ionic current rectification displayed by conically shaped nanochannel without any modification

Zhijun Guo, Jiahai Wang,* Jiangtao Ren and Erkang Wang*

In an aqueous solution with low ionic strength at pH values below 3, the conically shaped nanochannels exhibited distinct ion current rectification as expected for nanochannels with positive surface charge.

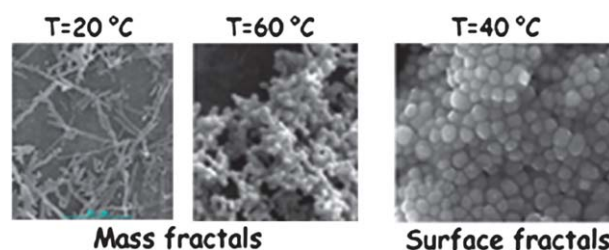


3774

Control of silver–polymer aggregation mechanism by primary particle spatial correlations in dynamic fractal-like geometry

Gaetano Campi,* Alessandra Mari, Augusto Pifferi, Heinz Amenitsch, Michela Fratini and Lorenza Suber*

Spatial correlations and dynamic fractal-like polymeric networks affect the morphology of silver structures forming in aqueous solution.

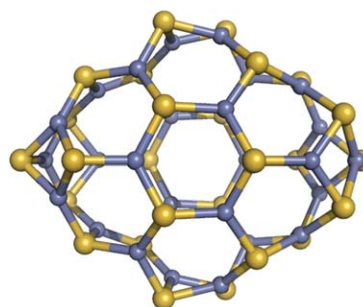


3780

Optical excitations in stoichiometric uncapped ZnS nanostructures

Martijn A. Zwijnenburg*

The optical absorption spectra of ZnS nanostructures obtained through global optimisation are calculated to interpret the cacophony of experimental results.

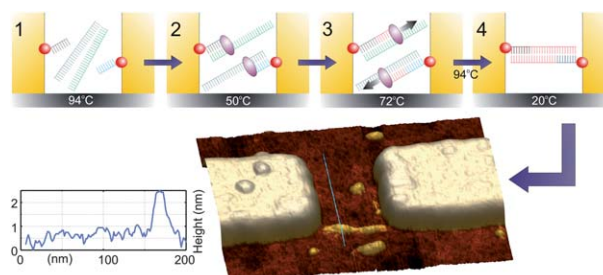


3788

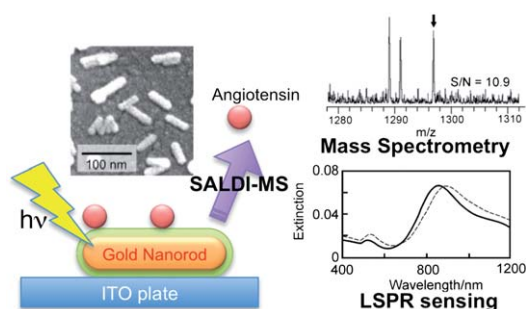
Growth of immobilized DNA by polymerase: bridging nanoelectrodes with individual dsDNA molecules

Veikko Linko,* Jenni Leppiniemi, Boxuan Shen, Einari Niskanen, Vesa P. Hytönen and J. Jussi Toppari

We demonstrate a novel method for controlled connection of nanoelectrodes with dsDNA molecules (locally on a chip) by polymerase elongation of single-stranded DNA primers immobilized to the electrodes.



3793

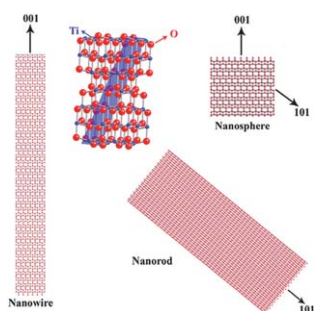


Sensing of oligopeptides using localized surface plasmon resonances combined with Surface-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry

Yuki Nakamura, Yukiko Tsuru, Masanori Fujii, Yumi Taga, Ayaka Kiya, Naotoshi Nakashima and Yasuro Niidome*

Gold nanorods on an ITO plate were used for spectroscopic sensing and mass spectrometry of oligopeptides.

3799

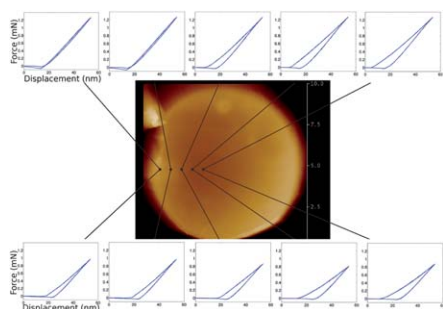


Ligand-mediated shape control in the solvothermal synthesis of titanium dioxide nanospheres, nanorods and nanowires

Isabel Gonzalo-Juan, James R. McBride and James H. Dickerson*

A versatile, solvothermal synthesis technique has been developed for the fabrication of monodisperse anatase TiO_2 nanowires, nanorods and ultra-small (4.0 nm) nanospheres.

3805

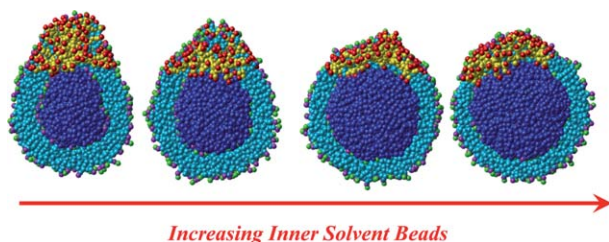


The critical role of water in spider silk and its consequence for protein mechanics

Cameron P. Brown,* Jennifer MacLeod, Heinz Amenitsch, Fernando Cacho-Nerin, Harinderjit S. Gill, Andrew J. Price, Enrico Traversa, Silvia Licoccia and Federico Rosei

The mechanical effect of water in the inner and outer cores of spider silk is investigated to provide insights into the contribution of different layers and proteins to the mechanics of the whole fibre.

3812



Complexes comprised of a dendrimer and a vesicle: role of vesicle size and the surface tension of the vesicle membrane

Li-Tang Yan* and Xiaobo Yu

Mesoscale simulations are performed to study the complexes between a dendrimer and a vesicle of amphiphilic molecules. In particular, the assembled structures and dynamics of these complexes are investigated by tuning vesicle size and the surface tension of vesicle membrane.

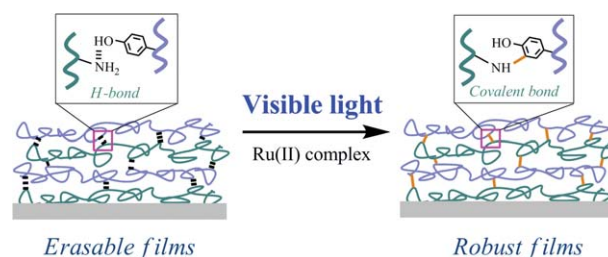
PAPERS

3819

Fabrication of robust multilayer films by triggering the coupling reaction between phenol and primary amine groups with visible light irradiation

You Yu, Hui Zhang and Shuxun Cui*

Visible light is utilized to trigger the chemical cross-linking between phenol and primary amine group within the self-assembled multilayer films.

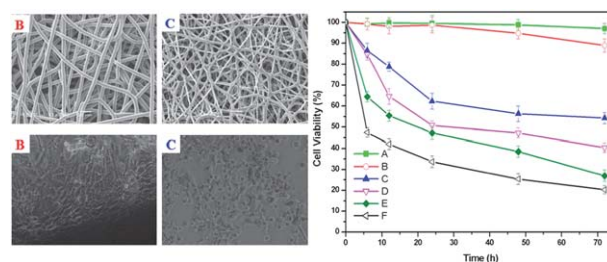


3825

Preparation of curcumin loaded poly(ϵ -caprolactone)-poly(ethylene glycol)-poly(ϵ -caprolactone) nanofibers and their *in vitro* antitumor activity against Glioma 9L cells

Gang Guo, ShaoZhi Fu, LiangXue Zhou, Hang Liang, Min Fan, Feng Luo, ZhiYong Qian* and YuQuan Wei

We prepared curcumin-loaded PCEC nanofibers by electrospinning, and these fibers might have application in postoperative local chemotherapy of brain tumors.

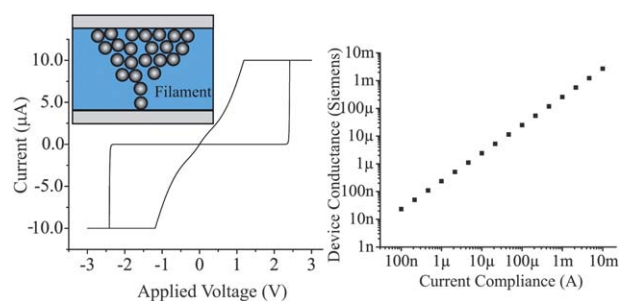


3833

Device and SPICE modeling of RRAM devices

Patrick Sheridan, Kuk-Hwan Kim, Siddharth Gaba, Ting Chang, Lin Chen and Wei Lu*

Device and SPICE models of resistive memory (memristor) devices that accurately capture the dynamic resistance switching processes.

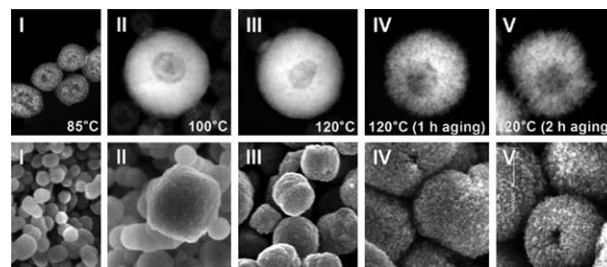


3841

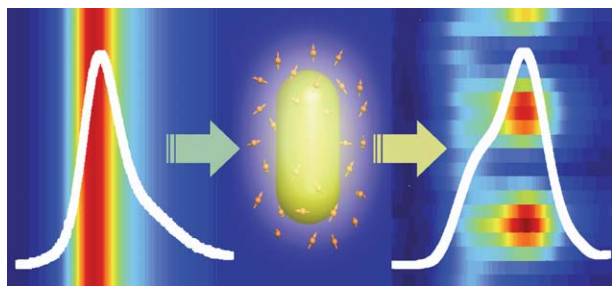
Formation of quasi-single crystalline porous ZnO nanostructures with a single large cavity

Seungho Cho, Semi Kim, Dae-Won Jung and Kun-Hong Lee*

We report a method for synthesizing single crystalline porous ZnO nanostructures containing a single large cavity. Transitory spherical amorphous/polycrystalline particles may play a key role in the formation of these nanostructures.



3849

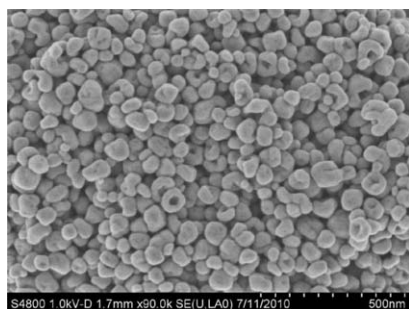


Plasmon-induced modulation of the emission spectra of the fluorescent molecules near gold nanorods

Lei Zhao, Tian Ming, Huanjun Chen, Yao Liang and Jianfang Wang*

The emission spectra of fluorescent molecules that are placed close to plasmonic gold nanorods can be modulated by the localized surface plasmon resonance to produce red-shifted new emission peaks.

3860

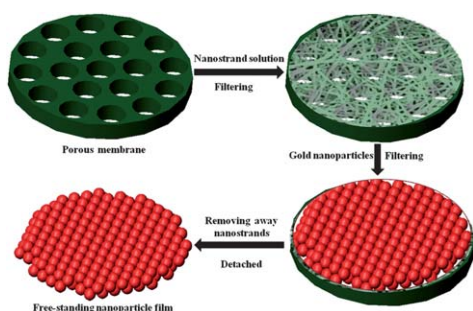


Microwave absorption enhancement and electron microscopy characterization of BaTiO₃ nano-torus

Feng Xia, Jiwei Liu, Dong Gu, Pengfei Zhao, Jie Zhang and Renchao Che*

The microwave absorption enhancement of nano-BaTiO₃ was found because of the nano-bowl morphology formation.

3868

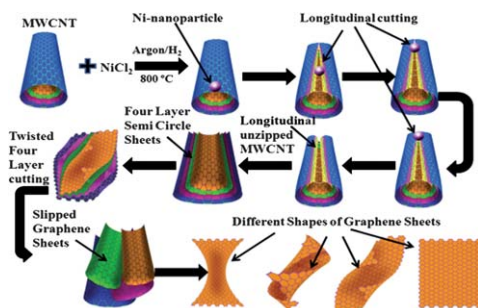


Ultrathin free-standing close-packed gold nanoparticle films: Conductivity and Raman scattering enhancement

Qing Yu, Hongwen Huang, Xinsheng Peng* and Zhizhen Ye

Roustr ultrathin free-standing gold nanoparticle films were prepared based on unique metal hydroxide nanostrand sacrificial layer through filtration process.

3876



Single step synthesis of graphene nanoribbons by catalyst particle size dependent cutting of multiwalled carbon nanotubes

Upendra Kumar Parashar, Suraj Bhandari, Rajesh Kumar Srivastava, Deep Jariwala and Anchal Srivastava*

Single step, aggressive oxidant free synthesis of the graphene nanoribbons based on MWCNTs unzipping through catalytic hydrogenation.

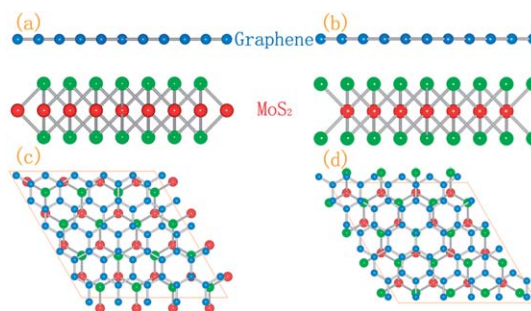
PAPERS

3883

Graphene adhesion on MoS₂ monolayer: An *ab initio* study

Yandong Ma, Ying Dai,* Meng Guo, Chengwang Niu and Baibiao Huang

Nearly linear band dispersion of graphene can be preserved in MoS₂/graphene hybrid accompanied by a small band-gap (2 meV) opening.

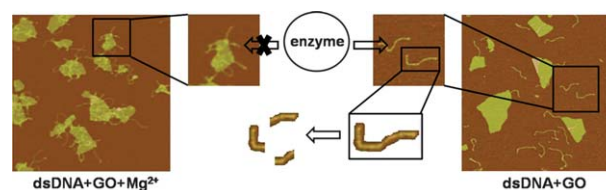


3888

Adsorption of double-stranded DNA to graphene oxide preventing enzymatic digestion

Haozhi Lei, Lijuan Mi, Xuejiao Zhou, Jiajia Chen, Jun Hu, Shouwu Guo* and Yi Zhang*

The dsDNA binds to GO and is protected from enzymatic digestion with the presence of metal cations in the solution.

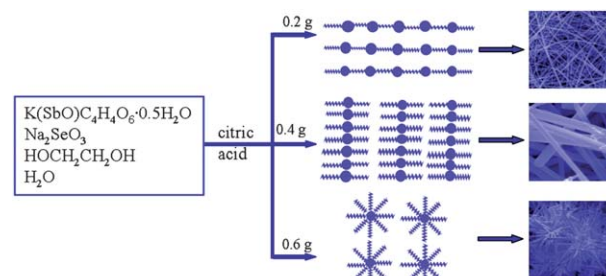


3893

Controllable synthesis and electrochemical hydrogen storage properties of Sb₂Se₃ ultralong nanobelts with urchin-like structures

Rencheng Jin, Gang Chen,* Jian Pei, Jingxue Sun and Yang Wang

The morphology, growth direction, and exposed facets of Sb₂Se₃ can be tuned by adjusting the concentration of the citric acid.

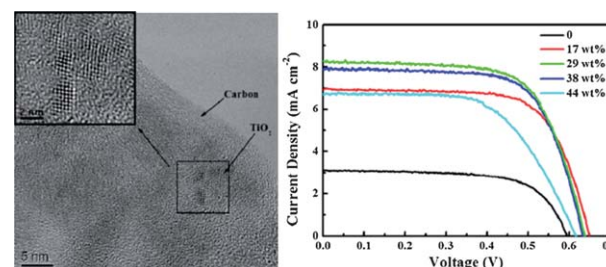


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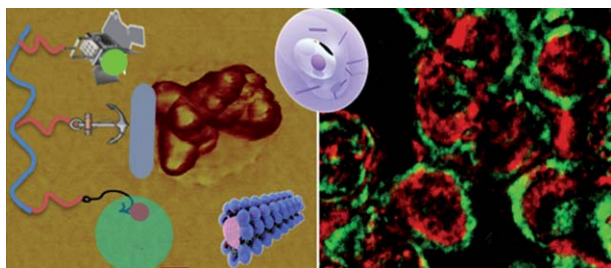
A novel preparation of small TiO₂ nanoparticle and its application to dye-sensitized solar cells with binder-free paste at low temperature

Ke Fan, Chuqing Gong, Tianyou Peng,* Junnian Chen and Jiangbin Xia

Small TiO₂ nanoparticles derived from a novel method without hydrothermal treatment were applied to dye-sensitized solar cells at low temperature.



3907

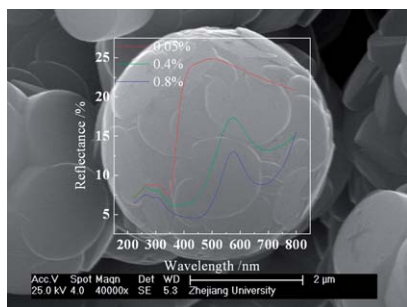


Hydrogen peroxide sensors for cellular imaging based on horse radish peroxidase reconstituted on polymer-functionalized TiO₂ nanorods

Muhammad Nawaz Tahir,* Rute André, Jugal Kishore Sahoo, Florian D. Jochum, Patrick Theato, Filipe Natalio, Rüdiger Berger, Robert Branscheid, Ute Kolb and Wolfgang Tremel*

A flexible synthesis approach to reconstitute apo-HRP on TiO₂ nanorods using multifunctional polymeric ligands is used to image H₂O₂ in HeLa cells.

3915

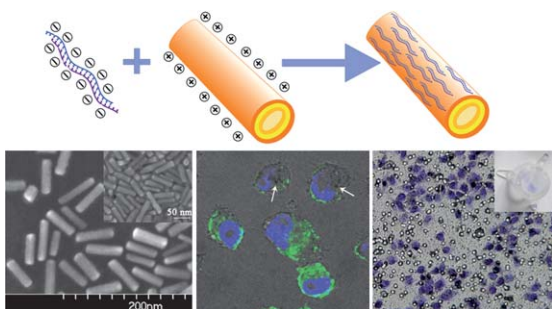


One-pot synthesis of N-F-Cr-doped anatase TiO₂ microspheres with nearly all-(001) surface for enhanced solar absorption

Jin-Ming Wu* and Mei-Lan Tang

N-F-Cr-doped anatase TiO₂ microspheres with nearly all-(001) surface were achieved through a one-pot synthesis, exhibiting significantly enhanced solar absorption.

3923

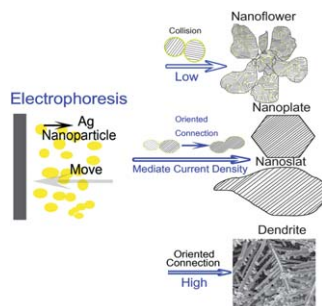


Inhibiting metastasis of breast cancer cells *in vitro* using gold nanorod-siRNA delivery system

Weiqi Zhang, Jie Meng, Yinglu Ji, Xiaojin Li, Hua Kong, Xiaochun Wu* and Haiyan Xu*

Cationic gold nanorods combined with PAR-1 siRNA inhibited the metastasis of breast cancer cells with low cytotoxicity.

3933



Complex nanostructures synthesized from nanoparticle colloids under an external electric field

Peisheng Liu,* Shikuan Yang, Ming Fang, Xiangdong Luo and Weiping Cai

In the paper, a novel method was presented to synthesize complex nanostructured films through oriented connection of nanoparticles under an external electric field, in which Silver is taken as an example to validate the feasibility of this fabrication approach.