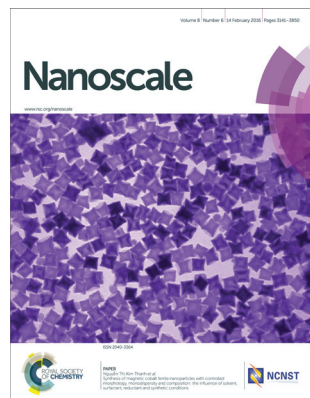


IN THIS ISSUE

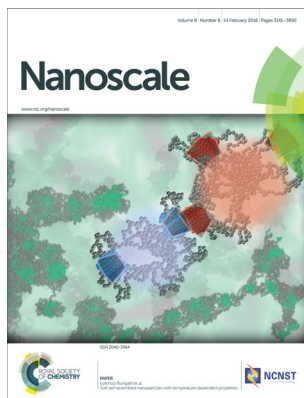
ISSN 2040-3364 CODEN NANOHL 8(6) 3141-3850 (2016)



Cover

See Nguyễn Thị Kim Thanh *et al.*, *Nanoscale*, 2015, **7**, 19596.

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Inside cover

See Lorenzo Rovigatti *et al.*, pp. 3287–3294.

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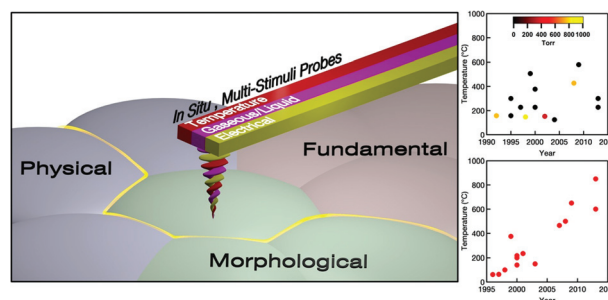
REVIEWS

3164

A hot tip: imaging phenomena using *in situ* multi-stimulus probes at high temperatures

Stephen S. Nonnenmann

Here we review high temperature, ambient pressure *in situ* SPM imaging to promote local, temperature-dependent catalytic, electronic, and electrochemical-based studies.

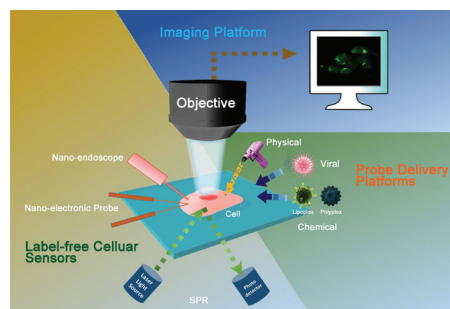


3181

Nanoscale bio-platforms for living cell interrogation: current status and future perspectives

Lingqian Chang, Jiaming Hu, Feng Chen, Zhou Chen, Junfeng Shi, Zhaogang Yang, Yiwen Li* and Ly James Lee*

The recent entries of nanoscale platforms with high spatial and temporal resolution have been widely employed to probe the living cells.



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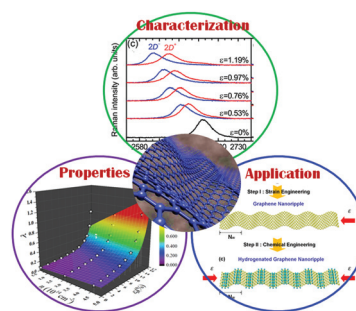
REVIEWS

3207

Strain engineering of graphene: a review

Chen Si, Zhimei Sun and Feng Liu*

Strain engineering is widely considered as an effective way of tuning the properties of graphene and has opened a new field called "straintronics".



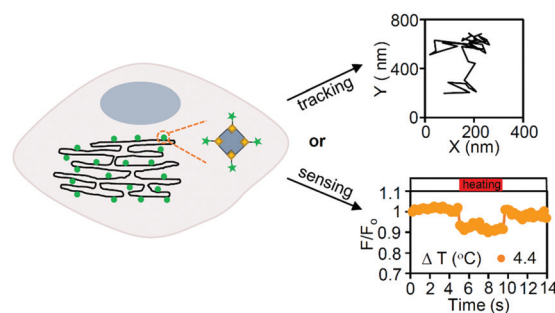
COMMUNICATIONS

3218

Intracellular bottom-up generation of targeted nanosensors for single-molecule imaging

Yanyan Hou, Satoshi Arai, Tetsuya Kitaguchi and Madoka Suzuki*

A convenient three-step method to generate brighter nanoprobes inside living cells was presented for tracking or sensing localized cellular activities.

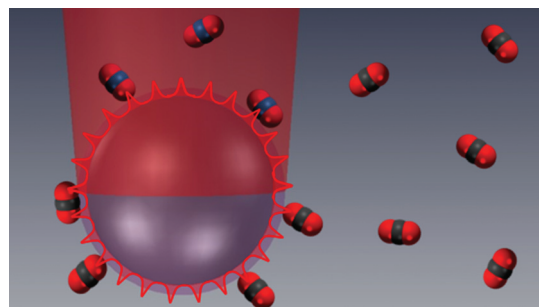


3226

Plasmon-free SERS detection of environmental CO₂ on TiO₂ surfaces

Nicolò Bontempi, Luca Carletti, Costantino De Angelis and Ivano Alessandri*

SiO₂/TiO₂ core/shell beads exploit light trapping and morphology dependent resonances to detect CO₂ adsorbed on TiO₂ surfaces.

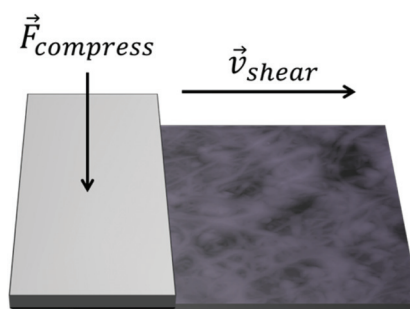


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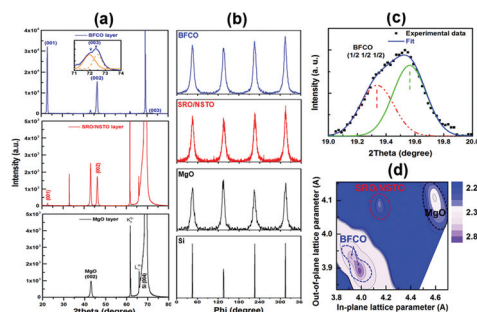
Dry shear aligning: a simple and versatile method to smooth and align the surfaces of carbon nanotube thin films

D. D. Tune,* B. W. Stolz, M. Pfohl and B. S. Flavel*

We show that the application of lateral shear force on a randomly oriented thin film of carbon nanotubes, in the dry state, causes significant reordering of the nanotubes at the film surface.



3237

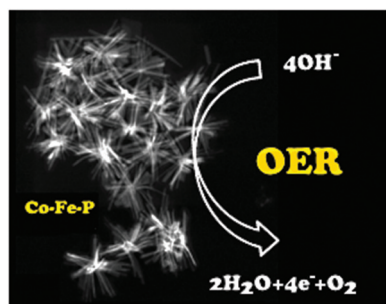


Photovoltaic properties of $\text{Bi}_2\text{FeCrO}_6$ films epitaxially grown on (100)-oriented silicon substrates

R. Nechache,* W. Huang, S. Li and F. Rosei*

We demonstrate the promising potential of using perovskite $\text{Bi}_2\text{FeCrO}_6$ (BFCO) for niche applications in photovoltaics (PV) (e.g. self-powered sensors that simultaneously exploit PV conversion and multiferroic properties) or as a complement to mature PV technologies like silicon.

3244

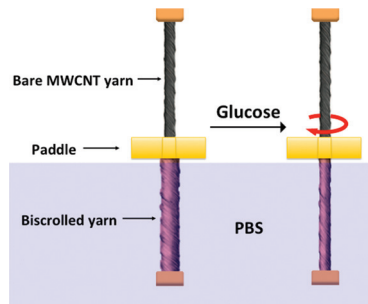


Sea urchin-like cobalt–iron phosphide as an active catalyst for oxygen evolution reaction

Adriana Mendoza-Garcia, Dong Su and Shouheng Sun*

Sea-urchin like iron–cobalt phosphide nanostructures were synthesized as a cost-effective and highly-efficient catalyst for oxygen evolution reaction.

3248

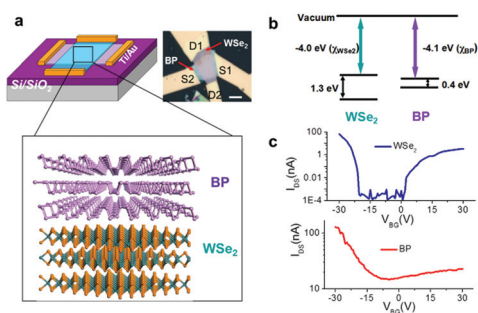


Biothermal sensing of a torsional artificial muscle

Sung-Ho Lee, Tae Hyeob Kim, Márcio D. Lima, Ray H. Baughman and Seon Jeong Kim*

Biothermal sensing artificial muscle composed of GOx–PNIPAm hydrogel particles provides a fast rotation and mechanically robust performance for smart systems in biomedical applications.

3254



Gate tunable WSe_2 –BP van der Waals heterojunction devices

Peng Chen, Ting Ting Zhang, Jing zhang, Jianyong Xiang, Hua Yu, Shuang Wu, Xiaobo Lu, Guole Wang, Fusheng Wen, Zhongyuan Liu, Rong Yang, Dongxia Shi and Guangyu Zhang*

The WSe_2 /BP heterojunction devices show promising gate tunable properties with both the current rectification ratio and photocurrent polarity could be completely changed by the electrostatic gating.

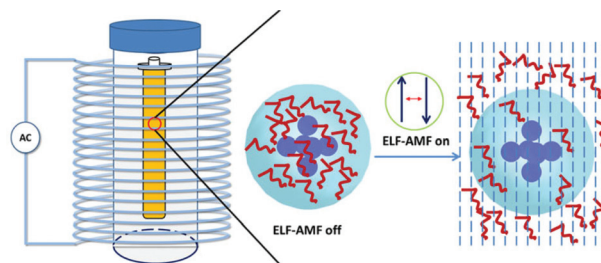
COMMUNICATIONS

3259

Extremely low frequency alternating magnetic field-triggered and MRI-traced drug delivery by optimized magnetic zeolitic imidazolate framework-90 nanoparticles

Jie Fang, Yong Yang, Wen Xiao, Bingwen Zheng, Yun-Bo Lv, Xiao-Li Liu and Jun Ding*

An extremely low frequency alternating magnetic field of 20 Hz was proved to be able to remarkably accelerate the drug release from optimized ZIF-90 nanospheres with incorporated Fe_3O_4 nanoparticles acting as actuator.

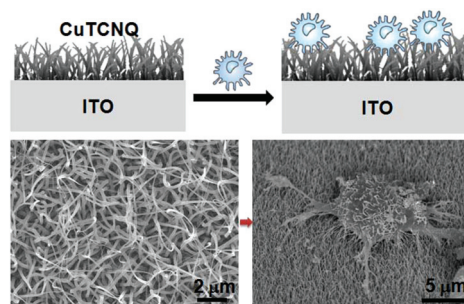


3264

Three-dimensional superhydrophobic copper 7,7,8,8-tetracyanoquinodimethane biointerfaces with the capability of high adhesion of osteoblasts

Jie Zhou, Jun-Bing Fan, Qiong Nie* and Shutao Wang*

A three-dimensional superhydrophobic copper 7,7,8,8-tetracyanoquinodimethane (CuTCNQ) nanowire array with the capability of very high adhesion of osteoblasts was demonstrated.

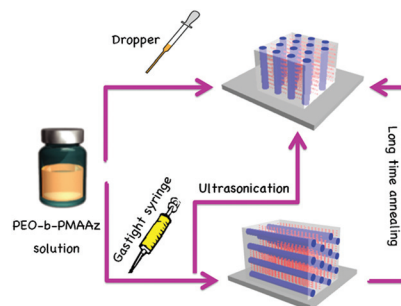


3268

Micropore extrusion-induced alignment transition from perpendicular to parallel of cylindrical domains in block copolymers

Ting Qu, Yongbin Zhao, Zongbo Li, Pingping Wang, Shubo Cao, Yawei Xu, Yayuan Li and Aihua Chen*

The orientation transition from perpendicular to parallel alignment of PEO cylindrical domains of PEO-*b*-PMA(Az) films has been demonstrated by extruding the block copolymer (BCP) solutions through a micropore of a plastic gastight syringe.

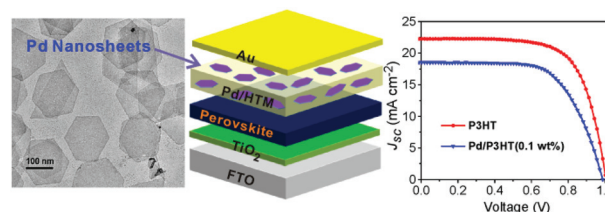


3274

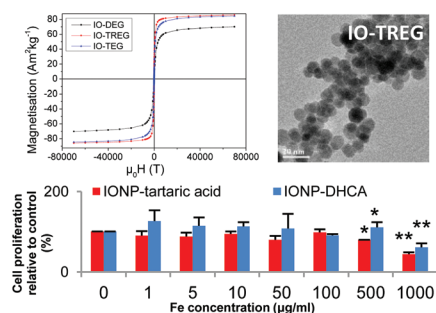
Trace surface-clean palladium nanosheets as a conductivity enhancer in hole-transporting layers to improve the overall performances of perovskite solar cells

Jing Cao, Shiguang Mo, Xiaojing Jing, Jun Yin, Jing Li and Nanfeng Zheng*

The incorporation of trace Pd nanosheets improves the conductivity of hole-transport layers, thus leading to remarkably enhanced perovskite solar cell performance.



3278

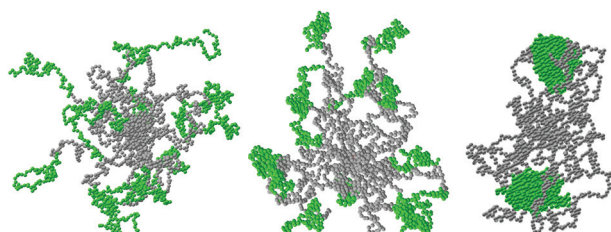


Polyol synthesis, functionalisation, and biocompatibility studies of superparamagnetic iron oxide nanoparticles as potential MRI contrast agents

R. Hachani, M. Lowdell, M. Birchall, A. Hervault, D. Mertz, S. Begin-Colin and N. T. K. Thanh*

High pressure and high temperature conditions were used to achieve IONPs with a narrow particle size distribution and high magnetic moment. Their biocompatibility was demonstrated with human mesenchymal stem cells.

3288

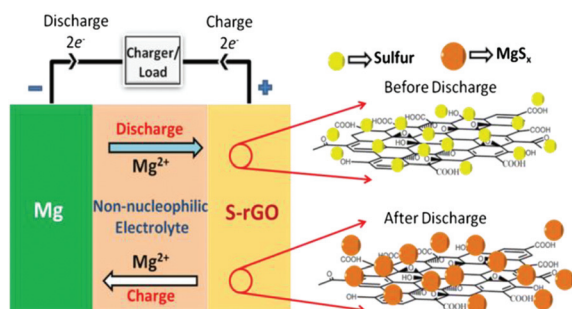


Soft self-assembled nanoparticles with temperature-dependent properties

Lorenzo Rovigatti,* Barbara Capone and Christos N. Likos

Telechelic star polymers, *i.e.* star polymers made of a number f of di-block copolymers grafted on a central anchoring point, spontaneously and reliably self-assemble into soft patchy particles. The properties of the stars can be finely controlled by changing the physical and chemical parameters of the solution, providing a robust route for the generation of novel materials.

3296

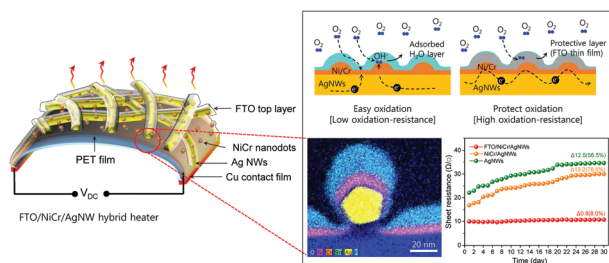


Performance study of magnesium-sulfur battery using a graphene based sulfur composite cathode electrode and a non-nucleophilic Mg electrolyte

B. P. Vinayan,* Zhirong Zhao-Karger, Thomas Diemant, Venkata Sai Kiran Chakravadhanula, Nele I. Schwarzbürger, Musa Ali Cambaz, R. Jürgen Behm, Christian Kübel and Maximilian Fichtner*

A magnesium-sulfur battery using a graphene based sulfur composite as a cathode electrode and non-nucleophilic Mg complex as an electrolyte.

3307



Oxidation-resistant hybrid metal oxides/metal nanodots/silver nanowires for high performance flexible transparent heaters

A-Young Kim, Min Kyu Kim, Chairul Hudaya, Ji Hun Park, Dongjin Byun, Jong Choo Lim and Joong Kee Lee*

The FTO/NiCr/AgNW hybrid heater exhibits excellent optoelectronic and thermal properties, oxidation-resistance, and high durability over 10 000 bending cycles.

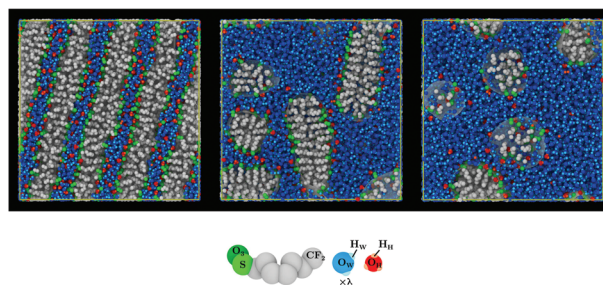
PAPERS

3314

Sub-diffusion and population dynamics of water confined in soft environments

Samuel Hanot, Sandrine Lyonnard and Stefano Mossa*

By molecular dynamics simulations, we show that dynamics of water confined in ionic surfactants soft confining matrices is sub-diffusive. Our in-depth analysis reveals that this sub-diffusive behavior originates at the water–matrix interface, where water molecules can be trapped for extended periods of time.

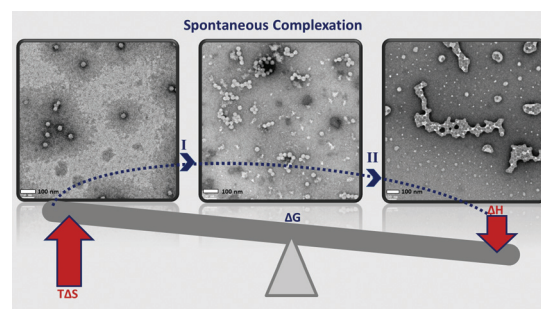


3326

Protein adsorption induced bridging flocculation: the dominant entropic pathway for nano-bio complexation

Necla Mine Eren,* Ganesan Narsimhan and Osvaldo H. Campanella*

Free energy of nano-bio complexation was decoupled into entropic and enthalpic contributions.

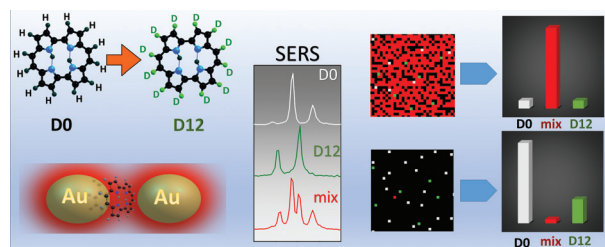


3337

Single molecule Raman spectra of porphycene isotopologues

Sylwester Gawinkowski, Maria Pszona, Alexandr Gorski, Joanna Niedziółka-Jönsson, Izabela Kamińska, Wojciech Nogala and Jacek Waluk*

Single molecule surface-enhanced resonance Raman scattering (SERRS) spectra have been obtained for the parent porphycene (Pc- d_0) and its deuterated isotopologue (Pc- d_{12}), located on gold and silver nanoparticles.

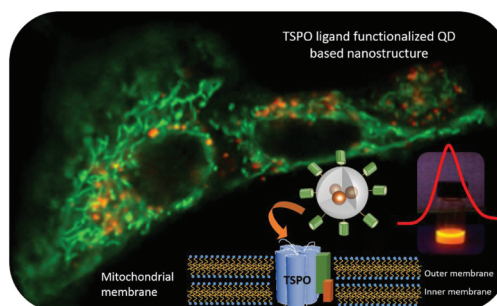


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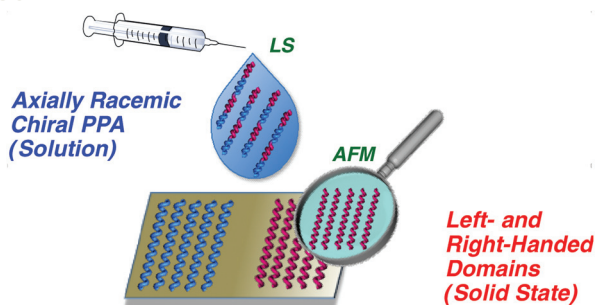
Highly selective luminescent nanostructures for mitochondrial imaging and targeting

E. Fanizza, R. M. Iacobazzi, V. Laquintana, G. Valente, G. Caliendo, M. Striccoli, A. Agostiano, A. Cutrignelli, A. Lopodota, M. L. Curri, M. Franco, N. Depalo* and N. Denora*

A multifunctional hybrid nanostructure based on luminescent QDs and a suitably designed TSPO ligand was used as a bioimaging agent for selective mitochondrial targeting.



3362

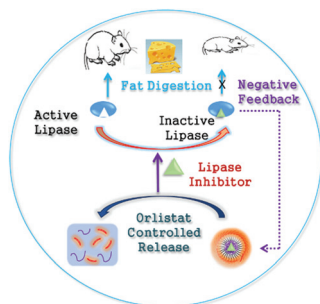


Helical sense selective domains and enantiomeric superhelices generated by Langmuir–Schaefer deposition of an axially racemic chiral helical polymer

R. Rodríguez, J. Ignés-Mullol, F. Sagués, E. Quiñoá, R. Riguera* and F. Freire*

An axially racemic chiral helical polymer generates left- and right-handed monolayers and enantiomeric superhelices by LS deposition.

3368

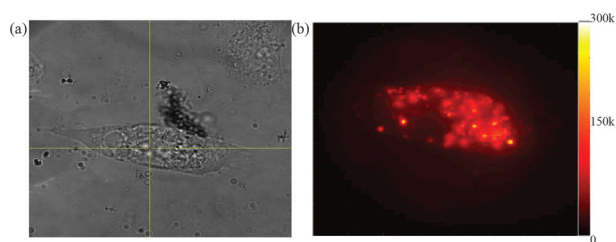


Smart conjugated polymer nanocarrier for healthy weight loss by negative feedback regulation of lipase activity

Yu-Lei Chen, Sha Zhu, Lei Zhang, Pei-Jian Feng, Xi-Kuang Yao, Cheng-Gen Qian, Can Zhang, Xi-Qun Jiang and Qun-Dong Shen*

A lipase-cleavable NIR-traceable smart nanocarrier conceived to treat obesity.

3376

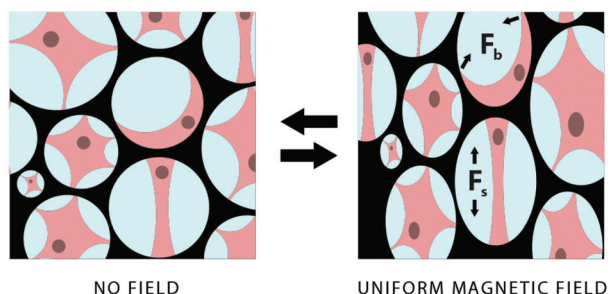


Intrinsic fluorescence of selenium nanoparticles for cellular imaging applications

A. Khalid,* Phong A. Tran,* Romina Norello, David A. Simpson, Andrea J. O'Connor and Snjezana Tomljenovic-Hanic*

(a) Microscopic image of selenium nanoparticles uptaken by the fibroblast cells. (b) Intrinsic fluorescence of the particles exploited for *in vitro* imaging.

3386



Magnetically actuated tissue engineered scaffold: insights into mechanism of physical stimulation

Yulia Sapir-Lekhovitser, Menahem Y. Rotenberg, Juergen Jopp, Gary Friedman, Boris Polyak* and Smadar Cohen*

Magnetic alginate scaffolds exposed to a time-varying uniform magnetic field reversibly deform to generate bending (F_b)/stretching (F_s) forces that may exert mechanical effects on cells.

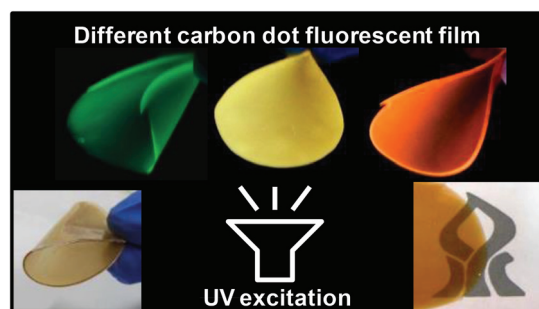
PAPERS

3400

Tuneable light-emitting carbon-dot/polymer flexible films prepared through one-pot synthesis

Susanta Kumar Bhunia, Sukhendu Nandi, Rafi Shikler and Raz Jelinek*

Multicolor flexible films were produced through a one-pot process in which carbon dots were simultaneously formed inside a transparent polymer host.

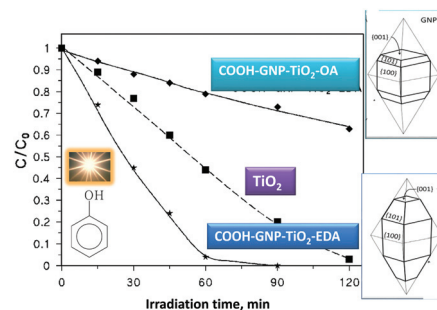


3407

Shape controllers enhance the efficiency of graphene–TiO₂ hybrids in pollutant abatement

F. Sordello, E. Odorici, K. Hu, C. Minero, M. Cerruti and P. Calza*

The addition of graphene nanoplatelets (GNP) to TiO₂ nanoparticles (NPs) has been recently considered as a method to improve the photocatalytic efficiency of TiO₂ by favoring charge carrier separation.

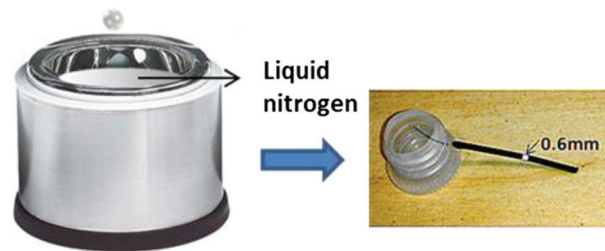


3416

Hierarchical Nafion enhanced carbon aerogels for sensing applications

Bo Weng,* Ailing Ding, Yuqing Liu, Jianglin Diao, Joselito Razal, King Tong Lau, Roderick Shepherd, Changming Li and Jun Chen*

This work describes the fabrication of hierarchical Nafion enhanced carbon aerogels (NECAGs) for sensing applications via a fast freeze drying method.

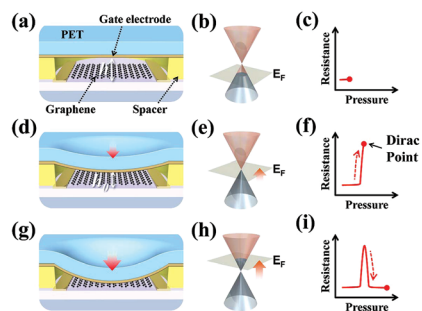


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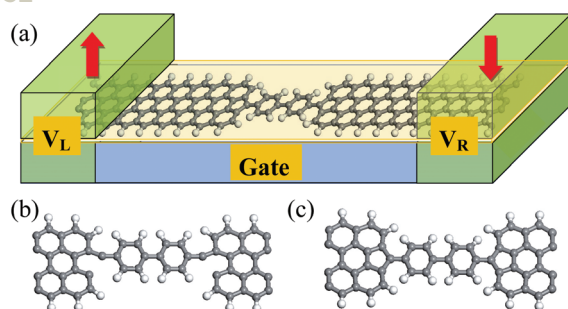
Touch stimulated pulse generation in biomimetic single-layer graphene

Onejae Sul, Hyunsuk Chun, Eunseok Choi, Jungbong Choi, Kyeongwon Cho, Dongpyo Jang, Sungwoo Chun, Wanjun Park and Seung-Beck Lee*

We report on a novel single-layer graphene based artificial mechanoreceptor that generates a resistance pulse as the contact stimulus passes a specific threshold pressure, mimicking the generation of action potentials in a biological fast-adapting mechanoreceptor.



3432

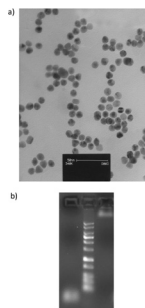


Giant tunnel magneto-resistance in graphene based molecular tunneling junction

Bin Wang, Jianwei Li, Yunjin Yu, Yadong Wei,*
Jian Wang* and Hong Guo

We propose and theoretically investigate a class of stable zigzag graphene nanoribbon (ZGNR) based molecular magnetic tunneling junctions (MTJs).

3439

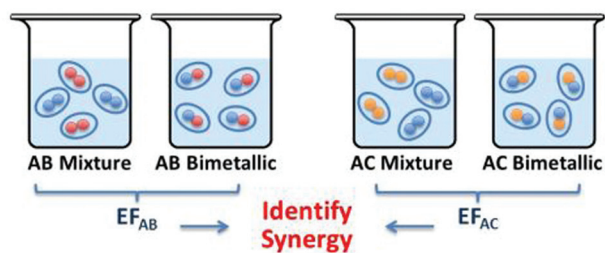


A novel fluorescent aptasensor based on gold and silica nanoparticles for the ultrasensitive detection of ochratoxin A

Seyed Mohammad Taghdisi, Noor Mohammad Danesh,
Hamed Reza Beheshti, Mohammad Ramezani and
Khalil Abnous*

Analytical approaches for the detection and quantitation of ochratoxin A (OTA) in blood serum and food products are high in demand.

3447

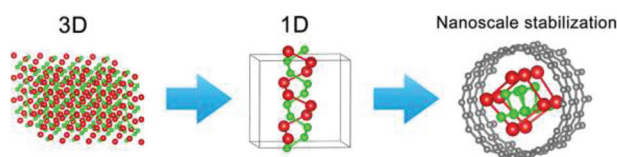


Levelling the playing field: screening for synergistic effects in coalesced bimetallic nanoparticles

Rachel Lee Siew Tan, Xiaohui Song, Bo Chen,
Wen Han Chong, Yin Fang, Hua Zhang, Jun Wei* and
Hongyu Chen*

We develop a new screening method that cancels out the structural effects of bimetallic nanoparticles in catalysis, so that synergistic effects can stand out from the level ground of comparison.

3454



Nanoscale stabilization of zintl compounds: 1D ionic Li–P double helix confined inside a carbon nanotube

Alexander S. Ivanov,* Tapas Kar and
Alexander I. Boldyrev

We demonstrate a prediction of a novel hybrid material, a nanotube encapsulated 1D ionic LiP double-helix structure, suggesting that nanostructured confinement may be used to stabilize other zintl polyphosphide chains.

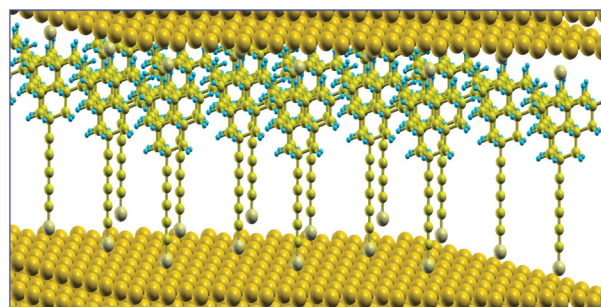
PAPERS

3461

Enhanced oscillatory rectification and negative differential resistance in pentamantane diamondoid–cumulene systems

Sherif Abdulkader Tawfik,* X. Y. Cui, S. P. Ringer and C. Stampfl

We propose a new diamondoid–cumulene molecular junction with a high rectification ratio and significant negative differential resistance.

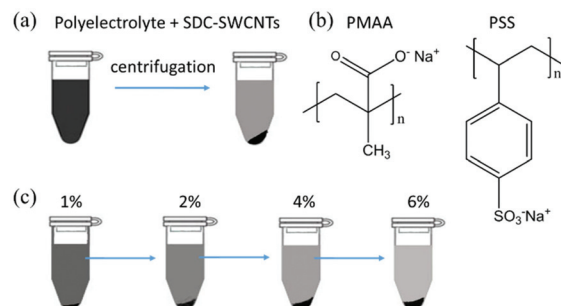


3467

A facile and low-cost length sorting of single-wall carbon nanotubes by precipitation and applications for thin-film transistors

Hui Gui, Haitian Chen, Constantine Y. Khripin, Bilu Liu, Jeffrey A. Fagan, Chongwu Zhou* and Ming Zheng*

We report for the first time a general phenomenon of length-dependent precipitation of surfactant-dispersed carbon nanotubes by polymers, salts, and their combinations.

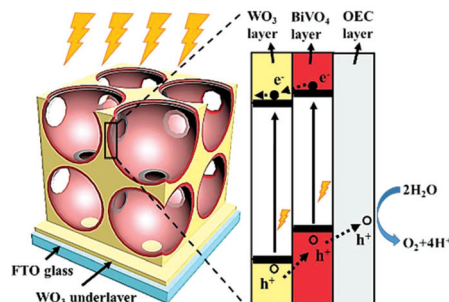


3474

A 3D triple-deck photoanode with a strengthened structure integrity: enhanced photoelectrochemical water oxidation

Ming Ma, Xinjian Shi, Kan Zhang, Soonwoo Kwon, Ping Li, Jung Kyu Kim, Thanh Tran Phu, Gi-Ra Yi and Jong Hyeok Park*

The optimal utilization of interfaces between every layer in a triple-deck 3D architecture realizes enhanced water oxidation efficiency.

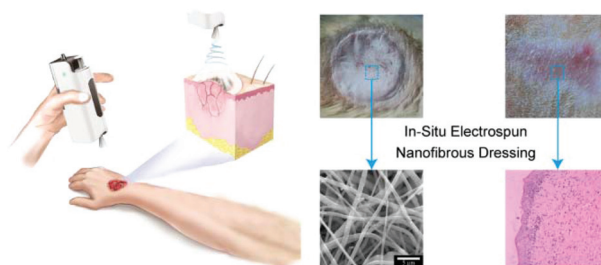


3482

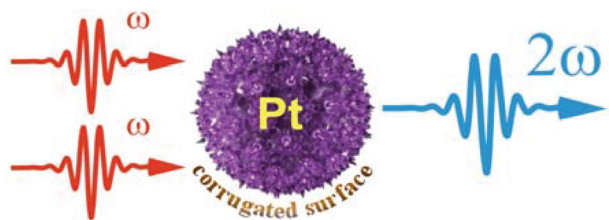
In situ deposition of a personalized nanofibrous dressing via a handy electrospinning device for skin wound care

Rui-Hua Dong, Yue-Xiao Jia, Chong-Chong Qin, Lu Zhan, Xu Yan, Lin Cui, Yu Zhou,* Xingyu Jiang* and Yun-Ze Long*

The *in situ* deposition of an electrospun antimicrobial nanofibrous dressing via a handheld portable electrospinning apparatus for skin wound healing is reported.



3489

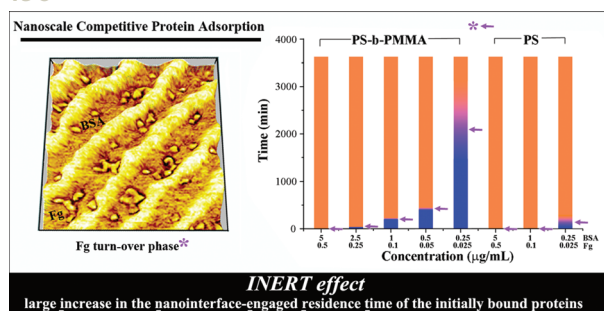


High second-order nonlinear response of platinum nanoflowers: the role of surface corrugation

Hoang Minh Ngo, Ngoc Diep Lai and Isabelle Ledoux-Rak*

We report the Harmonic Light scattering properties of PtNFs for six different diameters (~7.0; 8.0; 10.0; 14.0; 20.0 and 31.0 nm). For the first time, very large β values of PtNFs are presented.

3496

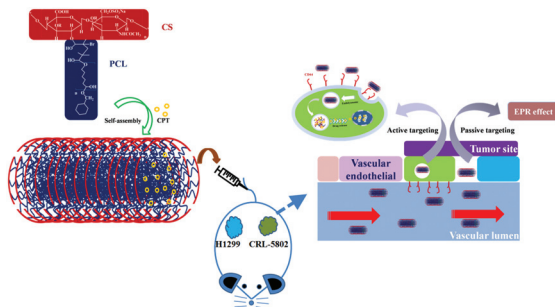


Ascertaining effects of nanoscale polymeric interfaces on competitive protein adsorption at the individual protein level

Sheng Song, Tian Xie, Kristina Ravensbergen and Jong-in Hahn*

We elucidate nanointerface effects on competitive protein adsorption behaviors at the individual protein level and present findings on protein residence time uniquely observed on nanoscale polymeric surfaces.

3510

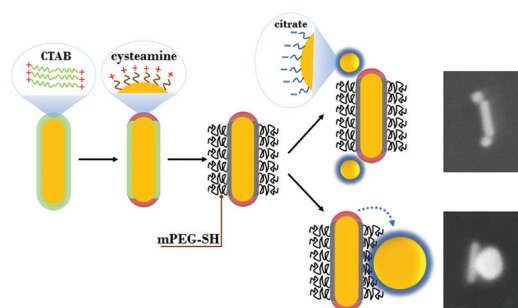


Distinct CPT-induced deaths in lung cancer cells caused by clathrin-mediated internalization of CP micelles

Yu-Sheng Liu, Ru-You Cheng, Yu-Lun Lo, Chin Hsu, Su-Hwei Chen, Chien-Chih Chiu* and Li-Fang Wang*

A chondroitin sulfate-*graft*-poly(ϵ -caprolactone), CP, was synthesized to encapsulate camptothecin (micelle/CPT) for tumor-targeting delivery. The therapeutic outcome of the micelle/CPT depends on internalization pathways and cell cycle arrest.

3523



Assembling patchy nanorods with spheres: limitations imposed by colloidal interactions

Sz. Pothorszky, D. Zámbo, T. Deák and A. Deák*

Colloidal interactions can modify the site-specific directed assembly of spherical particles and patchy nanorods.

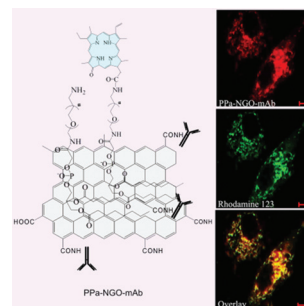
PAPERS

3530

A graphene oxide based smart drug delivery system for tumor mitochondria-targeting photodynamic therapy

Yanchun Wei, Feifan Zhou, Da Zhang, Qun Chen* and Da Xing*

A graphene oxide-based two-stage drug delivery system is presented for photodynamic therapy to sequentially target tumor cells and their mitochondria. The nanodrug is unactivated and turns on until it arrives at the cellular mitochondria.

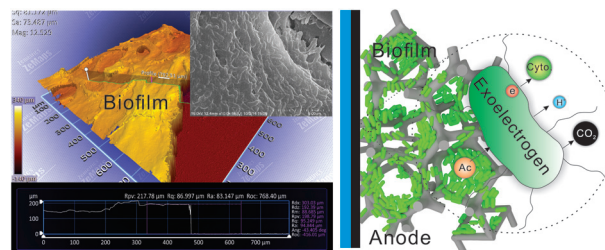


3539

A miniaturized microbial fuel cell with three-dimensional graphene macroporous scaffold anode demonstrating a record power density of over 10 000 W m⁻³

Hao Ren,* He Tian, Cameron L. Gardner, Tian-Ling Ren* and Junseok Chae

We report a miniaturized microbial fuel cell, integrated with a 3D free-standing graphene scaffold, delivering a record high power density of 11 220 W m⁻³.

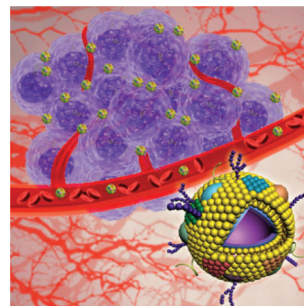


3548

Polymeric capsule-cushioned leukocyte cell membrane vesicles as a biomimetic delivery platform

Changyong Gao, Zhiguang Wu, Zhihua Lin, Xiankun Lin and Qiang He*

Camouflaging capsules with leukocyte membranes could effectively evade clearance, prolong the circulation time, and enhance the tumor accumulation property in mice.

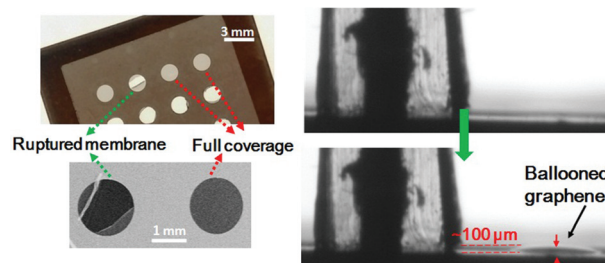


3555

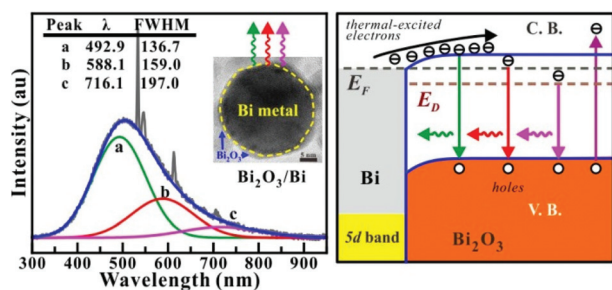
Ultra-large suspended graphene as a highly elastic membrane for capacitive pressure sensors

Yu-Min Chen, Shih-Ming He, Chi-Hsien Huang, Cheng-Chun Huang, Wen-Pin Shih, Chun-Lin Chu, Jing Kong, Ju Li and Ching-Yuan Su*

We prepared ultra-large suspended graphene membranes (up to 1.5 mm) through solvent replacement, followed by thermal decomposition. A capacitive pressure sensor was fabricated, which showed a linear response and high sensitivity of 15.15 aF Pa⁻¹.



3565

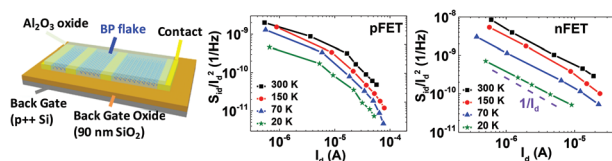


Size-controllable synthesis of Bi/Bi₂O₃ heterojunction nanoparticles using pulsed Nd:YAG laser deposition and metal–semiconductor–heterojunction-assisted photoluminescence

Ranjit A. Patil, Mao-Kuo Wei, P.-H. Yeh, Jyun-Bo Liang, Wan-Ting Gao, Jin-Han Lin, Yung Liou and Yuan-Ron Ma*

The PL spectra of Bi/Bi₂O₃ heterojunction nanoparticles, and the PL emission-enhanced mechanism in metal–semiconductor heterojunctions.

3572

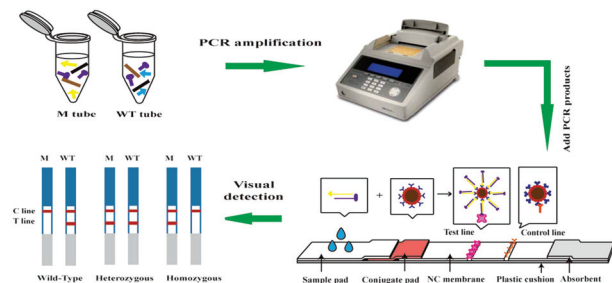


Mechanisms of current fluctuation in ambipolar black phosphorus field-effect transistors

Xuefei Li, Yuchen Du, Mengwei Si, Lingming Yang, Sichao Li, Tiaoyang Li, Xiong Xiong, Peide Ye and Yanqing Wu*

We provide the first systematically studied on the carrier transport properties and the low frequency noise mechanisms from 300 to 20 K in the BP ambipolar transistor.

3579

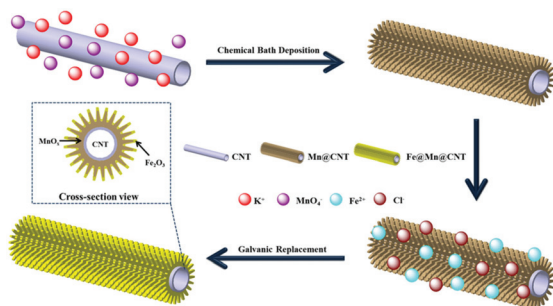


A novel lateral flow assay based on GoldMag nanoparticles and its clinical applications for genotyping of *MTHFR* C677T polymorphisms

Wenli Hui, Sinong Zhang, Chao Zhang, Yinsheng Wan,* Juanli Zhu, Gang Zhao, Songdi Wu, Dujuan Xi, Qinlu Zhang, Ningning Li and Yali Cui*

A visual genotyping method combining ARMS-PCR with GoldMag-based lateral flow assay.

3588



Design of multi-shell Fe₂O₃@MnO_x@CNTs for the selective catalytic reduction of NO with NH₃: improvement of catalytic activity and SO₂ tolerance

Sixiang Cai, Hang Hu, Hongrui Li, Liyi Shi and Dengsong Zhang*

Multi-shell Fe₂O₃@MnO_x@CNTs synthesized by a green and facile method demonstrate excellent de-NO_x activity and SO₂ resistance.

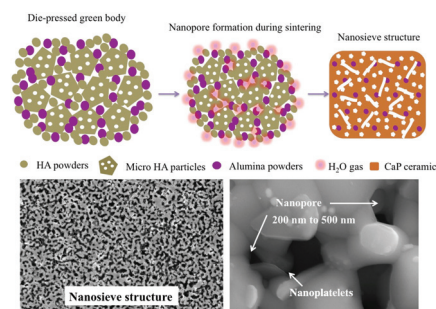
PAPERS

3599

Novel porous calcium aluminate/phosphate nanocomposites: *in situ* synthesis, microstructure and permeability

Jingzhou Yang,* Xiaozhi Hu,* Juntong Huang, Kai Chen, Zhaohui Huang, Yangai Liu, Minghao Fang and Xudong Sun

Permeable porous nanomaterials have extensive applications in engineering fields.

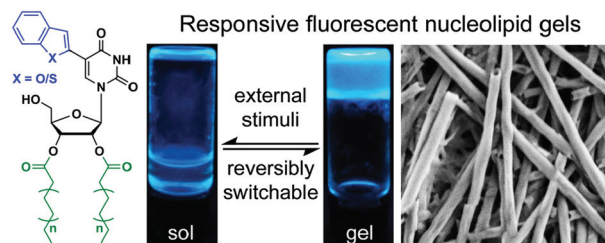


3607

Hierarchical self-assembly of switchable nucleolipid supramolecular gels based on environmentally-sensitive fluorescent nucleoside analogs

Ashok Nuthanakanti and Seergazhi G. Srivatsan*

Multistimuli-responsive supramolecular fluorescent nucleolipid gels, which show aggregation-induced enhanced emission, have been developed by using a new family of environmentally-sensitive nucleoside–lipid hybrid synthons.

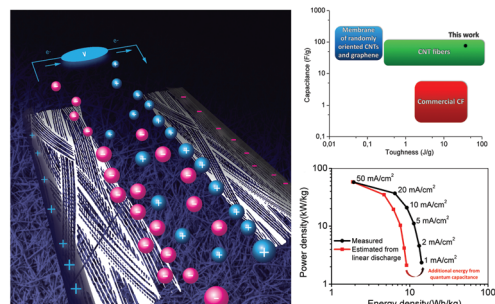


3620

Macroscopic fibres of CNTs as electrodes for multifunctional electric double layer capacitors: from quantum capacitance to device performance

E. Senokos, V. Reguero, J. Palma, J. J. Vilatela* and Rebeca Marcilla*

Large planar EDLC of strong CNT fibres and ionic liquids with high power and energy densities, exhibiting CNT quantum capacitance.

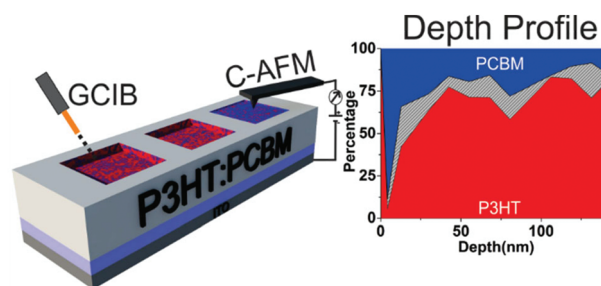


3629

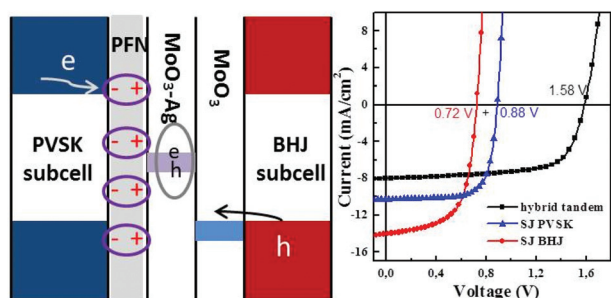
Insights into the nanoscale lateral and vertical phase separation in organic bulk heterojunctions via scanning probe microscopy

R. Chintala,* J. G. Tait, P. Eyben, E. Voroshazi, S. Surana, C. Fleischmann, T. Conard and W. Vandervorst

This work demonstrates the feasibility of 3-dimensional characterization of chemical composition with nanometer spatial resolution using a combination of GCIB sputtering and SPM techniques.



3638



Perovskite-organic hybrid tandem solar cells using a nanostructured perovskite layer as the light window and a PFN/doped-MoO₃/MoO₃ multilayer as the interconnecting layer

Jian Liu, Shunmian Lu, Lu Zhu, Xinchun Li and Wallace C. H. Choy*

A two-terminal Perovskite (PVSK)-organic hybrid tandem solar cell with nanostructured PVSK layer as light window and PFN/doped MoO₃/MoO₃ multilayer interconnection layer is presented.

3647

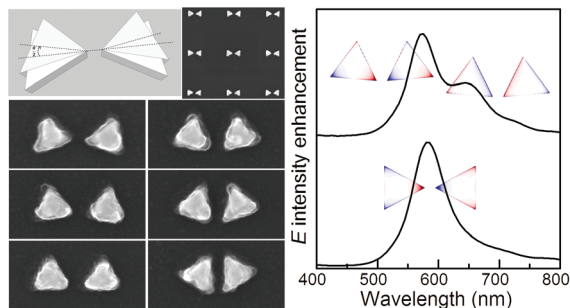


Short-range plasmonic nanofocusing within submicron regimes facilitates *in situ* probing and promoting of interfacial reactions

Chen-Chieh Yu, Keng-Te Lin, Pao-Yun Su, En-Yun Wang, Yu-Ting Yen and Hsuen-Li Chen*

The plasmonic nanofocusing configuration facilitates *in situ* probing and promoting of interfacial reactions on the dielectric NPs simultaneously.

3660

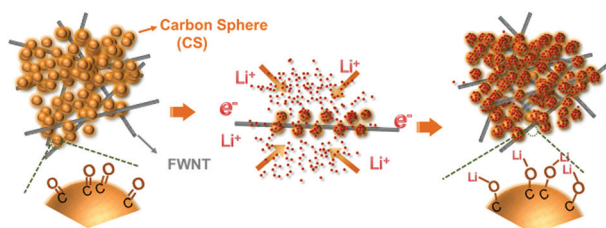


Effects of the rotation angle on surface plasmon coupling of nanoprisms

Miao-Hsuan Chien, Li-Wei Nien, Bo-Kai Chao, Jia-Han Li and Chun-Hway Hsueh*

Both experiments and simulations show formation of edge-mode and transition from tip mode I to II with increasing rotation angle.

3671



Biomass-derived carbonaceous positive electrodes for sustainable lithium-ion storage

Tianyuan Liu, Reza Kaviani, Zhongming Chen, Samuel S. Cruz, Suguru Noda and Seung Woo Lee*

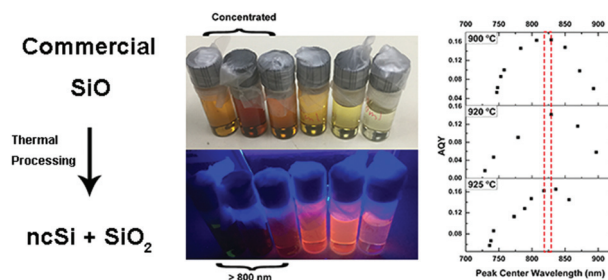
We demonstrate that carbon sphere products obtained from glucose by a hydrothermal carbonization process have redox-active properties with lithium ions.

3678

Silicon monoxide – a convenient precursor for large scale synthesis of near infrared emitting monodisperse silicon nanocrystals

Wei Sun, Chenxi Qian, Xiao Sherri Cui, Liwei Wang, Muan Wei, Gilberto Casillas, Amr S. Helmy and Geoffrey A. Ozin*

The in-depth study of a convenient synthesis of NIR-emitting ncSi, requiring only thermal processing of commercial SiO. The size separation enabled the study of quantum size effects, pinpointing the most efficient PL wavelength.

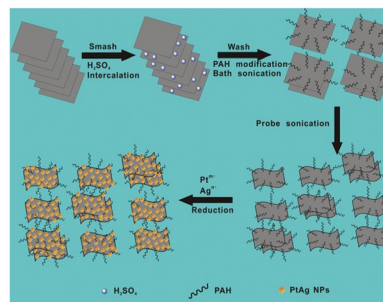


3685

Pt₇₄Ag₂₆ nanoparticle-decorated ultrathin MoS₂ nanosheets as novel peroxidase mimics for highly selective colorimetric detection of H₂O₂ and glucose

Shuangfei Cai, Qiusen Han, Cui Qi, Zheng Lian, Xinghang Jia, Rong Yang* and Chen Wang*

To extend the functionalities of two-dimensional graphene-like layered compounds as versatile materials, the modification of MoS₂ nanosheets with metal nanoparticles is of great and widespread interest.

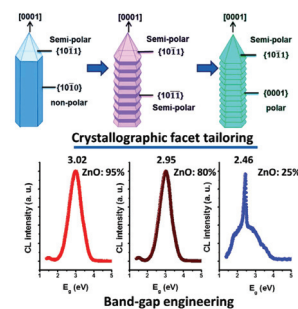


3694

Solubility and crystallographic facet tailoring of (GaN)_{1-x}(ZnO)_x pseudobinary solid-solution nanostructures as promising photocatalysts

Jing Li, Baodan Liu,* Wenjin Yang, Yujin Cho, Xinglai Zhang, Benjamin Dierre, Takashi Sekiguchi, Aimin Wu and Xin Jiang*

(GaN)_{1-x}(ZnO)_x solid solution nanorods with tunable crystallographic facets and controllable band-gaps are obtained and the ZnO solubility plays a key role in governing the morphology evolution and band-gap engineering.

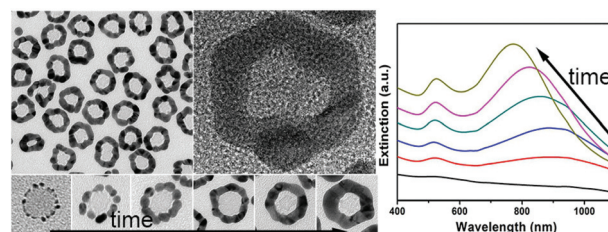


3704

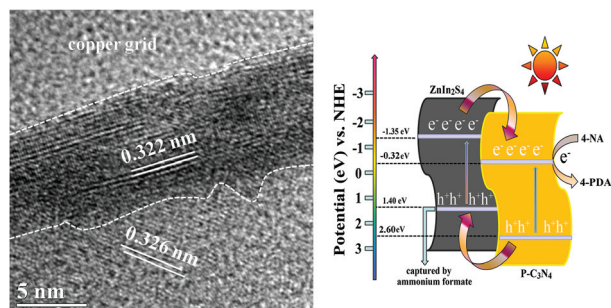
Seed-mediated growth of Au nanorings with size control on Pd ultrathin nanosheets and their tunable surface plasmonic properties

Wenxing Wang, Yucong Yan, Ning Zhou, Hui Zhang,* Dongsheng Li* and Deren Yang

Au nanorings with size control were generated by seeded growth on Pd nanosheets, which showed tunable surface plasmonic properties.



3711

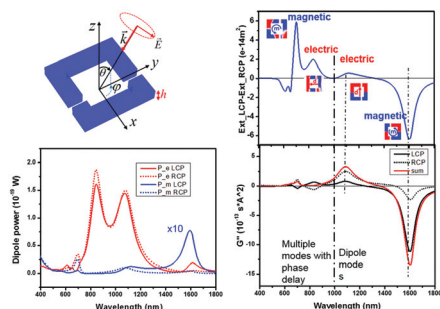


Novel mesoporous P-doped graphitic carbon nitride nanosheets coupled with ZnIn₂S₄ nanosheets as efficient visible light driven heterostructures with remarkably enhanced photo-reduction activity

Wei Chen, Tian-Yu Liu, Ting Huang, Xiao-Heng Liu* and Xu-Jie Yang

P-C₃N₄/ZnIn₂S₄ heterostructures have been proven to be highly efficient visible light responsive photocatalysts for photo-reduction, and meanwhile exhibit excellent photo-stability during recycling runs.

3720

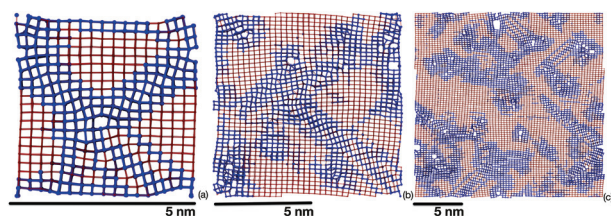


Quantitatively analyzing the mechanism of giant circular dichroism in extrinsic plasmonic chiral nanostructures by tracking the interplay of electric and magnetic dipoles

Li Hu, Xiaorui Tian, Yingzhou Huang, Liang Fang and Yurui Fang*

We quantitatively analyzed the extrinsic plasmonic chirality by tracking the interplay of electric and magnetic modes which causes mixed electric and magnetic polarizability and responses for the CD.

3729

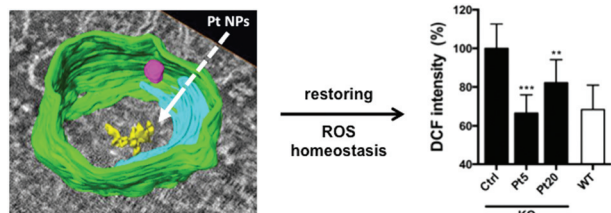


Hierarchical thermoelectrics: crystal grain boundaries as scalable phonon scatterers

Daniele Selli, Salah Eddine Boulfelfel, Philipp Schapotschnikow, Davide Donadio and Stefano Leoni*

Grains of different length-scales, obtained by controlled compression, affect the lattice thermal conductivity of polycrystalline lead chalcogenides thus improving their thermoelectric performance.

3739



Platinum nanozymes recover cellular ROS homeostasis in an oxidative stress-mediated disease model

Mauro Moglianetti*, Elisa De Luca, Deborah Pedone, Roberto Marotta, Tiziano Catelani, Barbara Sartori, Heinz Amenitsch, Saverio Francesco Retta and Pier Paolo Pompa*

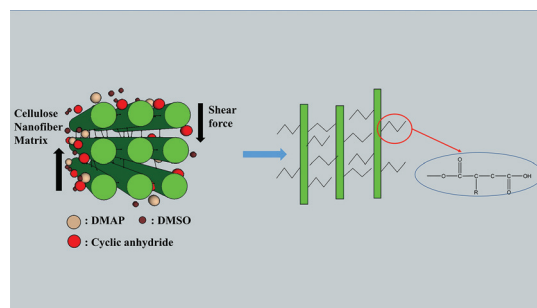
Pt NPs restore ROS homeostasis in a cellular model of oxidative stress mediated diseases and may act as both drug and drug carriers for combination therapies.

3753

A versatile method for producing functionalized cellulose nanofibers and their application

Pei Huang, Yang Zhao, Shigenori Kuga, Min Wu* and Yong Huang*

Individual dispersed cellulose nanofibers can be produced through ball milling by adding anhydride and DMAP in one step. By altering the type of anhydride, the cellulose nanofiber presents different surface properties and tailored compatibility with varied solvents or matrices, which greatly promote the massive applications of cellulose nanofibers.

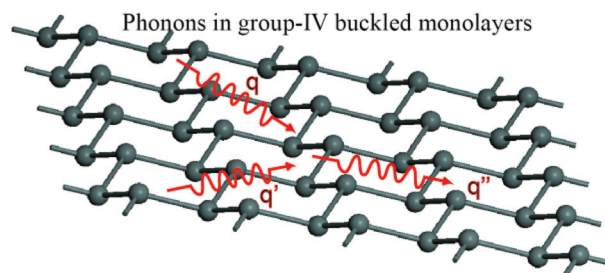


3760

Tensile strains give rise to strong size effects for thermal conductivities of silicene, germanene and stanene

Y. D. Kuang,* L. Lindsay, S. Q. Shi and G. P. Zheng

Tensile strains lead to strong size effects and peak enhancements for thermal conductivities of freestanding silicene, germanene and stanene.

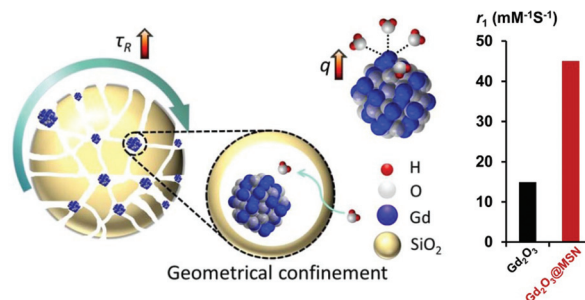


3768

Geometrically confined ultrasmall gadolinium oxide nanoparticles boost the T_1 contrast ability

Kaiyuan Ni, Zhenghuan Zhao, Zongjun Zhang, Zijian Zhou, Li Yang, Lirong Wang, Hua Ai and Jinhao Gao*

A novel nanocomposite generated by loading ultrasmall Gd_2O_3 nanoparticles into worm-like channels of mesoporous silica nanospheres (MSNs) was reported. Gd_2O_3 @MSN nanocomposites show extremely high T_1 contrast ability mainly due to the strong geometrical confinement effect.

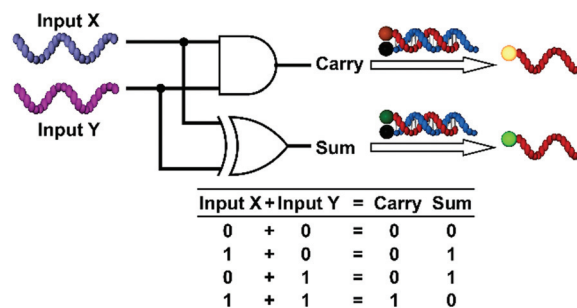


3775

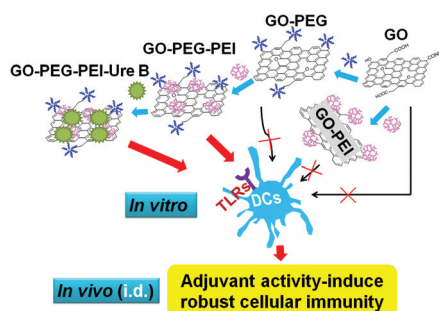
DNA based arithmetic function: a half adder based on DNA strand displacement

Wei Li,* Fei Zhang, Hao Yan and Yan Liu*

A half adder logic circuit based on DNA strand displacement reactions was designed and experimentally realized. The half adder is composed of an XOR gate and an AND gate, and it is a primary step toward constructing a full adder.



3785

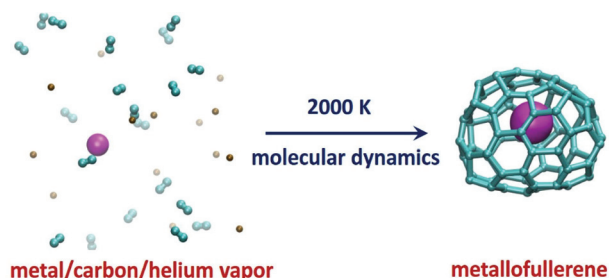


Functionalized graphene oxide serves as a novel vaccine nano-adjuvant for robust stimulation of cellular immunity

Ligeng Xu, Jian Xiang, Ye Liu, Jun Xu, Yinchuan Luo, Liangzhu Feng, Zhuang Liu* and Rui Peng*

Graphene oxide engineered with appropriate surface chemistry can serve as vaccine adjuvant to induce robust cellular immunity through intradermal injection.

3796

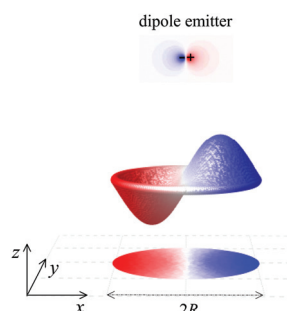


Self-assembly of endohedral metallofullerenes: a decisive role of cooling gas and metal–carbon bonding

Qingming Deng, Thomas Heine, Stephan Irle* and Alexey A. Popov*

Molecular dynamics simulations of the endohedral metallofullerene formation reveal a crucial role of the cooling gas (He) and the strength of metal–carbon bonding in the formation mechanism.

3809

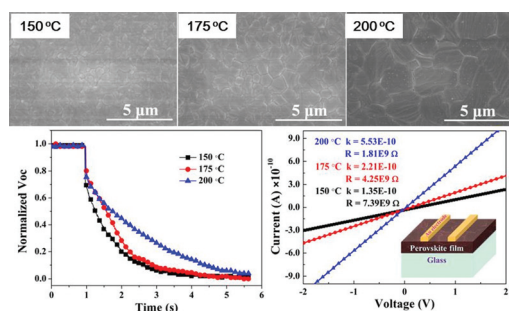


Localized surface plasmons in vibrating graphene nanodisks

Weihua Wang, Bo-Hong Li, Erik Stassen, N. Asger Mortensen* and Johan Christensen*

Mechanical vibrations create structural deformations in ways where the excitation of localized surface plasmons can be strongly modulated.

3816



Modulating crystal grain size and optoelectronic properties of perovskite films for solar cells by reaction temperature

Xiaodong Ren, Zhou Yang,* Dong Yang, Xu Zhang, Dong Cui, Yucheng Liu, Qingbo Wei, Haibo Fan and Shengzhong (Frank) Liu*

By regulating the reaction temperature during the direction contact and intercalation process (DCIP) for the transition from PbI_2 to $\text{CH}_3\text{NH}_3\text{PbI}_3$, both the crystal size and the electrical properties of the film have been modulated.

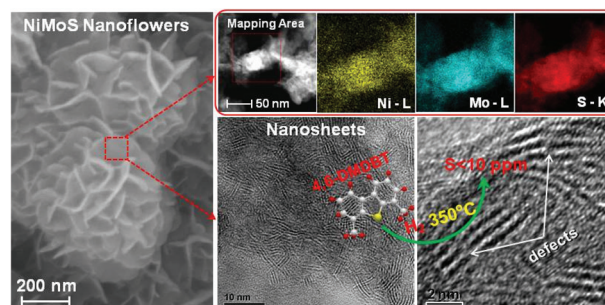
PAPERS

3823

A NiMoS flower-like structure with self-assembled nanosheets as high-performance hydrodesulfurization catalysts

Weikun Lai, Zhou Chen, Jianping Zhu, Lefu Yang, Jinbao Zheng, Xiaodong Yi* and Weiping Fang*

Nanosheet assembled NiMoS nanoflowers revealed a defect-rich structure and abundant Ni–Mo–S edge sites, which dramatically enhance the hydrodesulfurization activity of thiophene and 4,6-DMDBT.

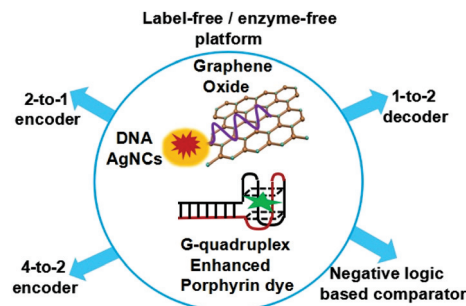


3834

Label-free and enzyme-free platform for the construction of advanced DNA logic devices based on the assembly of graphene oxide and DNA-templated AgNCs

Daoqing Fan, Jinbo Zhu, Yaqing Liu,* Erkang Wang and Shaojun Dong*

For the first time a label- and enzyme-free platform for the operation of a series of advanced logic devices is constructed; introducing negative logic, a label- and enzyme-free comparator was also successfully realized.

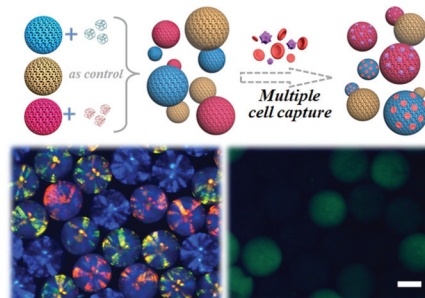


3841

A photonic crystal hydrogel suspension array for the capture of blood cells from whole blood

Bin Zhang, Yunlang Cai, Luoran Shang, Huan Wang, Yao Cheng, Fei Rong, Zhongze Gu* and Yuanjin Zhao*

A new type of PAAm inverse opal barcode particle that can capture and detect multiple types of blood cells is presented.



CORRECTION

3848

Correction: Localized plasmon assisted structured illumination microscopy for wide-field high-speed dispersion-independent super resolution imaging

Joseph Louis Ponsetto, Feifei Wei and Zhaowei Liu*