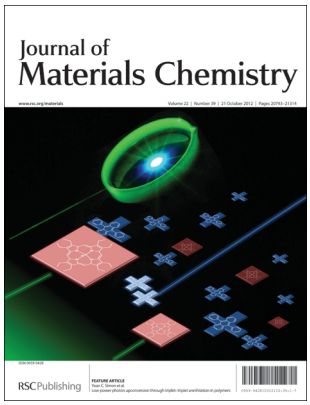
Journal of Materials Chemistry

www.rsc.org/materials

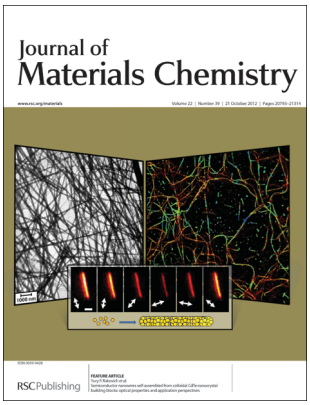
RSC Publishing is a not-for-profit publisher and a division of the Royal Society of Chemistry. Any surplus made is used to support charitable activities aimed at advancing the chemical sciences. Full details are available from www.rsc.org

IN THIS ISSUE

ISSN 0959-9428 CODEN JMACEP 22(39) 20793–21314 (2012)

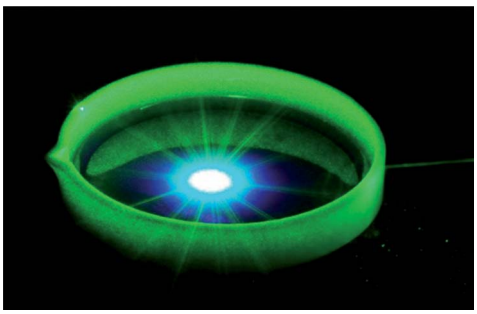


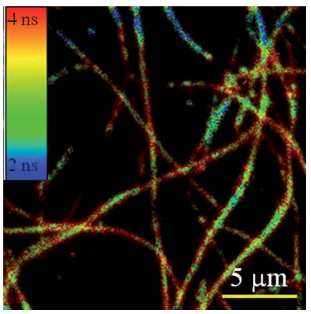
Cover
See Yoan C. Simon *et al.*, pp. 20817–20830.
Image reproduced by permission of Christoph Weder from *J. Mater. Chem.*, 2012, **22**, 20817.



Inside cover
See Yury P. Rakovich *et al.*, pp. 20831–20839.
Image reproduced by permission of Andrey L. Rogach from *J. Mater. Chem.*, 2012, **22**, 20831.

FEATURE ARTICLES





Journal of Materials Chemistry (print: ISSN 0959-9428; electronic: ISSN 1364-5501) is published 48 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF. All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to RSC Distribution Services, c/o Portland Customer Services, Commerce Way, Colchester, Essex, UK CO2 8HP. Tel +44 (0)1206 226050; E-mail sales@rscdistribution.org

2012 Annual (print+electronic) subscription price: £3,107; US$5,801. 2012 Annual (electronic) subscription price: £2,952; US$5,511. Customers in Canada will be subject to a surcharge to cover GST. Customers in the EU subscribing to the electronic version only will be charged VAT. If you take an institutional subscription to any RSC journal you are entitled to free, site-wide web access to that journal. You can arrange access *via* Internet Protocol (IP) address at www.rsc.org/ip. Customers should make payments by cheque in sterling payable on a UK clearing bank or in US dollars payable on a US clearing bank.

US Postmaster: send address changes to Journal of Materials Chemistry, c/o Mercury Airfreight International Ltd., 365 Blair Road, Avenel, NJ 07001. All despatches outside the UK by Consolidated Airfreight.

Journal of Materials Chemistry

www.rsc.org/materials

Journal of Materials Chemistry is a weekly, international journal that publishes high impact original research that demonstrates novelty and advance, either in the chemistry used to produce materials or in the properties and applications of the materials produced. Coverage of the field is broad and includes the design and synthesis of materials, their characterization, modelling, properties and applications.

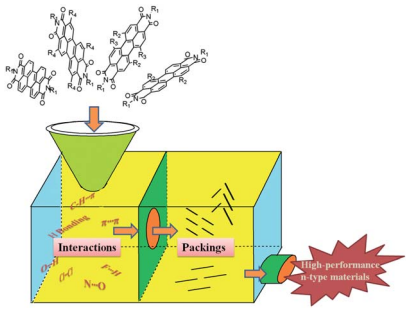
INFORMATION FOR AUTHORS

Full details on how to submit material for publication in Journal of Materials Chemistry are given in the Instructions for Authors (available from http://www.rsc.org/authors). Submissions should be made *via* the journal's homepage: http://www.rsc.org/materials.

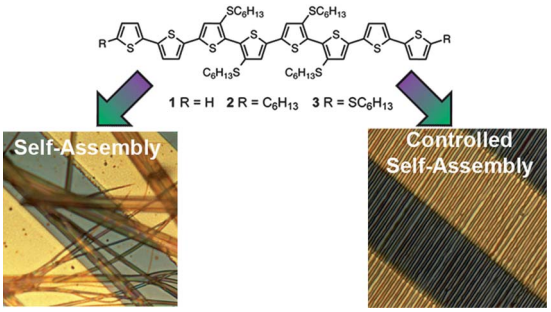
Submissions: The journal welcomes submissions of manuscripts for publication as Full Papers, Communications, Feature Articles, Highlights and Applications. Full Papers and Communications should describe original work of high quality and impact which must highlight the novel properties or applications (or potential properties/applications) of the materials studied.

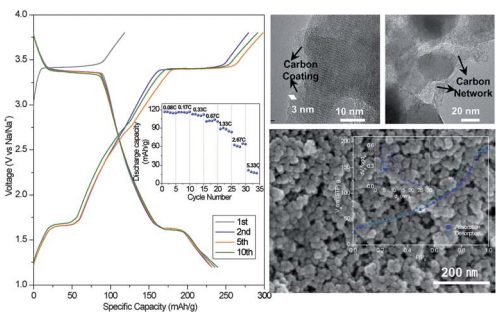
Colour figures are reproduced free of charge where the use of colour is scientifically enhancing. Authors who wish to publish other figures in colour will be asked to contribute towards the costs of colour reproduction.
Additional details are available from the Editorial Office or http://www.rsc.org/authors

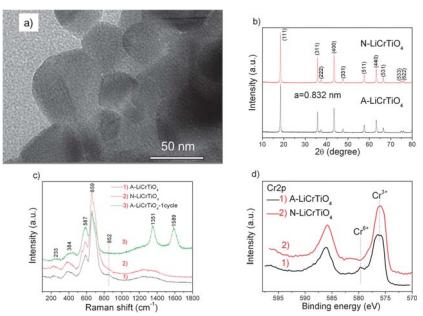
FEATURE ARTICLES

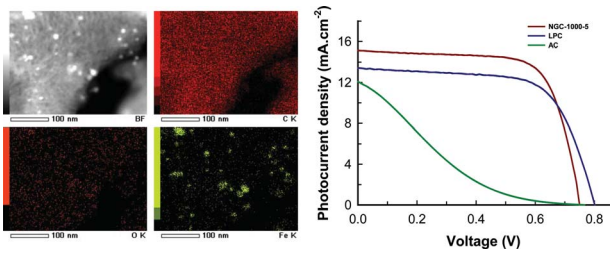


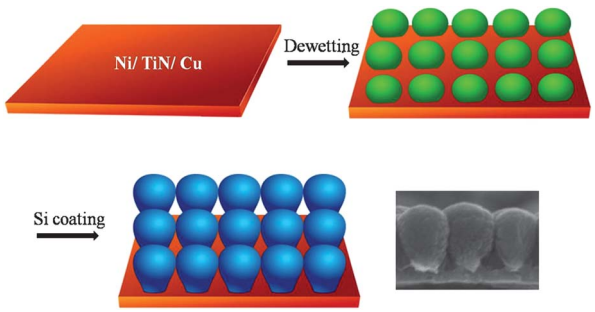
COMMUNICATIONS

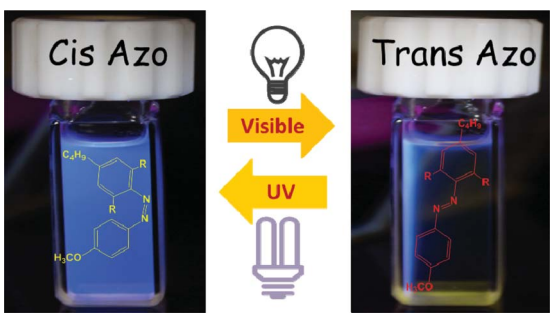


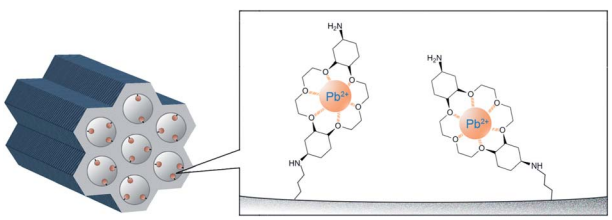




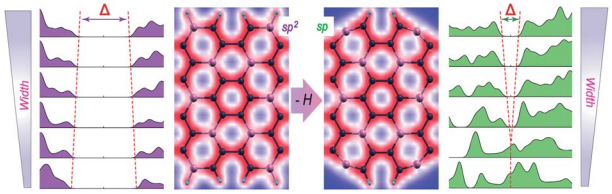


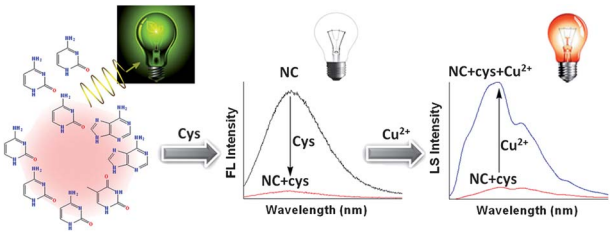




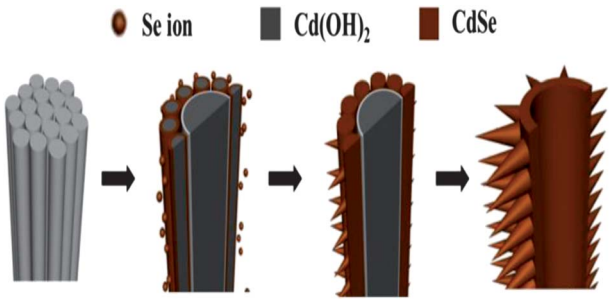


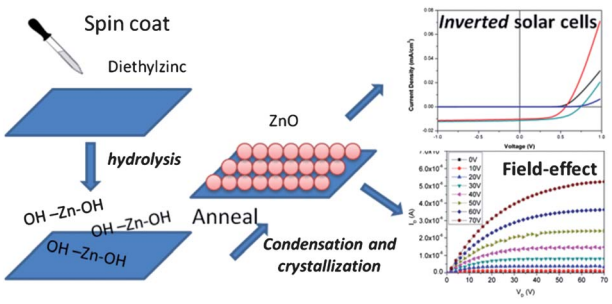
COMMUNICATIONS





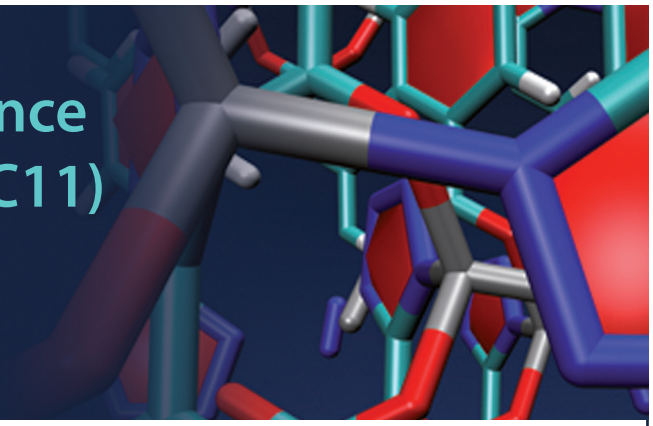
PAPERS





11th International Conference on Materials Chemistry (MC11)

8 – 11 July 2013
University of Warwick, UK



In the 20th year of this international Materials Chemistry conference series, MC11 will bring together researchers from across this exciting field to discuss four key areas of application of materials chemistry.

Conference Themes

- **Biomaterials**
- **Electronic, Optical & Magnetic Materials**
- **Energy Materials**
- **Environmental Materials**

Scientific Committee

Dr Andrew Dove (co-chair)
University of Warwick

Professor Richard Walton (co-chair)
University of Warwick

Professor Ian Hamley
University of Reading

Professor Neil McKeown
University of Cardiff

Dr Neil Robertson
University of Edinburgh

Dr Stephen Skinner
Imperial College London

Plenary Speakers

Professor Robert Cava
Princeton University

Professor Andy Cooper
University of Liverpool

Professor Clare Grey FRS
University of Cambridge

Professor Alan Heeger
University of California, Santa Barbara
(Chemistry Nobel Laureate 2000)

Professor Allan Hoffman
University of Washington

Professor Samuel Stupp
Northwestern University

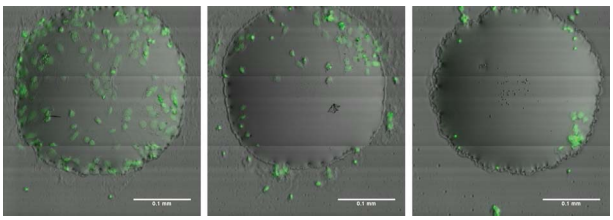
Key dates

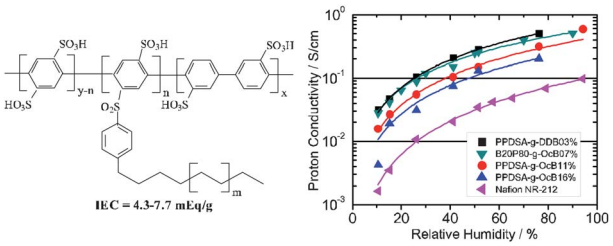
Oral abstract deadline – 9 November 2012
Early bird and poster abstract deadline – 10 May 2013
Standard registration deadline – 7 June 2013

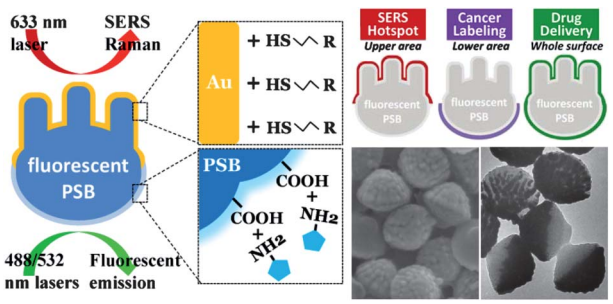
RSC | Advancing the Chemical Sciences

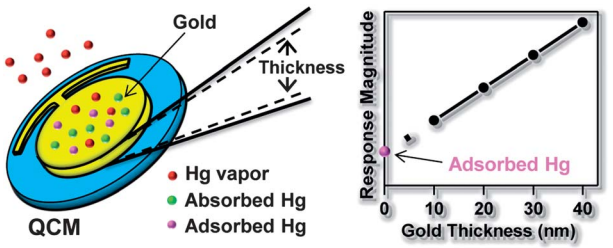
www.rsc.org/MC11

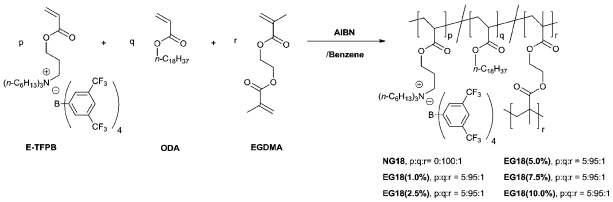
Registered Charity Number 207890

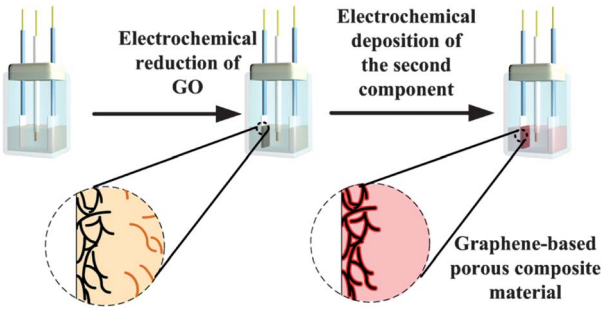


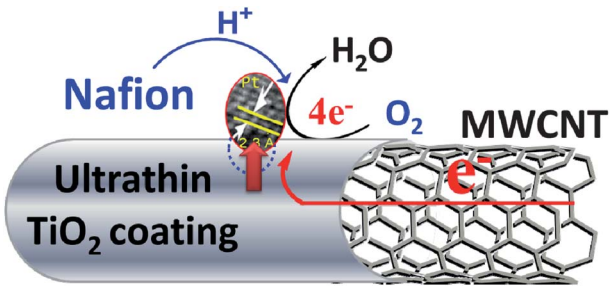


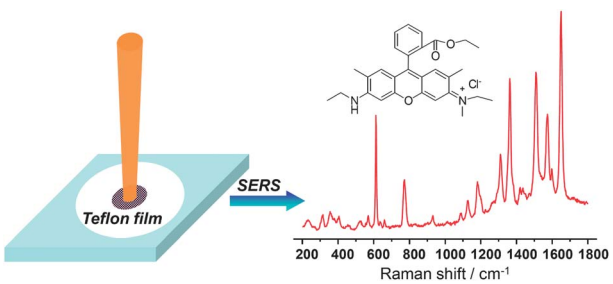




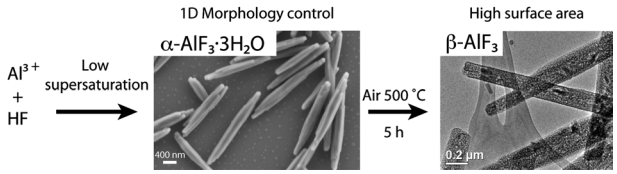








20991

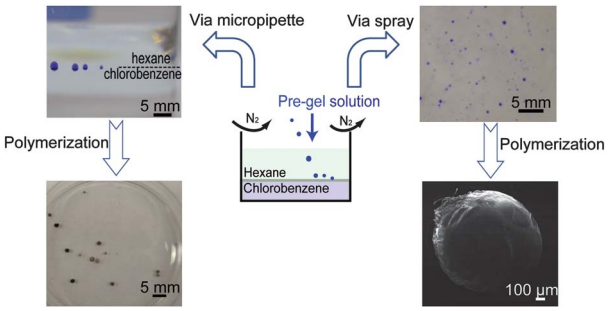


Large-scale solution synthesis of α-$AlF_3 \cdot 3H_2O$ nanorods under low supersaturation conditions and their conversion to porous β-AlF_3 nanorods

Marc Estruga, Fei Meng, Linsen Li, Lianyi Chen, Xiaochun Li and Song Jin*

We report for the first time the multi-gram scale solution growth of α-aluminium fluoride trihydrate (α-$AlF_3 \cdot 3H_2O$) nanorods (NRs) under low supersaturation conditions, and their conversion to porous β-AlF_3 NRs.

20998

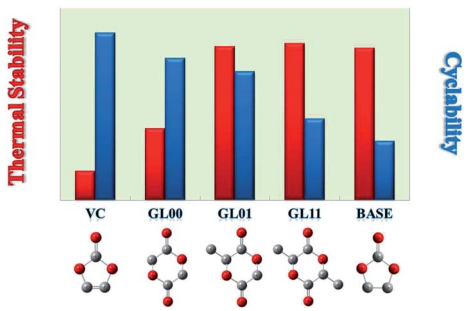


Liquid–liquid interface assisted synthesis of multifunctional and multicomponent hydrogel particles

Zeming Chen, Liang Hu and Michael J. Serpe*

Adding pre-gel solution to the hexane–chlorobenzene solvent interface allows chemically and compositionally complex hydrogel particles to be easily synthesized.

21003

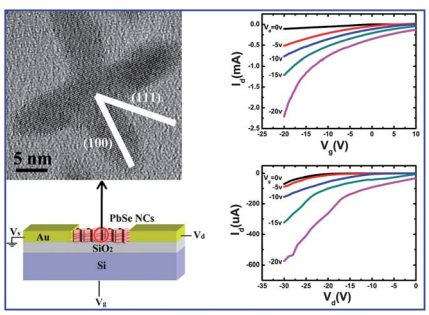


Tuning glycolide as an SEI-forming additive for thermally robust Li-ion batteries

Jongho Jeon, Soojin Yoon, Taeyoon Park, Jeong-Ju Cho, Sunwoo Kang, Young-Kyu Han* and Hochun Lee*

Glycolide is tuned at the molecular level to outperform vinylene carbonate, the current most popular SEI-forming additive for lithium-ion batteries.

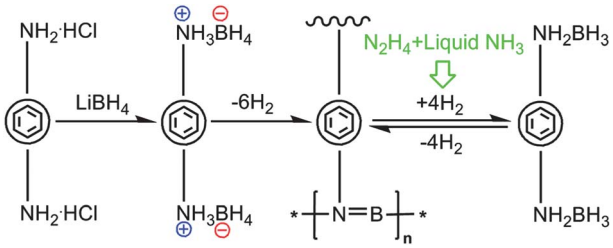
21009

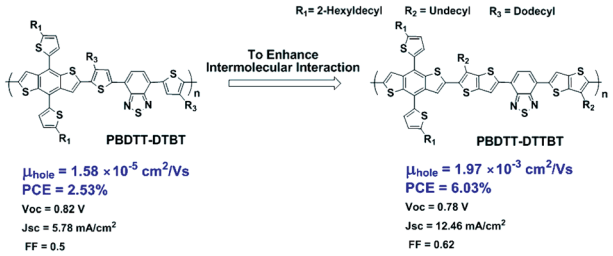


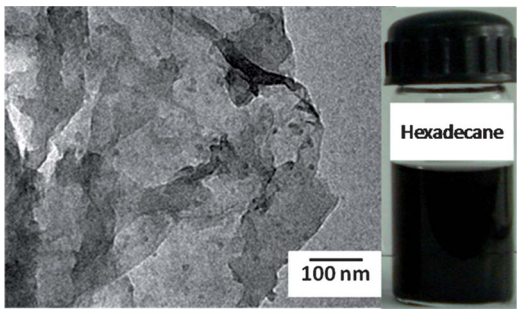
The impact of chemical treatment on optical and electrical characteristics of multipod PbSe nanocrystal films

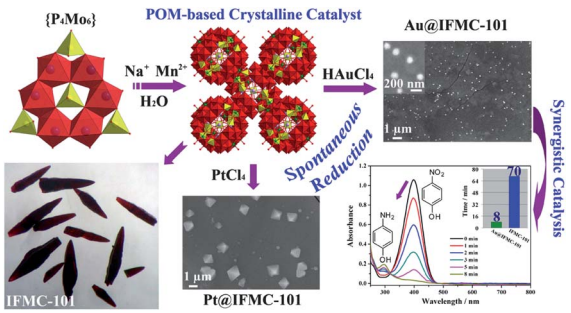
Zhi Yang, Minqiang Wang,* Yanhua Shi, Xiaohui Song, Zhonghai Lin, Zhaoyu Ren and Jintao Bai*

Solid-state field-effect transistors where multipod PbSe nanocrystals are deposited onto Si/SiO_2 substrate are used to investigate the electrical characteristics.

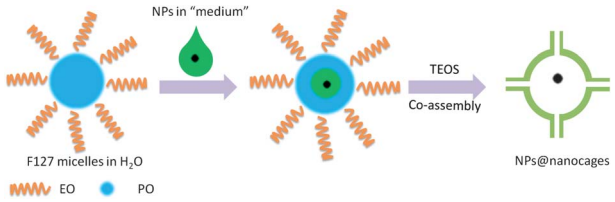








21045

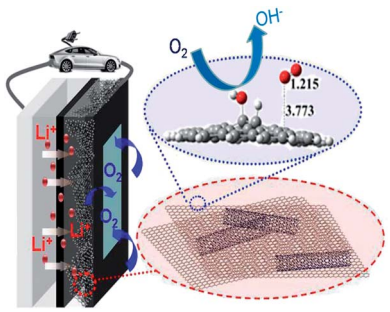


Entrapment of metal nanoparticles within nanocages of mesoporous silicas aided by co-surfactants

Xiaobo Li, Xiao Liu, Yan Yang, Jiao Zhao, Can Li* and Qihua Yang*

We demonstrated an efficient approach for *in situ* encapsulation of metal nanoparticles into nanocages of mesoporous silicas using co-surfactants as the transportation medium.

21051

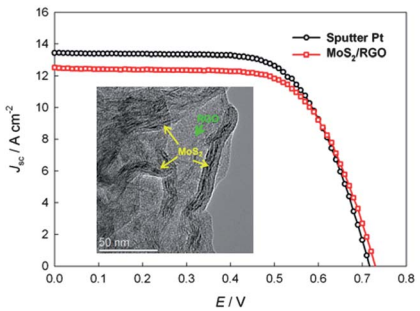


Oxygen-enriched carbon material for catalyzing oxygen reduction towards hybrid electrolyte Li-air battery

Shan Wang, Shanmu Dong, Jun Wang, Lixue Zhang, Pengxian Han, Chuanjian Zhang, Xiaogang Wang, Kejun Zhang, Zhenggang Lan* and Guanglei Cui*

Oxygen-containing groups on graphene oxide facilitate the electrocatalysis of O_2.

21057

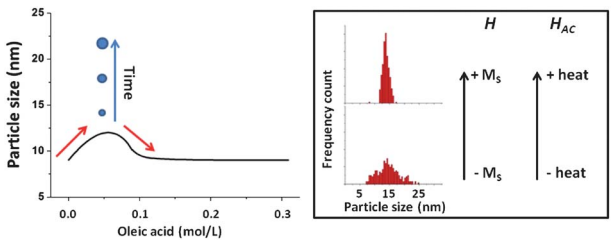


Facile synthesis of MoS_2/graphene nanocomposite with high catalytic activity toward triiodide reduction in dye-sensitized solar cells

Chia-Jui Liu, Sheng-Yen Tai, Shu-Wei Chou, Ya-Chu Yu, Kai-Di Chang, Shuei Wang, Forest Shih-Sen Chien, Jeng-Yu Lin* and Tsung-Wu Lin*

A MoS_2/RGO nanocomposite was proposed for the first time as the counter electrode catalyst in DSSCs to reduce I_3^- to I^-.

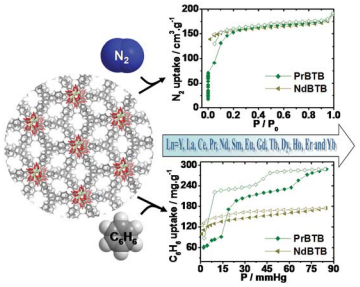
21065

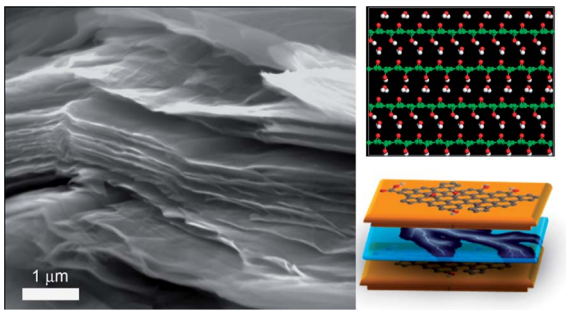


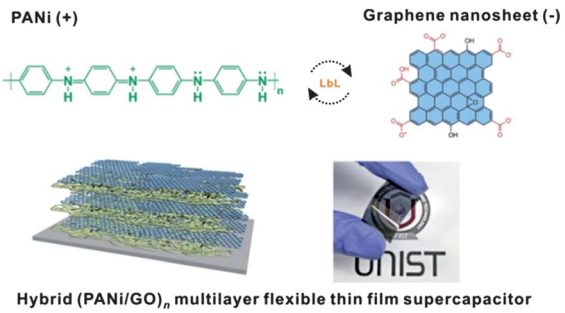
Controlled synthesis of uniform magnetite nanocrystals with high-quality properties for biomedical applications

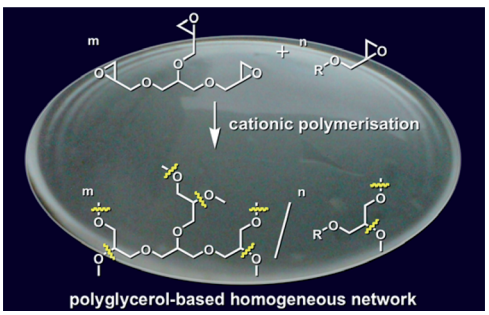
Gorka Salas,* Cintia Casado, Francisco J. Teran, Rodolfo Miranda, Carlos J. Serna and M. Puerto Morales

Uniform DMSA-coated iron oxide magnetic nanoparticles have been synthesized by controlling the thermal decomposition process of an iron oleate complex. The relationship between synthetic experimental procedures, size, size distribution and shape, and magnetic/magneto-thermal properties is discussed.

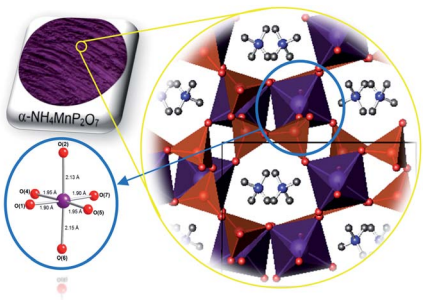








21110

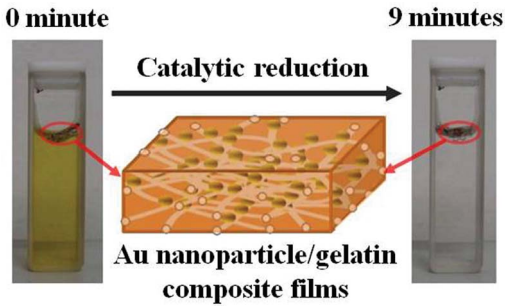


Relating highly distorted Jahn–Teller MnO_6 to colouration in manganese violet pigments

Yasmin Begum and Adrian J. Wright*

Mn^{3+} chelated by pyrophosphate anions provides highly distorted coordination environments, leading to intense violet pigments.

21117

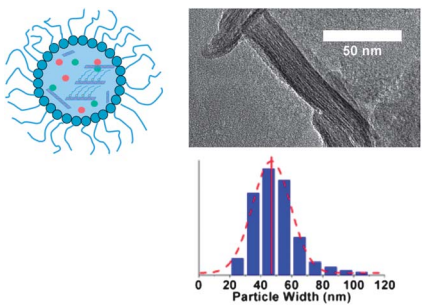


High catalytic performance of gold nanoparticle–gelatin mesoporous composite thin films

Li Shi, Qing Yu, Yiyin Mao, Hubiao Huang, Hongwen Huang, Zhizhen Ye and Xinsheng Peng*

Gold nanoparticle–gelatin mesoporous composite thin films prepared by *in situ* reduction at room temperature demonstrate superior catalytic properties.

21125

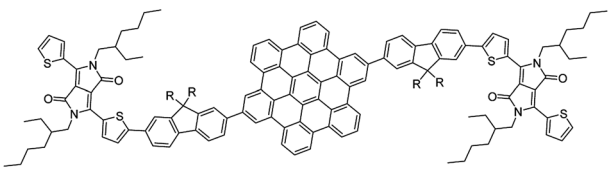


Synthesis of layered double hydroxide nanoparticles in a novel microemulsion

Chengle J. Wang and Dermot O'Hare*

Oleylamine performs multiple functions in the synthesis of LDHs nanosheets.

21131

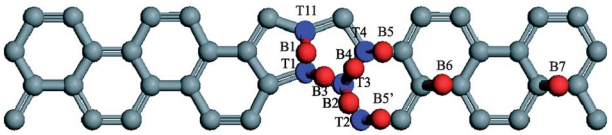


Liquid crystalline hexa-*peri*-hexabenzocoronene-diketopyrrolopyrrole organic dyes for photovoltaic applications

Wallace W. H. Wong,* Jegadesan Subbiah, Sreenivasa R. Puniredd, Balaji Purushothaman, Wojciech Pisula, Nigel Kirby, Klaus Müllen, David J. Jones and Andrew B. Holmes

Small changes in the structure of liquid crystalline organic dyes led to significant differences in molecular organisation and semiconducting properties.

21167

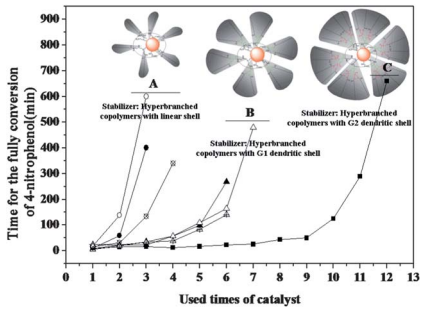


Atomic nitrogen chemisorption on graphene with extended line defects

Yu Li, Ji-Chang Ren, Rui-Qin Zhang,* Zijing Lin* and Michel A. Van Hove*

Adsorption of N atoms onto a graphene substrate with extended line defects can substantially affect their electronic and magnetic properties, depending in particular on specific adsorption sites and density.

21173

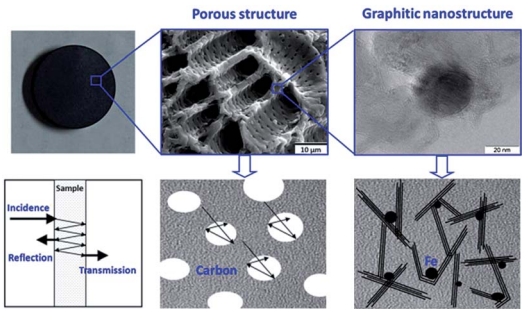


Amphiphilic hyperbranched copolymers bearing a hyperbranched core and a dendritic shell as novel stabilizers rendering gold nanoparticles with an unprecedentedly long lifetime in the catalytic reduction of 4-nitrophenol

Yi Liu, You Fan, Yuan Yuan, Yu Chen,* Fa Cheng and Shi-Chun Jiang*

Compared with amphiphilic hyperbranched copolymers with a linear shell, those with a dendritic shell made AuNPs more robust in the catalytic reduction of 4-nitrophenol by $NaBH_4$.

21183

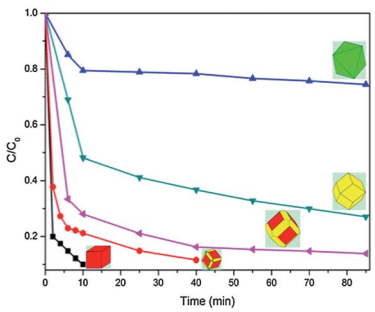


Biomorphic porous graphitic carbon for electromagnetic interference shielding

Qinglei Liu, Jiajun Gu, Wang Zhang, Yoshinari Miyamoto, Zhixin Chen and Di Zhang*

Using plant biomass as raw materials, we prepared biomorphic porous carbon materials with tunable electrical conductivity and EMI shielding capacity.

21189



Controlled synthesis of Ag_2O microcrystals with facet-dependent photocatalytic activities

Gang Wang, Xiangchao Ma, Baibiao Huang,* Hefeng Cheng, Zeyan Wang, Jie Zhan,* Xiaoyan Qin, Xiaoyang Zhang and Ying Dai

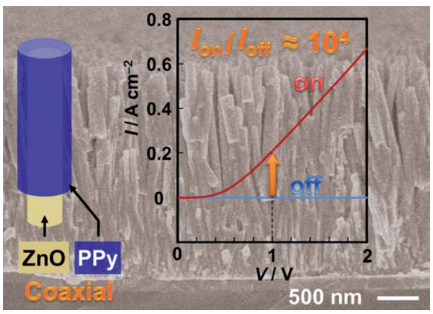
Different morphologies of Ag_2O microcrystals were prepared by a facile method. The as-synthesized samples exhibit facet-dependent photocatalytic activities.

21195

Enhanced photoconductive properties of a simple composite coaxial nanostructure of zinc oxide and polypyrrole

Yuya Oaki,* Takahiro Oki and Hiroaki Imai*

The coaxial nanostructures of zinc oxide and polypyrrole are synthesized through the low-temperature solution processes. Compared with the reference structures, the enhanced photoconductive properties with high on–off ratio comparable to 10^4 are found for the coaxial nanostructures. The results indicate that the simple composites and nanostructures lead to the enhanced performance applicable for photoswitches and photodetectors.

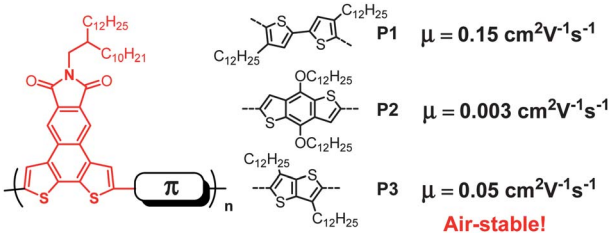


21201

Dithieno-naphthalimide based copolymers for air-stable field effect transistors: synthesis, characterization and device performance

Gaole Dai, Jingjing Chang, Jishan Wu and Chunyan Chi*

A new dithieno-naphthalimide building block was synthesized and three copolymers **P1–P3** were prepared and used for OFETs with good air-stability.

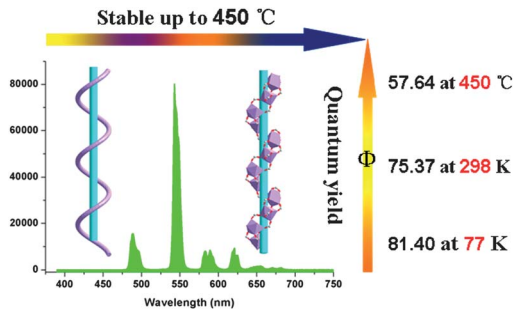


21210

Highly luminescent and thermostable lanthanide-carboxylate framework materials with helical configurations

Huabin Zhang, Liujiang Zhou, Jing Wei, Zhihua Li, Ping Lin and Shaowu Du*

Highly luminescent and thermostable lanthanide-carboxylate frameworks with helical configurations were solvo(hydro) thermally synthesized. The terbium compound has highly efficient emission quantum yields of 81.40% at 77 K and 75.37% at RT.

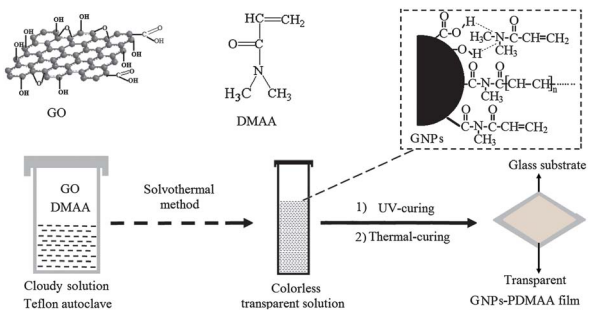


21218

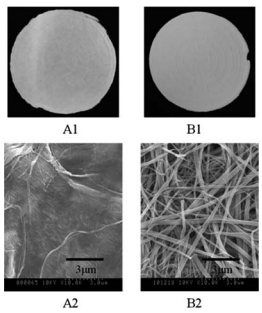
Embedding graphene nanoparticles into poly(*N*,*N*′-dimethylacrylamine) to prepare transparent nanocomposite films with high refractive index

Guoyan Zhang, Hao Zhang, Xiaoran Zhang, Shoujun Zhu, Liang Zhang, Qingnan Meng, Mingyang Wang, Yunfeng Li and Bai Yang*

Transparent nanocomposite films of GNPs–PDMAA with a high refractive index are prepared *via* a facile *in situ* polymerization method.



21225

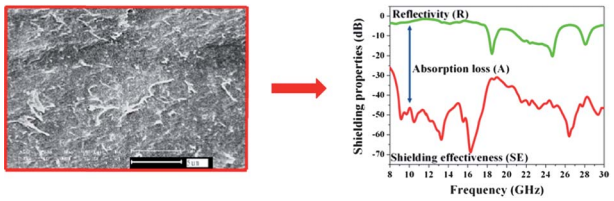


Fabrication of boehmite and Al_2O_3 nonwovens from boehmite nanofibres and their potential as the sorbent

Naofumi Nagai, Kazuaki Ihara, Ayaka Itoi, Tetsuya Kodaira, Hiroshi Takashima, Yukiya Hakuta, Kyoko K. Bando, Naotsugu Itoh and Fujio Mizukami*

Boehmite nonwovens with hierarchical texture could be fabricated by a simple procedure consisting of mixing a boehmite nanofibre sol with an organic solvent and filtering the mixture.

21232

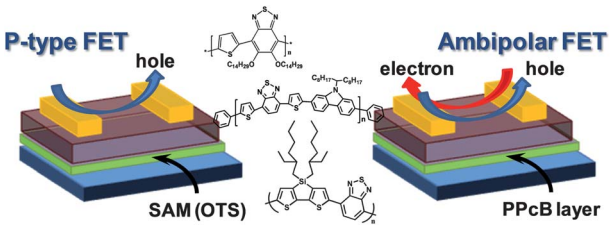


A material with high electromagnetic radiation shielding effectiveness fabricated using multi-walled carbon nanotubes wrapped with poly(ether sulfone) in a poly(ether ether ketone) matrix

Hongsong Wang, Guibin Wang, Wenlei Li, Qitong Wang, Wei Wei, Zhenhua Jiang and Shuling Zhang*

A material with high electromagnetic radiation shielding effectiveness fabricated using MWCNTs wrapped with PES in a PEEK matrix was successfully prepared.

21238

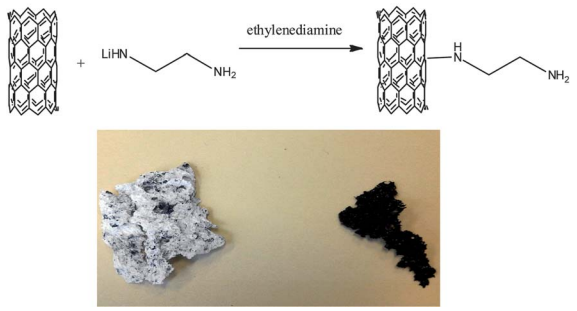


Observation of ambipolar field-effect behavior in donor–acceptor conjugated copolymers

Shinuk Cho,* Jung Hwa Seo, Gi-Hwan Kim, Jin Young Kim* and Han Young Woo

Ambipolar field-effect behavior was derived from general D–A conjugated copolymers, believed to be a typical p-type material, by introducing a functional passivation layer between the gate dielectric layer and the active layer using polypropylene-*co*-1-butene (PPcB).

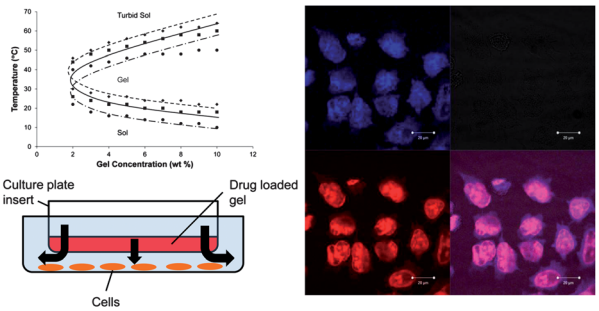
21242

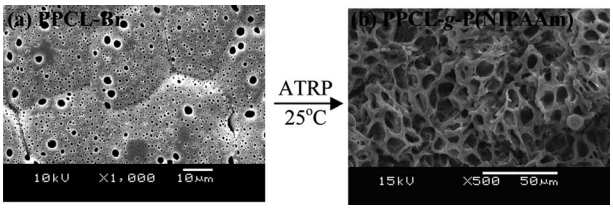


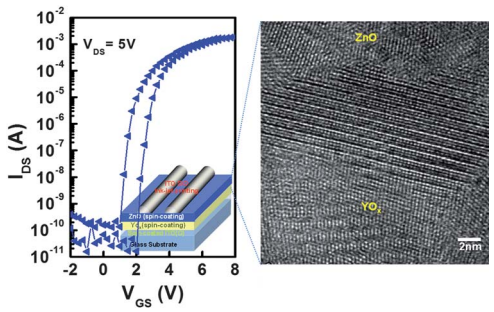
Direct grafting of carbon nanotubes with ethylenediamine

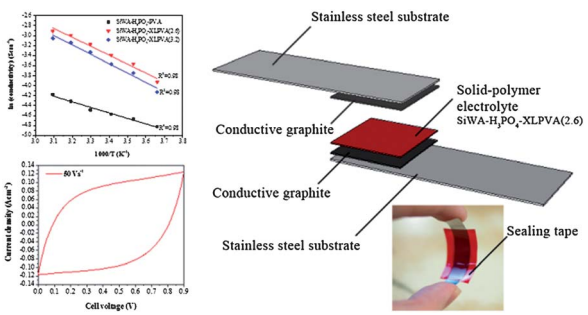
Andrei V. Gromov,* Nia Gray, Petra Ágota Szilágyi and Eleanor E. B. Campbell

Singlewall and multiwall carbon nanotubes were covalently functionalised with ethylenediamine (EDA) in a simple one-pot process providing a good surface coverage.

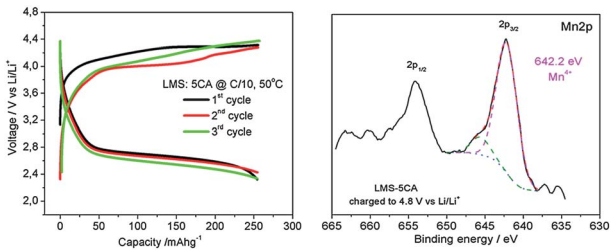








21279

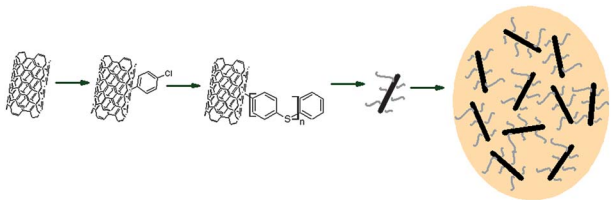


Li_2MnSiO_4 obtained by microwave assisted solvothermal method: electrochemical and surface studies

M. Kuezma, S. Devaraj and P. Balaya*

Nanostructured Li_2MnSiO_4 is successfully synthesized by microwave assisted solvothermal method followed by successful conductive carbon coating. For the first time, we confirm the presence of Mn^{4+} by XPS studies upon charging Li_2MnSiO_4.

21285

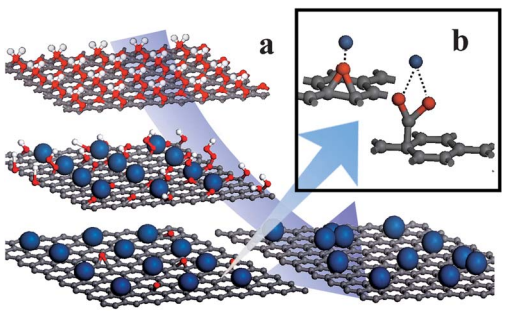


Covalent functionalization of MWCNTs with poly(*p*-phenylene sulphide) oligomers: a route to the efficient integration through a chemical approach

J. M. González-Domínguez, P. Castell,* S. Bespín-Gascón, A. Ansón-Casaos, A. M. Díez-Pascual, M. A. Gómez-Fatou, A. M. Benito, W. K. Maser and M. T. Martínez

Schematic representation of the preparation route of CNT/PPS composites.

21298

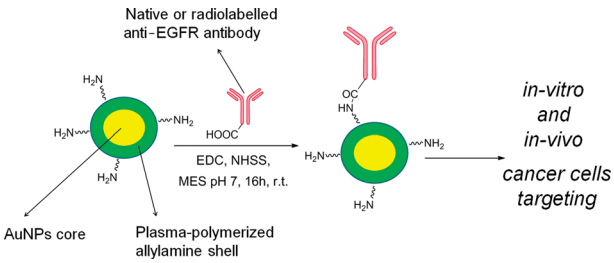


Bifunctional effect of reduced graphene oxides to support active metal nanoparticles for oxygen reduction reaction and stability

Daping He, Kun Cheng, Tao Peng, Xueling Sun, Mu Pan and Shichun Mu*

Highly active and stable Pt/reduced graphene oxide (RGO) electrocatalysts for the application of PEM fuel cells can be developed by tuning the O/C atom ratio of RGO supports.

21305



Antibody-functionalized polymer-coated gold nanoparticles targeting cancer cells: an *in vitro* and *in vivo* study

Riccardo Marega, Linda Karmani, Lionel Flamant, Praveen Ganesh Nageswaran, Vanessa Valembois, Bernard Masereel, Olivier Feron, Thierry Vander Borght, Stephane Lucas,* Carine Michiels,* Bernard Gallez* and Davide Bonifazi*

Gold nanoparticles (~5 nm) coated with plasma-polymerized allylamine were produced through plasma vapor deposition and bioconjugated with a monoclonal antibody targeting the epidermal growth factor receptor.

