

# Journal of Materials Chemistry C

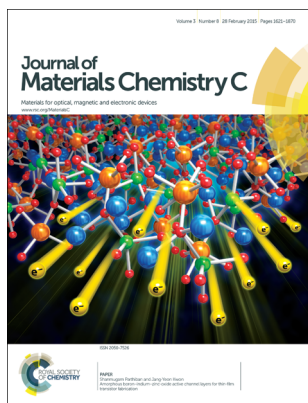
Materials for optical, magnetic and electronic devices

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## IN THIS ISSUE

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See Shanmugam Parthiban and Jang-Yeon Kwon, pp. 1661–1665. Image reproduced by permission of Jang-Yeon Kwon from *J. Mater. Chem. C*, 2015, 3, 1661.

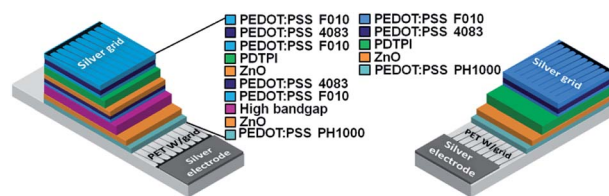
## COMMUNICATIONS

1633

### An isoindigo containing donor–acceptor polymer: synthesis and photovoltaic properties of all-solution-processed ITO- and vacuum-free large area roll-coated single junction and tandem solar cells

Rasmus Guldbæk Brandt, Wei Yue, Thomas Rieks Andersen, Thue Trofod Larsen-Olsen, Mogens Hinge, Eva Bundgaard, Frederik C. Krebs and Donghong Yu\*

A novel isoindigo containing D–A polymer was developed for large area single junction and tandem solar cells.

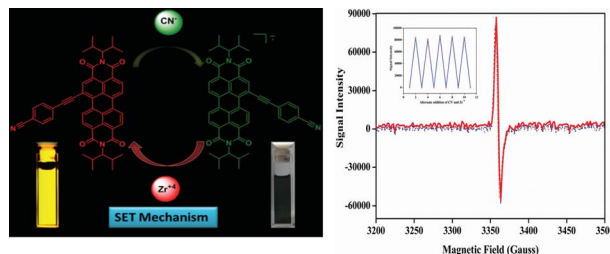


1640

### Perylenebisimide-based multi-modal cyanide recognition: molecular logic gate deciphering magnetic memory units

Masood Ayoub Kaloo, Ruchika Mishra and Jeyaraman Sankar\*

An electron-deficient perylenebisimide has been identified as the first example of a molecular Boolean logic gate having a magnetic signalling mechanism.



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# Journal of Materials Chemistry C

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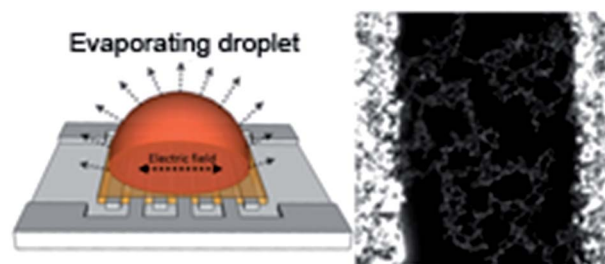
## COMMUNICATIONS

1645

**Electrically driven assembly of CdTe quantum dots into photoconductive microwires**

Gaurav Maheshwari, Mona Mittal, Sameer Sapra and Shalini Gupta\*

Low energy, low cost quantum dot nanocrystal assembly into one-dimensional microwires for optoelectronic device applications.



1649

**Enhanced thermoelectric property by the construction of a nanocomposite 3D interconnected architecture consisting of graphene nanolayers sandwiched by polypyrrole nanowires**

Zhuang Zhang, Guangming Chen,\* Hanfu Wang\* and Wentao Zhai\*

A new strategy is developed to significantly enhance polymer thermoelectric property by the construction of 3D interconnected architecture consisting of rGO nanolayers sandwiched by PPy nanowires.

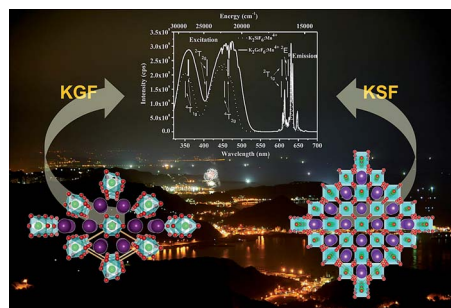


1655

**A low-temperature co-precipitation approach to synthesize fluoride phosphors  $K_2MF_6:Mn^{4+}$  ( $M = Ge, Si$ ) for white LED applications**

Ling-Ling Wei, Chun Che Lin, Mu-Huai Fang, Mikhail G. Brik, Shu-Fen Hu, Huan Jiao\* and Ru-Shi Liu\*

A new class of  $Mn^{4+}$  activated alkali-metal hexafluoride red phosphors are emerging for white light-emitting diodes because of their sharp red line  ${}^2E_g \rightarrow {}^4A_{2g}$  emissions (600–650 nm) excited by irradiation of  ${}^4A_{2g} \rightarrow {}^4T_{1g}$  (320–380 nm) and  ${}^4A_{2g} \rightarrow {}^4T_{2g}$  (380–500 nm) transitions.



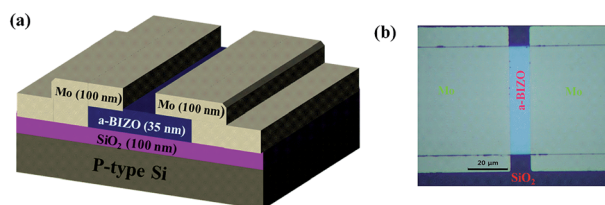
## PAPERS

1661

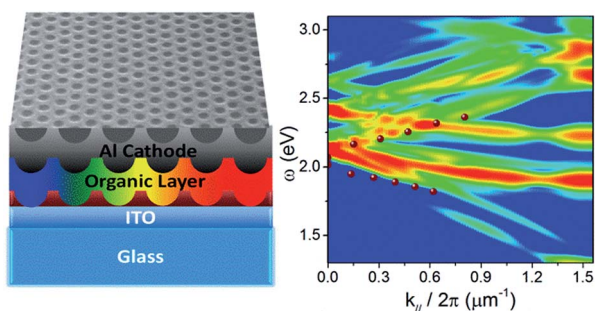
**Amorphous boron–indium–zinc-oxide active channel layers for thin-film transistor fabrication**

Shanmugam Parthiban and Jang-Yeon Kwon\*

Thin-film transistor fabrication was investigated using a novel amorphous boron–indium–zinc-oxide active channel layer.



1666



### Origin of light manipulation in nano-honeycomb structured organic light-emitting diodes

Xiao-Bo Shi, Min Qian, Dong-Ying Zhou, Zhao-Kui Wang\* and Liang-Sheng Liao\*

The origin of light manipulation in nano-honeycomb structured organic light-emitting diodes is analyzed both experimentally and theoretically.

1672

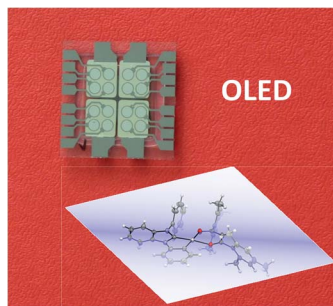


### Coupling of plasmon and 3D antireflection quasi-photonic crystal structure for enhancement infrared absorption

Junlong Tian, Wang Zhang,\* Xiaotian Fang, Qinglei Liu, Jiajun Gu, Tao Deng, Yuhua Wang and Di Zhang\*

In this study, the carbon-matrix Ag wing with a hierarchical sub-micron antireflection quasi-photonic crystal structure (HSAS) was fabricated by a simple and promising method.

1680

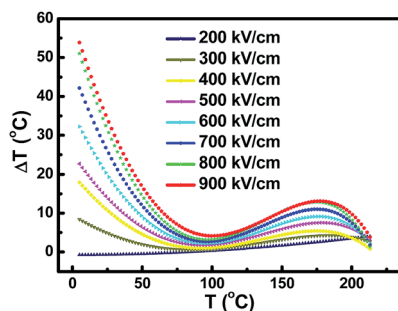


### Heteroleptic platinum(II) NHC complexes with a C^A C\* cyclometalated ligand – synthesis, structure and photophysics

Alexander Tronnier, Ute Heinemeyer, Stefan Metz, Gerhard Wagenblast, Ingo Muenster and Thomas Strassner\*

Significant improvement of photophysical properties for blue emitting C^A C\* cyclometalated NHC complexes by changing the acac-ligands.

1694



### A giant electrocaloric effect of a $\text{Pb}_{0.97}\text{La}_{0.02}\text{-(Zr}_{0.75}\text{Sn}_{0.18}\text{Ti}_{0.07})\text{O}_3$ antiferroelectric thick film at room temperature

Ye Zhao, Xihong Hao\* and Qi Zhang

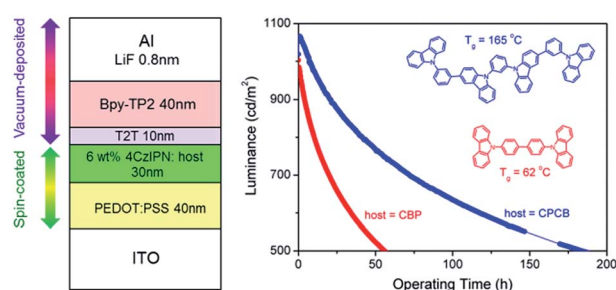
A maximum  $\Delta T$  of 53.8 °C at 5 °C was achieved at 900 kV cm<sup>-1</sup> for a PLZST AFE thick film.

1700

### A solution-processable host material of 1,3-bis(3-[3-(9-carbazolyl)phenyl]-9-carbazolyl)benzene and its application in organic light-emitting diodes employing thermally activated delayed fluorescence

Yoshitake Suzuki, Qisheng Zhang and Chihaya Adachi\*

The stability of solution-processed organic light-emitting diodes employing a thermally activated delayed fluorescent emitter was improved using a host with a high glass transition temperature and high mobility electron transport layers.

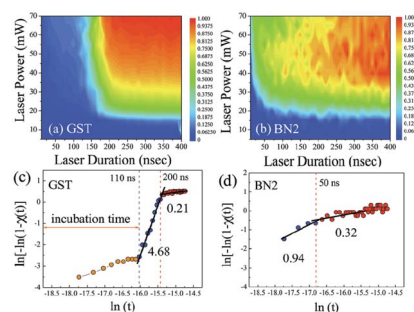


1707

### Ultrafast phase change and long durability of BN-incorporated GeSbTe

Moon Hyung Jang, Seung Jong Park, Min Ahn, Kwang Sik Jeong, Sung Jin Park, Mann-Ho Cho,\* Jae Yong Song and Hongsik Jeong

BN-incorporated amorphous  $\text{Ge}_2\text{Sb}_2\text{Te}_5$  (GST) films were deposited by an ion beam sputtering deposition method. The power-time-effect (PTE) diagrams showed that as the amount of BN increased, the crystallization temperature and phase change speed increased.

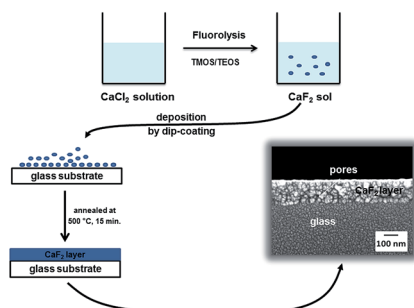


1716

### Formation of nanoscopic $\text{CaF}_2$ via a fluorolytic sol-gel process for antireflective coatings

Alexander Rehmer, Kerstin Scheurell and Erhard Kemnitz\*

For the first time transparent antireflective  $\text{CaF}_2$ -coatings were prepared from clear  $\text{CaF}_2$ -sols obtained via the fluorolytic sol-gel synthesis and containing homo-dispersed  $\text{CaF}_2$  nano-particles.

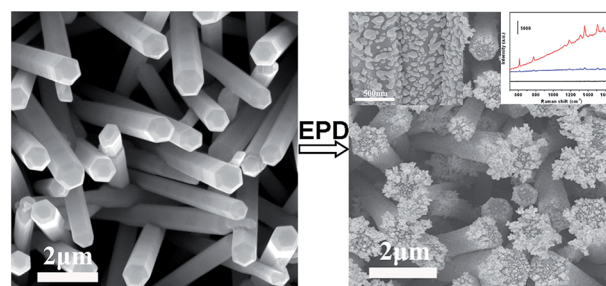


1724

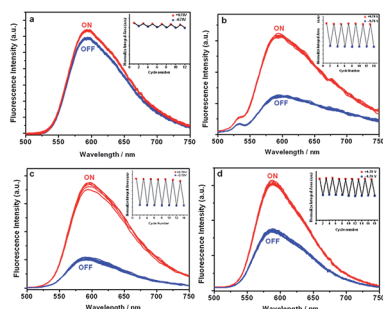
### Electrophoretic fabrication of silver nanostructure/zinc oxide nanorod heterogeneous arrays with excellent SERS performance

Hui He, Huoquan Li, Weiwei Xia, Xiaoshuang Shen, Min Zhou, Jiurong Han, Xianghua Zeng\* and Weiping Cai

Electrophoretic deposition (EPD) is used to fabricate Ag-decorated ZnO nanorod arrays with excellent SERS performance.



1732

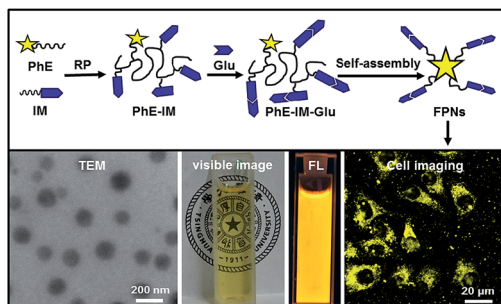


### Study on effects of tungstophosphate structures on electrochemically induced luminescence switching behaviors of the composite films consisting of tris(1,10-phenanthroline) ruthenium

Lingxiao Xu, Bin Wang, Wenmei Gao, Lixin Wu and Lihua Bi\*

A series of composite films consisting of different tungstophosphates were fabricated and their electrochemically induced fluorescence switchable behaviors were investigated.

1738

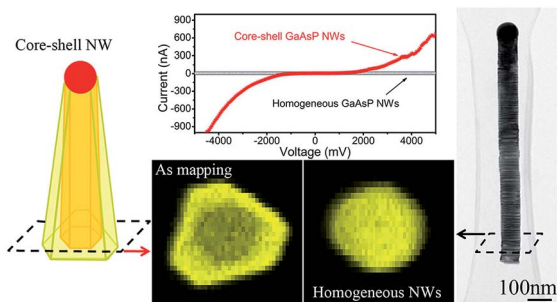


### A novel fluorescent amphiphilic glycopolymer based on a facile combination of isocyanate and glucosamine

Xiqi Zhang,\* Xiaoyong Zhang, Ke Wang, Hongliang Liu, Zhen Gu, Yang Yang and Yen Wei\*

A novel fluorescent amphiphilic glycopolymer was synthesized through radical polymerization and subsequent glycosylation with glucosamine, and self-assembled into nanoparticles for cell imaging.

1745

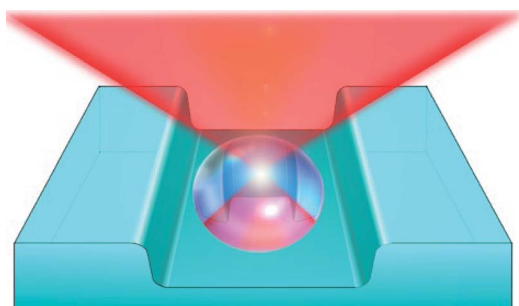


### Spontaneous formation of core-shell GaAsP nanowires and their enhanced electrical conductivity

Wen Sun, Yang Huang, Yanan Guo, Zhi Ming Liao, Qiang Gao, Hark Hoe Tan, Chennupati Jagadish, Xiao Zhou Liao and Jin Zou\*

Spontaneous formation of core-shell GaAsP nanowires with P-enriched cores and As-enriched shells, demonstrating enhanced electrical conductivity.

1751



### Solvent-tunable PDMS microlens fabricated by femtosecond laser direct writing

Dong-Xiao Lu, Yong-Lai Zhang,\* Dong-Dong Han, Huan Wang, Hong Xia, Qi-Dai Chen, Hong Ding and Hong-Bo Sun\*

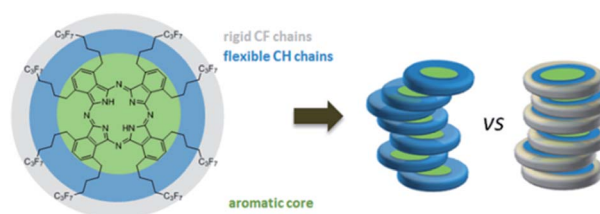
Reported here is the fabrication of a solvent-tunable polydimethylsiloxane (PDMS) microlens using the femtosecond laser direct writing (FsLDW) technique.

1757

### Liquid crystalline and charge transport properties of novel non-peripherally octasubstituted perfluoroalkylated phthalocyanines

Lydia Sosa-Vargas, Fabien Nekelson, Daiju Okuda, Minokazu Takahashi, Yukimasa Matsuda, Quang-Duy Dao, Yoshida Hiroyuki, Akihiko Fujii, Masanori Ozaki and Yo Shimizu\*

Enhancement of the Col mesophase thermal stability, high carrier mobility in ambipolar nature and strong tendency towards homeotropic alignment.

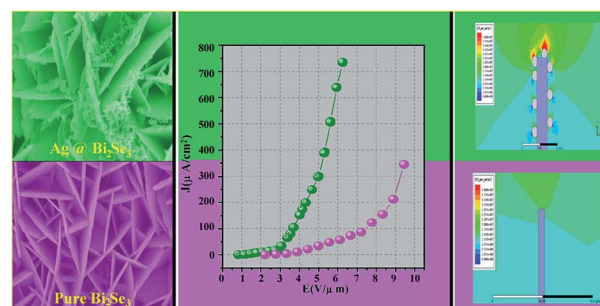


1766

### Ag decorated topological surface state protected hierarchical Bi<sub>2</sub>Se<sub>3</sub> nanoflakes for enhanced field emission properties

Biswajit Das, Debabrata Sarkar, Supratim Maity and Kalyan Kumar Chattopadhyay\*

In this paper, we report an economical and low temperature synthesis route of Ag nanoparticle decorated hierarchical Bi<sub>2</sub>Se<sub>3</sub> nanoflakes (NFs) over a large surface area of Si substrate in an open atmosphere for cold cathode application.

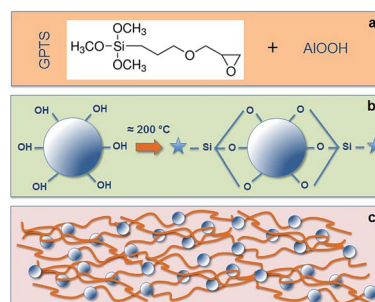


1776

### Gravure printed sol-gel derived AlOOH hybrid nanocomposite thin films for printed electronics

Terho Kololuoma,\* Jaakko Leppäniemi, Himadri Majumdar, Rita Branquinho, Elena Herbei-Valcu, Viorica Musat, Rodrigo Martins, Elvira Fortunato and Ari Alastalo

We report a sol-gel approach to fabricate aluminum oxyhydroxide (AlOOH)-based inks for the gravure printing of high-dielectric-constant nanocomposite films.

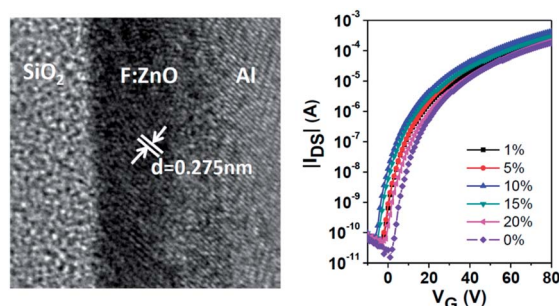


1787

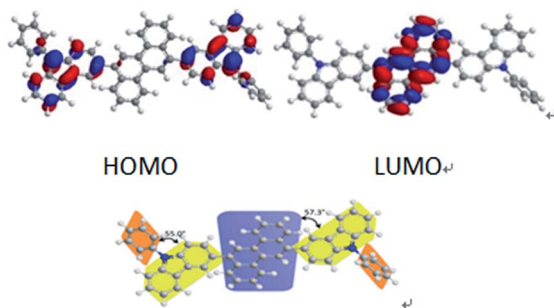
### Solution processed F doped ZnO (ZnO:F) for thin film transistors and improved stability through co-doping with alkali metals

Jingjing Chang, Zhenhua Lin, Ming Lin, Chunxiang Zhu, Jie Zhang\* and Jishan Wu\*

FETs based on ZnO doped with F and alkali metals showed largely improved charge carrier mobility, shelf-life stability and bias stress stability.



1794

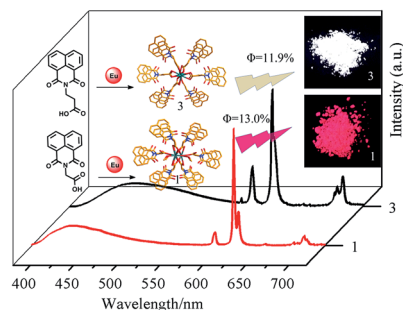


### A pure blue emitter (CIE<sub>y</sub> ≈ 0.08) of chrysene derivative with high thermal stability for OLED

Yao-Hsien Chung, Lei Sheng, Xing Xing, Lingling Zheng, Mengying Bian, Zhijian Chen, Lixin Xiao\* and Qihuang Gong

A chrysene derivative, BPCC (6,12-bis(9-phenyl-9*H*-carbazol-3-yl)chrysene), possessing high thermal stability with a high glass transition temperature ( $T_g = 181$  °C) was synthesized.

1799

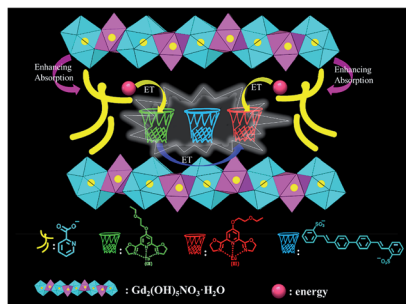


### A new strategy for achieving white-light emission of lanthanide complexes: effective control of energy transfer from blue-emissive fluorophore to Eu(III) centres

Junqing Zhang, Hongfeng Li,\* Peng Chen, Wenbin Sun, Ting Gao and Pengfei Yan\*

A white-light-emitting Eu(III) coordination polymer based on a 1,8-naphthalimide-derivative was synthesized, and three primary colours are well balanced by controlling energy transfer efficiency from fluorophore to Eu(III) ions.

1807

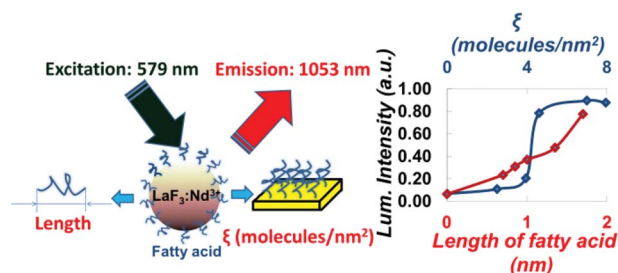


### Novel multi-color photoluminescence emission phosphors developed by layered gadolinium hydroxide *via in situ* intercalation with positively charged rare-earth complexes

Tingting Shen, Yu Zhang, Weisheng Liu and Yu Tang\*

The hybrid multi-color emission phosphors have been assembled by the positively charged Eu(III) and Tb(III) complexes *in situ* intercalated into the gallery of layered gadolinium hydroxide utilizing the chelation of the picolinic acid anions by ligand exchange reaction.

1817



### Effect of surface grafting coefficient and chain length of fatty acids on the luminescence of neodymium<sup>3+</sup>-doped LaF<sub>3</sub> nanoparticles

Pramod K. Nampoothiri, Mayuri N. Gandhi and A. R. Kulkarni\*

Effect of chain length and surface grafting coefficient ( $\xi$ ) of fatty acids on the luminescence intensity of LaF<sub>3</sub>:Nd<sup>3+</sup> nanoparticles were investigated.

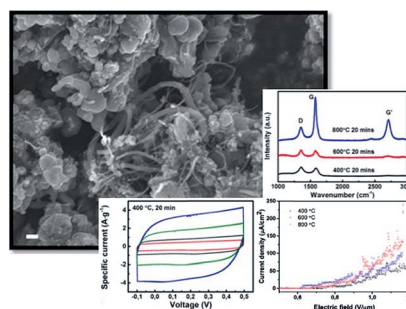


1823

### Facile synthesis of nanostructured carbon materials over RANEY® nickel catalyst films printed on Al<sub>2</sub>O<sub>3</sub> and SiO<sub>2</sub> substrates

J.-F. Lin, M. Mohl, M. Nelo, G. Toth, Á. Kukovecz, Z. Kónya, S. Sridhar, R. Vajtai, P. M. Ajayan, W.-F. Su, H. Jantunen and K. Kordas\*

Films of porous RANEY® Ni catalyst particles deposited on substrates by stencil printing offer a facile platform for synthesizing nanostructured carbon/nickel composites for direct use as electrodes in electrochemical and field emitter devices.

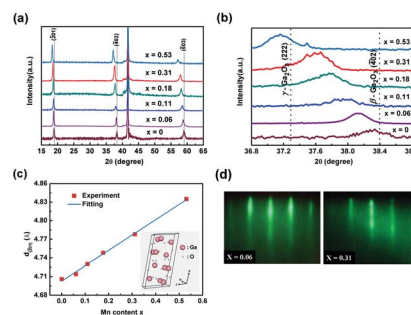


1830

### Room temperature ferromagnetism in (Ga<sub>1-x</sub>Mn<sub>x</sub>)<sub>2</sub>O<sub>3</sub> epitaxial thin films

Daoyou Guo, Zhenping Wu, Yuehua An, Xiaojiang Li, Xuncai Guo, Xulong Chu, Changlong Sun, Ming Lei, Linghong Li, Lixin Cao, Peigang Li\* and Weihua Tang\*

Mn-doped monoclinic β-(Ga<sub>1-x</sub>Mn<sub>x</sub>)<sub>2</sub>O<sub>3</sub> thin films were epitaxially grown on α-Al<sub>2</sub>O<sub>3</sub> (0001) substrates by alternately depositing Ga<sub>2</sub>O<sub>3</sub> and Mn layers using the laser molecular beam epitaxy technique.

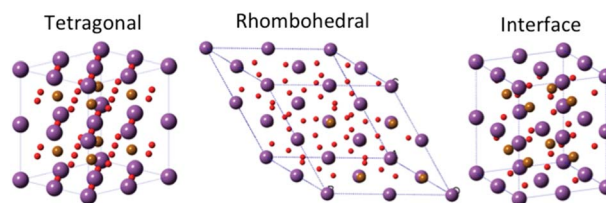


1835

### Mapping strain modulated electronic structure perturbations in mixed phase bismuth ferrite thin films

P. S. Sankara Rama Krishnan, Jeffery A. Aguiar, Q. M. Ramasse, D. M. Kepaptsoglou, W.-I. Liang, Y.-H. Chu, N. D. Browning, P. Munroe and V. Nagarajan\*

A combination of atom column-by-column scanning transmission electron microscopy and density functional theory shows how epitaxial strain alters the local electronic structure in mixed phase bismuth ferrite thin films.

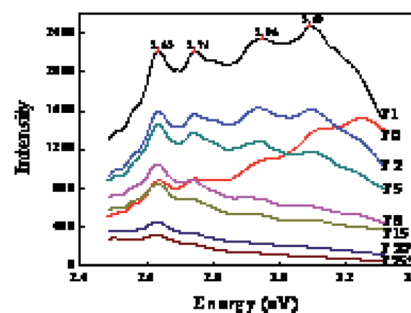


1846

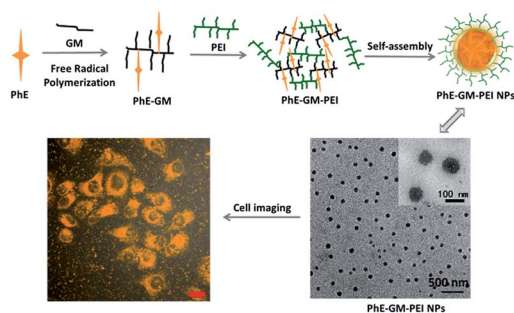
### Non-uniform distribution of dopant iron ions in TiO<sub>2</sub> nanocrystals probed by X-ray diffraction, Raman scattering, photoluminescence and photocatalysis

S. Manu and M. Abdul Khadar\*

The phenomenon of 'self-purification' is a real mechanism operative in nanocrystals and this should be taken into account while doping semiconductor nanocrystals with external impurities for practical applications.



1854

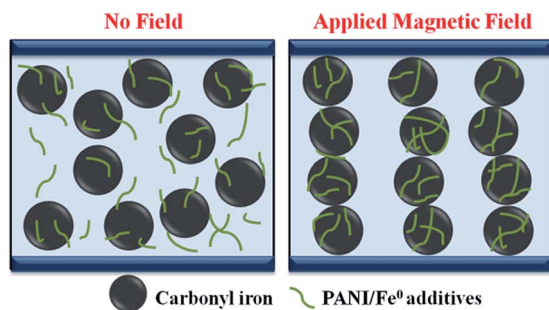


### Fabrication of cross-linked fluorescent polymer nanoparticles and their cell imaging applications

Ke Wang, Xiaoyong Zhang, Xiqi Zhang, Bin Yang, Zhen Li, Qingsong Zhang, Zengfang Huang and Yen Wei\*

Fabrication of aggregation induced emission dye based cross-linked fluorescent polymer nanoparticles via free radical polymerization and ring-opening reaction for bioimaging.

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### Polyaniline/Fe composite nanofiber added softmagnetic carbonyl iron microsphere suspension and its magnetorheology

Shang Hao Piao, Madhumita Bhaumik, Arjun Maity and Hyung Jin Choi\*

We synthesized PANI/Fe<sup>0</sup> nanofibers and added them to a carbonyl iron based magnetorheological fluid to study its enhanced magnetorheological behavior and sedimentation stability.