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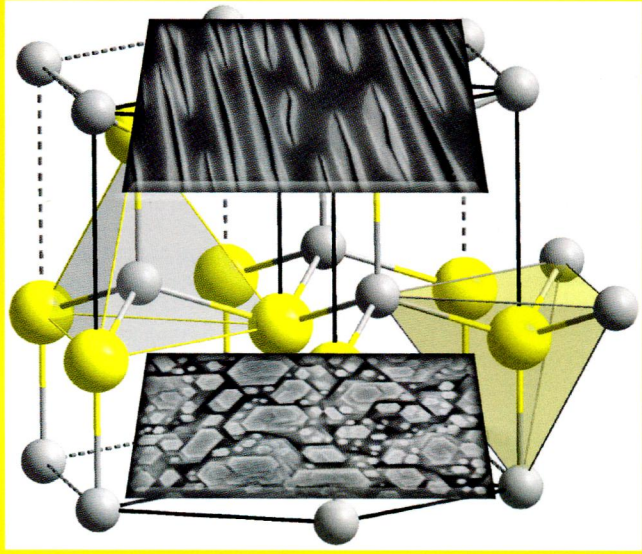
# JOURNAL OF SOLID STATE CHEMISTRY



## Special Issue

**Innovative processing of inorganic films and nanostructures of functional materials, Symposium Q, 7th International Conference on Materials for Advanced Technologies, 30 June to 5 July 2013, Singapore**



**Guest Editor: Dr. Gregory Goh**

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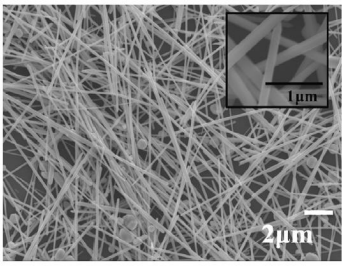
## *Editorial*



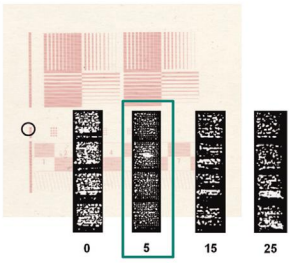
## *Regular Articles*






The FE-SEM image shows that nanostructures with considerable quantities of silver nanowires can also be produced when the PVP (Mw=360 K)/$AgNO_3$ molar ratio was 2.5.

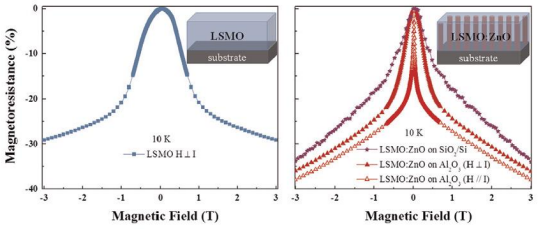





Print quality of a polylactide film surface modified with atomic layer deposition prior to inkjet printing (360 dpi) with an aqueous ink. Number of printed dots illustrated as a function of 0, 5, 15 and 25 deposition cycles of trimethylaluminum and water.

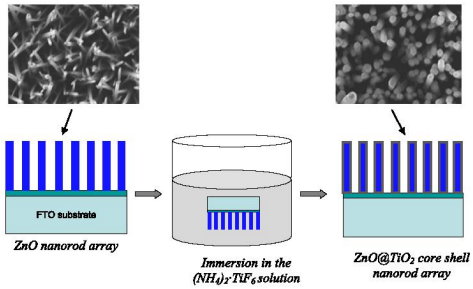
## *Regular Articles—Continued*






The magnetic field dependent magnetoresistance values at 10 K for $La_{0.67}Sr_{0.33}MnO_3$ (LSMO) film on $Al_2O_3$ substrate are enhanced with addition of secondary phase in LSMO:ZnO nanocomposite films on $SiO_2$/Si and $Al_2O_3$ substrates. The field sensitivity further increases when the field is applied parallel to the current (H//I).

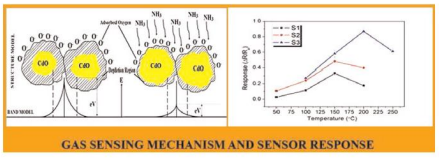





The synthesis process of coating $TiO_2$ shell onto ZnO nanorod core is shown schematically. A thin, uniform, and conformal shell had been grown on the surface of the ZnO core after immersing in the $(NH_4)_2$·$TiF_6$ solution for 5–15 min.

*Continued*

**Magnetron sputtered nanostructured cadmium oxide films for ammonia sensing**
P. Dhivya, A.K. Prasad and M. Sridharan
*page 24*

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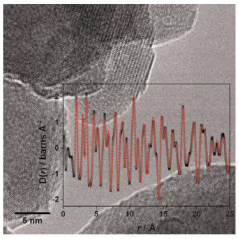
**Investigation of some new hydro(solvo)thermal synthesis routes to nanostructured mixed-metal oxides**
David L. Burnett, Mohammad H. Harunsani, Reza J. Kashtiban, Helen Y. Playford, Jeremy Sloan, Alex C. Hannon and Richard I. Walton
*page 30*



New solvothermal synthesis approaches to spinel and rutile mixed-metal oxides are reported.

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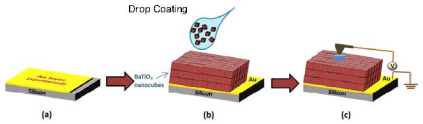
**Growth and self-assembly of $BaTiO_3$ nanocubes for resistive switching memory cells**
Dewei Chu, Xi Lin, Adnan Younis, Chang Ming Li, Feng Dang and Sean Li
*page 38*




This work describes a novel resistive switching memory cell based on self-assembled $BaTiO_3$ nanocubes.

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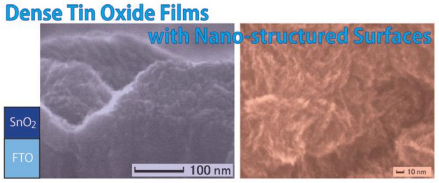
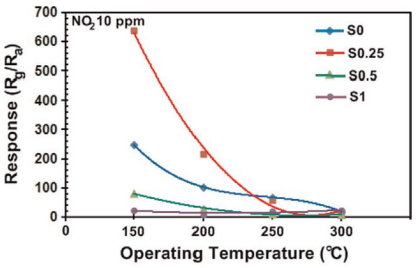
**Aqueous phase deposition of dense tin oxide films with nano-structured surfaces**
Yoshitake Masuda, Tatsuki Ohji and Kazumi Kato
*page 42*




Dense tin oxide films of 65 nm were successfully fabricated in an aqueous solution. They had nano-structured surfaces. Concave-convex substrates were entirely-covered with the continuous films.

**$NO_2$ gas sensing of flame-made Pt-loaded $WO_3$ thick films**
Thanittha Samerjai, Nittaya Tamaekong, Chaikarn Liewhiran, Anurat Wisitsoraat and Sukon Phanichphant
*page 47*




The response of 0.25 wt% Pt-loaded $WO_3$ sensor was 637 towards $NO_2$ concentration of 10 ppm at 150 °C.

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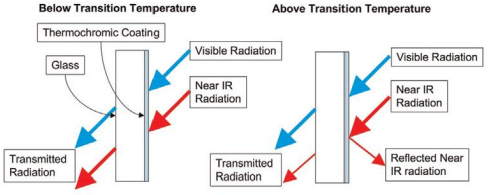
**Chemical vapour deposition of thermochromic vanadium dioxide thin films for energy efficient glazing**
Michael E.A. Warwick and Russell Binions
*page 53*




Schematic demonstration of the effect of thermochromic glazing on solar radiation (red arrow represents IR radiation, black arrow represents all other solar radiation).

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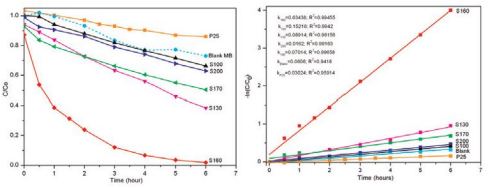
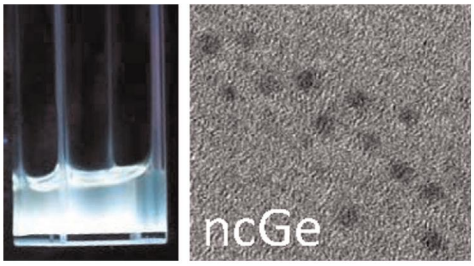
**One-pot solvothermal synthesis of dual-phase titanate/titania Nanoparticles and their adsorption and photocatalytic Performances**
Yu Hua Cheng, Dangguo Gong, Yuxin Tang, Jeffery Weng Chye Ho, Yee Yan Tay, Wei Siew Lau, Olivia Wijaya, Jiexiang Lim and Zhong Chen
*page 67*

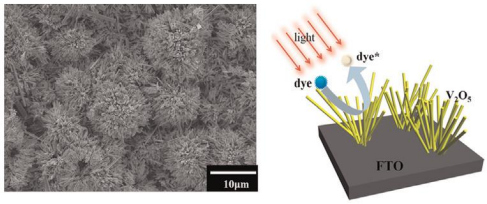


The effect of solvothermal synthesis temperature on the formation and dye removal performance of dual phase titanate/titania nanoparticles was unveiled and optimized.

**Solution-processable white-light-emitting germanium nanocrystals**
Naoto Shirahata
*page 74*

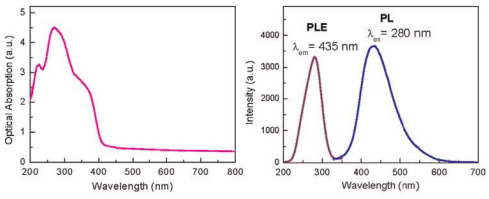



**Growth of oriented vanadium pentaoxide nanostructures on transparent conducting substrates and their applications in photocatalysis**
Hongjiang Liu, Yanfeng Gao, Jiadong Zhou, Xinling Liu, Zhang Chen, Chuanxiang Cao, Hongjie Luo and Minoru Kanehira
*page 79*



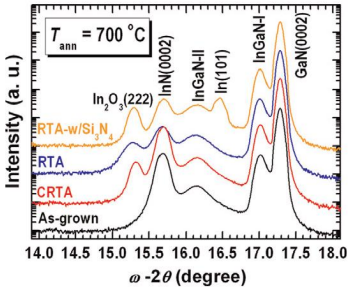

Flower nanostructured vanadium oxide film was prepared by hydrothermal reaction for photocatalysis application.

**Photoluminescence of titanium-doped zinc spinel blue-emitting nanophosphors**
Mu-Tsun Tsai, Yee-Shin Chang, You-Hsin Chou and Kai-Min Tsai
*page 86*



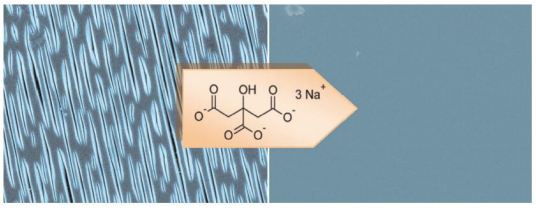

The absorption band around 270 nm is associated with the charge-transfer processes between octahedral $Ti^{4+}$ and $O^{2-}$ ions. The excitation band around 280 nm corresponds to the charge-transfer excitations from $O^{2-}(2p)^6$ electrons to $Ti^{4+}$ ($3d^0$). Under 280 nm excitation, the PL spectrum shows a strong blue emission with a peak at around 435 nm.

**Post-growth thermal oxidation of wurtzite InN thin films into body-center cubic $In_2O_3$ for chemical/gas sensing applications**
H.F. Liu, N.L. Yakovlev, D.Z. Chi and W. Liu
*page 91*




Oxidation of h-InN into bcc-$In_2O_3$ has been realized at elevated temperatures. A $Si_3N_4$ cap improves the crystal quality of $In_2O_3$ oxidized by conventional RTA but it results in the presence of undesired metallic indium. Cycle-RTA not only improves the crystal quality but also avoids the byproduct of metallic indium. SIMS depth profiles provide evidence that the oxidation of InN is dominated by oxygen inward diffusion mechanism. The crystal quality of the resultant $In_2O_3$/InN heterostructure is mainly controlled by the balance between the speeds of oxygen diffusion and InN thermal dissociation, which can be effectively tuned by cycle-RTA.

**Homoepitaxy of ZnO and MgZnO Films at 90 °C**
Dirk Ehrentraut, Gregory K.L. Goh, Katsushi Fujii, Chin Chun Ooi, Le Hong Quang, Tsuguo Fukuda, Masataka Kano, Yuantao Zhang and Takashi Matsuoka
*page 96*




Homoepitaxial ZnO films grown from aqueous solution below boiling point of water on a ZnO substrate with off-orientation reveal parallel grooves that are characterized by {1 0 $\bar{1}$ 1} facets. Adding trisodium citrate yields closed, single-crystalline ZnO films, which can further be functionalized. Alloying with MgO yields MgZnO films with low Mg content only.

*Continued*

**Synthesis and characterization of Cr-doped ZnO nanorod-array photocatalysts with improved activity**
Chi-Jung Chang, Tsung-Lin Yang and Yu-Ching Weng
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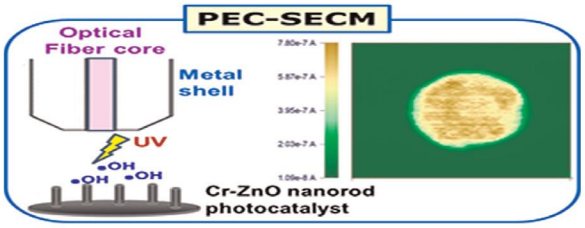
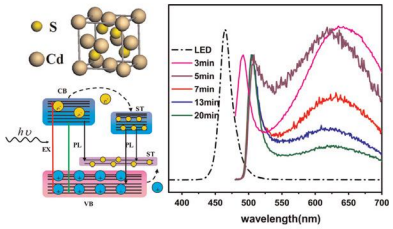



Photoinduced charge separation and its relation with the photocatalytic degradation activity of Cr-doped ZnO were investigated by photoelectrochemical scanning electrochemical microscopy.

**White luminescence from CdS nanocrystals under the blue light excitation**
Bo Li, Xiaosong Zhang, Lan Li, Mengzhen Li, Jianping Xu and Yuan Hong
*page 108*




Trap-rich CdS nanocrystals were synthesized. Furthermore, white light is produced by mixing broad emission across 500–700 nm from CdS NCs excited by blue light, in combination with the remaining blue light.