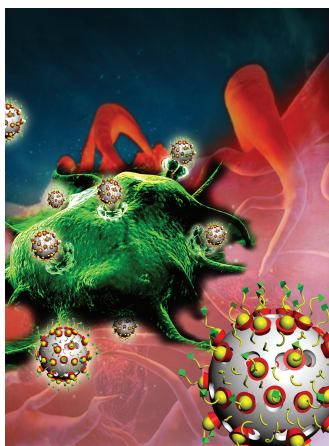


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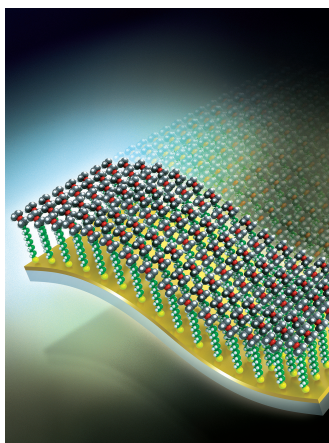
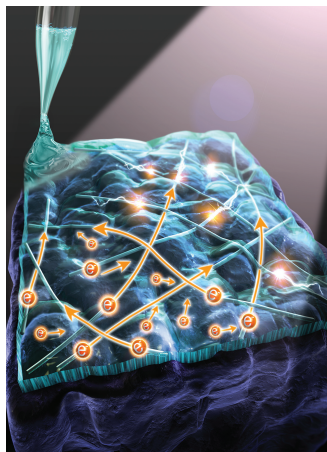


Cancer Treatment

Y. L. Zhao and colleagues develop biocompatible, uniform, and redispersible mesoporous silica nanoparticle-based nanocarriers towards controlled and cancer-targeted drug delivery for significantly inhibiting the tumor growth in vivo. On page 2450, the research team demonstrates a successful cancer therapy protocol of 1) intravenous injection of drug-loaded nanocarriers, 2) controlled and targeted drug delivery to tumor sites for therapy, and 3) excretion of the nanocarriers from the animal bodies after the drug delivery.

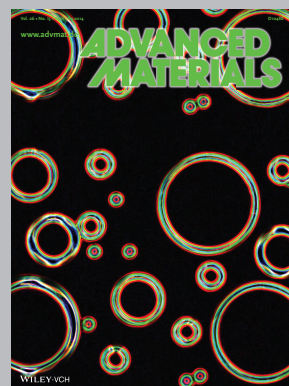
Transparent Electronics

A composite transparent composite electrode using silver nanowire (AgNW) with sol-gel derived ZnO and AZO is proposed by J. Moon and co-workers with careful analysis of the electrical conduction behavior using conductive-atomic force microscopy. On page 2462, low temperature ($\approx 200^\circ\text{C}$) processes are achieved by a combustion reaction based sol-gel method, demonstrating a comparable performance to the sputtered ITO based device.



Molecular Electronics

The electrical properties of ferrocene-alkanethiolate molecular devices on both rigid and flexible substrates are studied on page 2472 by D. Xiang, T. Lee, and team. A distinctive temperature dependence of the current (i.e., a decrease in current as temperature increases) upon an applied bias polarity is observed, which is associated with the redox of ferrocene groups in the junctions. The flexible molecular devices function consistently under various mechanical stress configurations.



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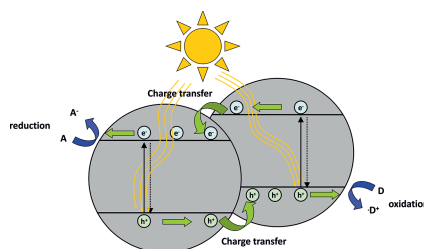
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FEATURE ARTICLE

Photocatalysis

R. Marschall*2421–2440

Semiconductor Composites: Strategies for Enhancing Charge Carrier Separation to Improve Photocatalytic Activity



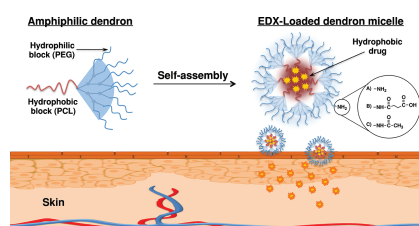
The formation of semiconductor composites, leading to multicomponent and multiphase heterojunctions, is herein reviewed. Highly active photocatalyst systems with improved charge carrier separation and charge transfer are the result, leading to significantly enhanced efficiencies. Particular interest is given to recent developments in multiphase composites.

FULL PAPERS

Drug Delivery

Y. Yang, R. M. Pearson, O. Lee, C.-W. Lee, R. T. Chatterton Jr., S. A. Khan, S. Hong*2442–2449

Dendron-Based Micelles for Topical Delivery of Endoxifen: A Potential Chemo-Preventive Medicine for Breast Cancer

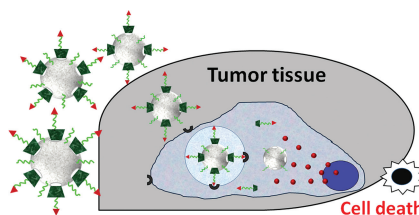


Surface-modified dendron micelles (DMs) are developed as a potential platform for the topical delivery of endoxifen (EDX). Skin permeation of EDX is highly dependent on the surface group of the DMs. In particular, carboxylated DMs exhibit significantly enhanced permeation of EDX through both mouse and human skin layers, offering a potential alternative administration route for chemoprevention.

Cancer Treatment

Q. Zhang, X. Wang, P.-Z. Li, K. T. Nguyen, X.-J. Wang, Z. Luo, H. Zhang, N. S. Tan,* Y. L. Zhao*2450–2461

Biocompatible, Uniform, and Redispersible Mesoporous Silica Nanoparticles for Cancer-Targeted Drug Delivery In Vivo

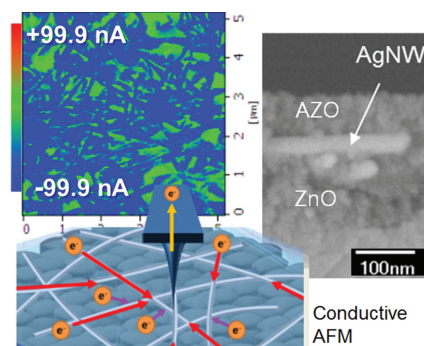


Biocompatible, uniform, and redispersible mesoporous silica nanoparticles are developed for cancer-targeted drug delivery in vivo. The folate-functionalized mesoporous silica nanoparticles with a core diameter of 48 nm can deliver sufficient amount of doxorubicin into tumor, resulting in a remarkable tumor-inhibiting effect as compared with those of free doxorubicin and non-targeted nanoparticles.

Transparent Electronics

A. Kim, Y. Won, K. Woo, S. Jeong, J. Moon*2462–2471

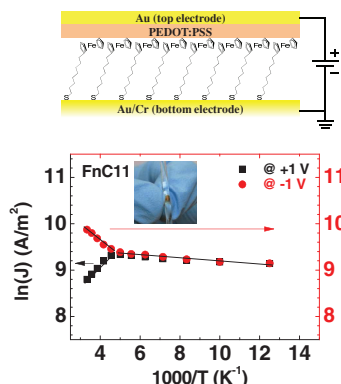
All-Solution-Processed Indium-Free Transparent Composite Electrodes based on Ag Nanowire and Metal Oxide for Thin-Film Solar Cells



A composite transparent electrode using silver nanowire (AgNW) with sol-gel driven ZnO and AZO (Al doped ZnO) is demonstrated with high transmittance ($T = 93\%$) and low sheet resistance ($R_s = 11.3 \Omega \text{ sq}^{-1}$). It applied on the $\text{Cu}(\text{In}_{1-x}\text{Ga}_x)\text{S}_2$ thin film solar cell showing high efficiency about 11.03%. Current-atomic force microscopy analysis is performed to understand lateral conduction behavior of A/AgNW/AZ composite under illumination.

FULL PAPERS

The electrical properties of ferrocene-alkanethiolate molecular devices on both rigid and flexible substrates are studied. A distinctive temperature dependence of the current (i.e., a decrease in current as temperature increases) upon an applied bias polarity, which is associated with the redox of ferrocene groups in the junctions, is observed. The flexible molecular devices function consistently under various mechanical stress configurations.

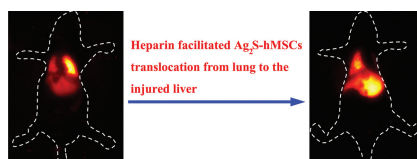


Molecular Electronics

H. Jeong, D. Kim, G. Wang, S. Park, H. Lee, K. Cho, W.-T. Hwang, M.-H. Yoon, Y. H. Jang, H. Song, D. Xiang,* T. Lee*2472–2480

Redox-Induced Asymmetric Electrical Characteristics of Ferrocene-Alkanethiolate Molecular Devices on Rigid and Flexible Substrates

In situ translocation and dynamic distribution of transplanted hMSCs in the lung and liver of mice are clearly visualized up to 14 days by using Ag₂S quantum dots with emission of 1200 nm in the second near-infrared window (NIR-II). The novel NIR-II fluorescence imaging promises the future cell tracking and clinical imaging-guided cell therapy.

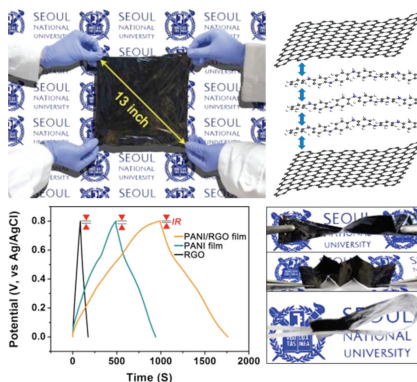


Cell Tracking

G. Chen, F. Tian, Y. Zhang, Y. J. Zhang, C. Li, Q. Wang* 2481–2488

Tracking of Transplanted Human Mesenchymal Stem Cells in Living Mice using Near-Infrared Ag₂S Quantum Dots

Size-controllable PANI/RGO hybrid films are fabricated via solution processing. The film shows the enhanced electrical conductivity and crystallinity greater than both RGO and PANI components. The film also demonstrates excellent performance as a supercapacitor electrode with various film sizes and under bending conditions. This approach offers a promising tool for producing highly flexible, scalable, and high-performance supercapacitor electrodes.

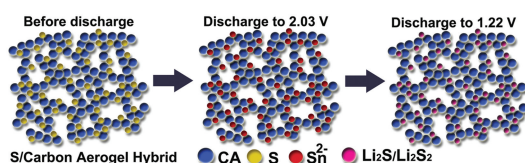


Supercapacitors

M. Kim, C. Lee, J. Jang*2489–2499

Fabrication of Highly Flexible, Scalable, and High-Performance Supercapacitors Using Polyaniline/Reduced Graphene Oxide Film with Enhanced Electrical Conductivity and Crystallinity

3D carbon aerogel (CA) materials with abundant micropores and mesopores are utilized as an immobilizer host for sulfur impregnation to eliminate capacity-fading effects due to the loss of sulfur cathode as a result of polysulfide dissolution in lithium-sulfur cells. The 3D porous S/CA hybrids exhibit significantly improved reversible capacity, high-rate capability, and cycling performance as a cathode electrode for Li-S batteries.



Batteries

Z. Zhang, Z. Li, F. Hao, X. Wang, Q. Li, Y. X. Qi,* R. Fan, L. W. Yin* ...2500–2509

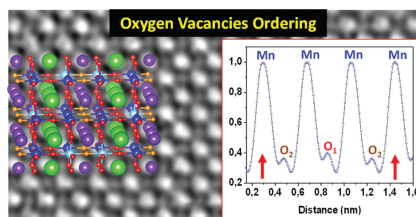
3D Interconnected Porous Carbon Aerogels as Sulfur Immobilizers for Sulfur Impregnation for Lithium-Sulfur Batteries with High Rate Capability and Cycling Stability

FULL PAPERS

Complex Oxides

D. Ávila-Brandé, G. King,
E. Urones-Garrote, Subakti, A. Llobet,
S. García-Martín* 2510–2517

Structural Determination and Imaging of Charge Ordering and Oxygen Vacancies of the Multifunctional Oxides $\text{REBaMn}_2\text{O}_{6-x}$ (RE = Gd, Tb)

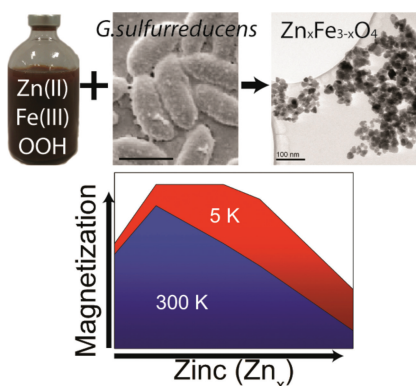


The knowledge of the features in complex oxides, such as location of oxygen vacancies or charge ordering at the unit cell level, is critical to understand the functional properties of these materials. These structural details are successfully investigated in A-site layered oxygen deficient perovskite materials based on the combination of highly advanced structural determination methods.

Magnetic Nanoparticles

J. M. Byrne,* V. S. Coker, E. Cespedes,
P. L. Wincott, D. J. Vaughan,
R. A. D. Patrick, G. van der Laan,
E. Arenholz, F. Tuna, M. Bencsik,
J. R. Lloyd, N. D. Telling 2518–2529

Biosynthesis of Zinc Substituted Magnetite Nanoparticles with Enhanced Magnetic Properties

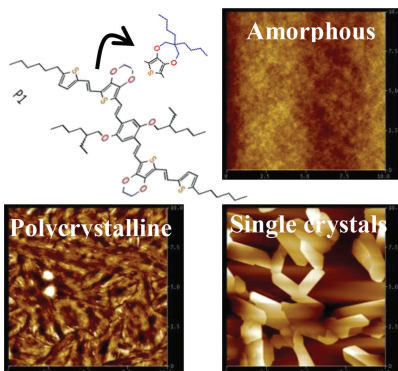


A range of zinc doped magnetite nanoparticles are produced through the reduction of zinc–iron oxyhydroxide precursors by the bacterium *Geobacter sulfurreducens*. These materials exhibit significant increases in saturation magnetization at low zinc concentrations in comparison to stoichiometric magnetite. The enhanced magnetic properties are tested as potential MRI contrast agents and show significant MRI contrast enhancement over a commercially available agent.

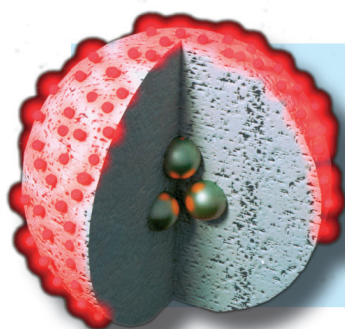
Organic Electronics

P. Kumar, K. N. Shivananda,
W. Zajączkowski, W. Pisula, Y. Eichen,*
N. Tessler* 2530–2536

The Relation Between Molecular Packing or Morphology and Chemical Structure or Processing Conditions: the Effect on Electronic Properties



A small molecular change using “Click” in units or a different processing procedure can change the molecular packing which in turn affects the morphology and hence the electronic properties. Using these two knobs, it is possible to obtain amorphous film to single crystal devices and thus tune the device properties. It is found that reliable comparison of different chemistries can be done only within the stable processing window of each.



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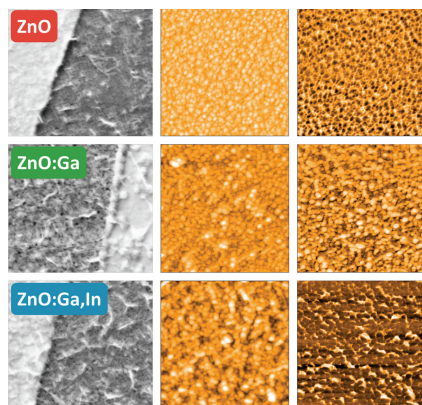
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FULL PAPERS

The performance of ZnO-based field-effect transistors is improved by a simple solution-doping procedure using ions of the 13th group. The method has a strong influence on the film morphology and orientation of the crystallites. This leads to field effect mobility values comparable to amorphous silicon. The low conversion temperature allows the fabrication on flexible substrates.

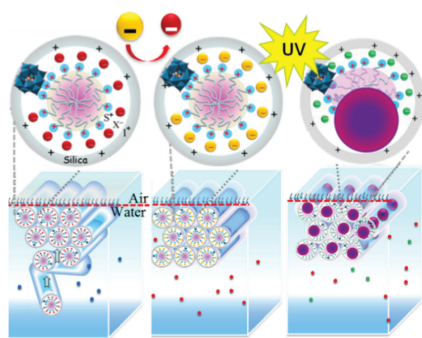


Flexible Electronics

D. Weber*, S. Botnaraş*, D. V. Pham, A. Merkurov, J. Steiger, R. Schmechel, L. De Cola.....2537–2543

A Facile Solution-Doping Method to Improve a Low-Temperature Zinc Oxide Precursor: Towards Low-Cost Electronics on Plastic Foil

Densely arrayed metallic nanoparticles are fabricated via self-assembly of a mesostructured polyoxometalate-silicate-surfactant (PSS) template at the air-water interface (left), followed by adsorption of metallic precursors to the PSS film via anion exchange (middle), then finished by polyoxometalate (POM)-site-directed photoreduction of the metallic anions and formation of metallic NPs inside the silicate-surfactant channels upon UV irradiation (right).

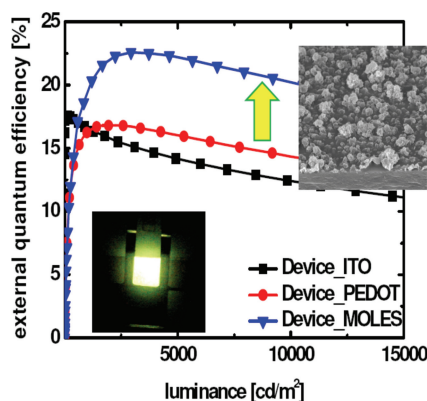


Nanoparticles

Y.-H. Lai*, S.-W. Chen, M. Hayashi, Y.-J. Shiu, C.-C. Huang, W.-T. Chuang, C.-J. Su, H.-C. Jeng, J.-W. Chang, Y.-C. Lee, A.-C. Su, C.-Y. Mou, U.-S. Jeng*2544–2552

Mesostructured Arrays of Nanometer-spaced Gold Nanoparticles for Ultrahigh Number Density of SERS Hot Spots

Conventional planar OLEDs suffer from poor light extraction due to the total internal reflection at internal interfaces. In this paper, a high-performance internal light outcoupling system for white OLEDs with spontaneously formed metal oxide nanostructures is developed. In addition to the huge improvement of light extraction, the novel nanostructures lead to excellent color stability over broad viewing angles.



OLEDs

Y. H. Kim*, J. Lee, W. M. Kim, C. Fuchs, S. Hofmann, H.-W. Chang, M. C. Gather, L. Müller-Meskamp, K. Leo* ... 2553–2559

We Want Our Photons Back: Simple Nanostructures for White Organic Light-Emitting Diode Outcoupling