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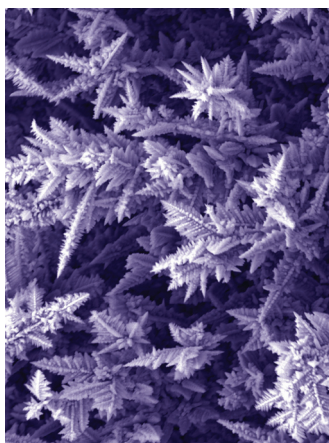


Sensors

On page 2723, Albertus P. H. J. Schenning, Cees W. M. Bastiaansen, and co-workers report the fabrication of a printable, optical, irreversible temperature sensor (e.g., a time-temperature integrator) by mechanical embossing of a chiral nematic polymer network, which yields a green colored film. A permanent color shift to orange is observed at temperatures above the glass transition temperature of the embossed film. Cover design by ICMS Animation Studio TU/e.

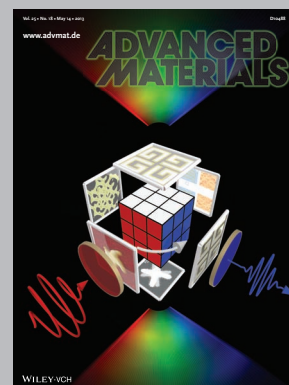
Field-Effect Transistors

As reported by Ming-Qiang Zhu, Guozhen Shen, and co-workers on page 2681, single crystalline p-type Zn_3As_2 nanowires (NWs) are grown via a simple thermal evaporation process. Single and large-scale ordered Zn_3As_2 NW array field-effect transistors (FETs) on rigid SiO_2/Si substrates and photodetectors on both rigid and flexible polyethylene terephthalate (PET) substrates are studied. They exhibit high performance, revealing that the p-type Zn_3As_2 NWs have important applications in future electronic and optoelectronic devices.



Metallic-Glass Nanostructures

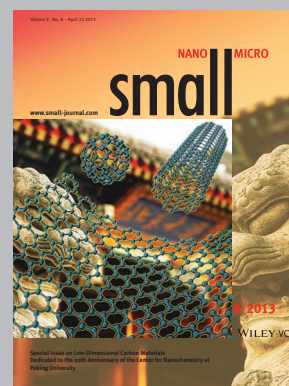
Palladium-rich nanostructures with widely different morphologies are obtained by electrochemical processing of a nickel-palladium metallic glass. Metallic glasses are multicomponent alloys that exist in a wide range of chemical compositions and have a fully amorphous structure. On page 2708, Sundeep Mukherjee and co-workers report that starting with a homogeneous and isotropic amorphous surface, the morphology and chemistry can be modified to obtain hierarchical nanostructures with high catalytic activity.



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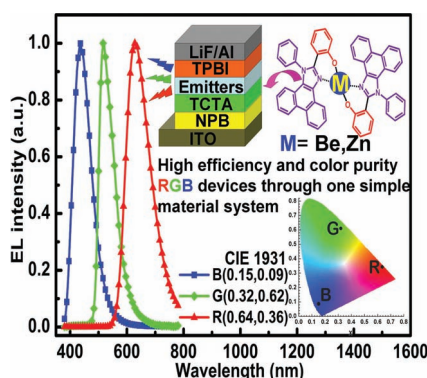
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FULL PAPERS

Electro-Optical Materials

K. Wang, F. C. Zhao, C. G. Wang,
S. Y. Chen, D. Chen, H. Y. Zhang, Y. Liu,
D. G. Ma,* Y. Wang*2672–2680

High-Performance Red, Green, and Blue Electroluminescent Devices Based on Blue Emitters with Small Singlet–Triplet Splitting and Ambipolar Transport Property

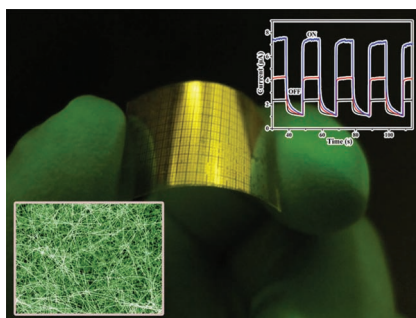


Two coordination complexes with deep blue emission, small singlet–triplet splitting, and ambipolar transport properties are designed and synthesized. Efficient electroluminescent devices with the three primary colors are achieved by employing the complexes as an undoped deep-blue emitter in organic light-emitting devices (OLEDs) and as a host in red and green phosphorescent OLEDs.

Field-Effect Transistors

G. Chen, Z. Liu, B. Liang, G. Yu, Z. Xie,
H. Huang, B. Liu, X. F. Wang, D. Chen,
M.-Q. Zhu,* G. Z. Shen*2681–2690

Single-Crystalline p-Type Zn_3As_2 Nanowires for Field-Effect Transistors and Visible-Light Photodetectors on Rigid and Flexible Substrates

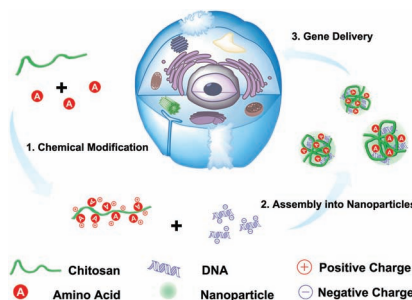


Single-crystalline p-type Zn_3As_2 nanowires are successfully synthesized and used as building blocks for high-performance field-effect transistors and photodetectors. By using a contact printing process, highly aligned nanowire arrays are produced to fabricate thin-film transistors and photodetectors on both rigid and flexible substrates.

Drug Delivery

J. Chang, X. H. Xu, H. P. Li,
Y. T. Jian, G. Wang, B. He,*
Z. W. Gu*2691–2699

Components Simulation of Viral Envelope via Amino Acid Modified Chitosans for Efficient Nucleic Acid Delivery: In Vitro and In Vivo Study

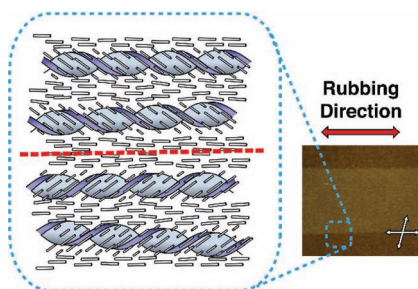


Alkaline amino acids of arginine-, histidine-, and lysine-modified chitosans (AAA-CSs) are designed for use as non-viral gene vectors and synthesized to simulate the components of viral envelopes. The DNA condensation capacity and intracellular tracking of the AAA-CSs are investigated. Arginine-modified chitosan exhibits the best cellular internalization and gene-transfection efficiency both in vitro and in vivo.

Liquid Crystals

F. Araoka,* G. Sugiyama, K. Ishikawa,
H. Takezoe2701–2707

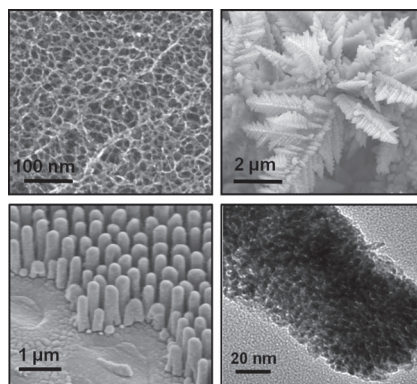
Highly Ordered Helical Nanofilament Assembly Aligned by a Nematic Director Field



Successful alignment control of the B4 helical nanofilament assembly in a binary mixture system of bent-shaped and rod-shaped liquid crystals is presented. The aligned nanofilament domains appear as extremely smooth and uniform stripes over millimeters. Second-harmonic generation (SHG) studies including a new technique, interferometric SHG microscopy, reveal that in these aligned domains, polarity from the nucleus and chirality are preserved.

FULL PAPERS

Metallic-glasses are promising for electrocatalytic applications due to their favorable chemistry and unique abilities for thermoplastic manipulation down to the nanometer length-scale. Combination of electrochemical processing and thermoplastic nanofabrication of metallic glasses serves as a versatile toolbox for fabricating hierarchical metallic nanostructures with large surface area and tunable morphology.

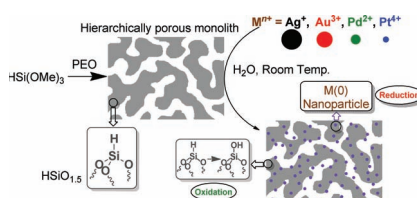


Catalysis

S. Mukherjee,* R. C. Sekol, M. Carmo, E. I. Altman, A. D. Taylor, J. Schroers2708–2713

Tunable Hierarchical Metallic-Glass Nanostructures

Surface-active hierarchically porous monoliths consisting of hydrogen silsesquioxane (HSiO_{1.5}) are prepared via sol-gel accompanied by phase separation. The on-site reduction of aqueous noble metal salts results in the formation and embedding of metal nanoparticles throughout the monoliths. Both the bare monolith and nanoparticle-embedded monolith are promising as reusable and recyclable heterogeneous catalysts.

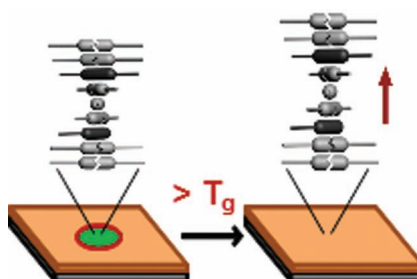


Porous Materials

N. Moitra, K. Kanamori,* T. Shimada, K. Takeda, Y. H. Ikuhara, X. Gao, K. Nakanishi*2714–2722

Synthesis of Hierarchically Porous Hydrogen Silsesquioxane Monoliths and Embedding of Metal Nanoparticles by On-Site Reduction

An optical, irreversible temperature sensor is fabricated based on a chiral-nematic polymer network that has an orange reflection color. After mechanical embossing of the polymer film a temporary shift to a green color is achieved, which shifts back to the original color above a certain threshold temperature. This sensor can be printed on a foil, thus displaying its potential application as a battery-free time-temperature integrator in food and pharmaceutical products.



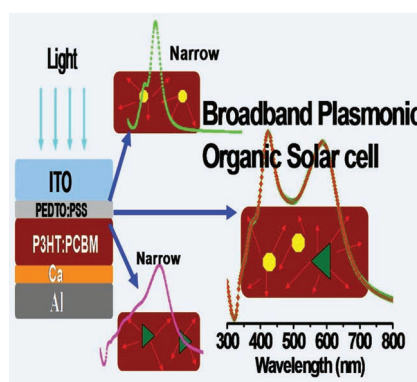
Sensors

D. J. D. Davies, A. R. Vaccaro, S. M. Morris, N. Herzer, A. P. H. J. Schenning,* C. W. M. Bastiaansen*2723–2727

A Printable Optical Time-Temperature Integrator Based on Shape Memory in a Chiral Nematic Polymer Network



A broadband absorption of organic solar cells (OSCs) is realized by combining differently shaped nanomaterials exhibiting varied localized plasmonic resonances and scattering regions into the active layer. As a result, power conversion efficiency is enhanced by 19.44% compared to pre-optimized control OSCs. With respect to the origin of this enhancement, theoretical and experimental studies show that the broadband resonance is achieved by the simultaneous excitation of versatile plasmonic resonances, i.e., material-, shape-, size-, and polarization-dependent low- and high-order plasmonic resonances.



Organic Solar Cells

X. H. Li, W. C. H. Choy,* H. F. Lu, W. E. I. Sha, A. H. P. Ho2728–2735

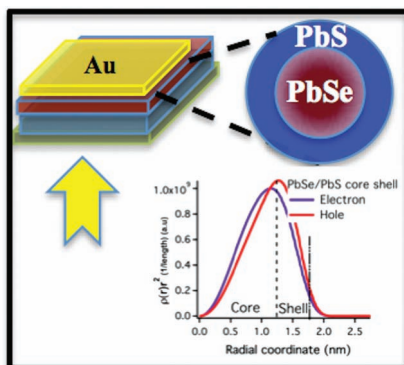
Efficiency Enhancement of Organic Solar Cells by Using Shape-Dependent Broadband Plasmonic Absorption in Metallic Nanoparticles

FULL PAPER

Solar Cells

L. Etgar,* D. Yanover, R. K. Čapek,
R. Vaxenburg, Z. Xue, B. Liu,
M. K. Nazeeruddin, E. Lifshitz,
M. Grätzel.....2736–2741

Core/Shell PbSe/PbS QDs TiO₂ Heterojunction Solar Cell

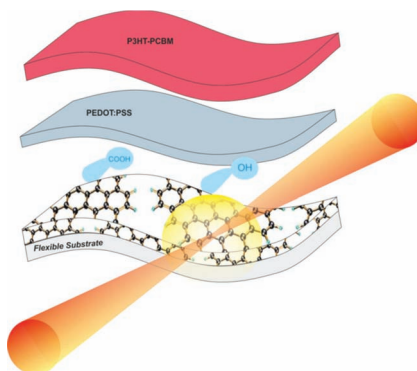


PbSe core and PbSe/PbS core/shell quantum dots (QDs) are employed in a QD/TiO₂ heterojunction solar cell. Theoretical calculations show that the wave functions of the electrons and holes are extended to both materials, which contributes to the better photovoltaic performance of the PbSe/PbS core/shell compared to the PbSe core. The PbSe/PbS core/shell heterojunction solar cell produces a power conversion efficiency of 3.93%.

Organic Solar Cells

E. Kymakis,* K. Savva,
M. M. Stylianakis, C. Fotakis,
E. Stratakis*.....2742–2749

Flexible Organic Photovoltaic Cells with In Situ Nonthermal Photoreduction of Spin-Coated Graphene Oxide Electrodes



A methodology for controlled in situ reduction of spin-cast graphene oxide nanometric films on flexible substrates and the subsequent realization of highly conductive and transparent electrodes for flexible organic photovoltaic devices is presented. The technique is compatible with temperature-sensitive substrates in the sense that it achieves reduction of films on flexible substrates in a single step.

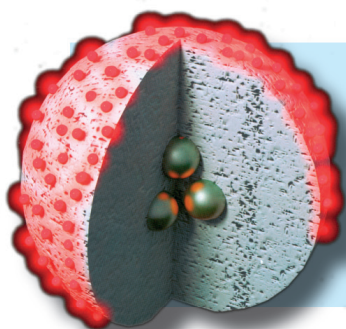
Organic Light-Emitting Diodes

J.-H. Jou,* C.-Y. Hsieh, J.-R. Tseng,
S.-H. Peng, Y.-C. Jou, J. H. Hong,
S.-M. Shen, M.-C. Tang, P.-C. Chen,
C.-H. Lin2750–2757

Candle Light-Style Organic Light- Emitting Diodes



A sensationally warm but physically cold candle-light-style emission driven by electricity is developed in lieu of hydrocarbon-burning in the energy-inefficient, greenhouse gas releasing candles invented 5000 years ago. The dimmable and single-sided emitting nature of the developed candle-light-style organic light-emitting diode (OLED) provides a lighting atmosphere free from glare and obtrusion.



How to contact us:

Editorial Office:

Phone: (+49) 6201-606-286/531
Fax: (+49) 6201-606-500
Email: afm@wiley-vch.de

Reprints:

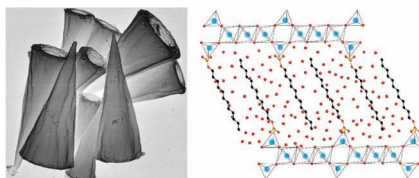
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FULL PAPERS

Three types of layered $\alpha\text{-Co}(\text{OH})_2$ nanocones with intercalated anions of dodecyl sulfate, benzoate, and nitrate, corresponding to interlayer spacings of 1.6, 0.7, and 0.09 nm, respectively, are prepared and used as model materials to investigate the effect of interlayer space on the electrochemical activity in the system of $\alpha\text{-Co}(\text{OH})_2$ nanocone-based pseudocapacitors.

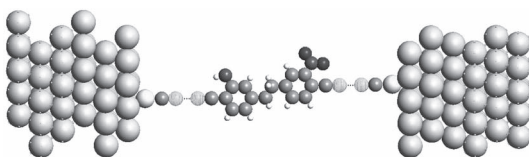


Supercapacitors

L. Wang, Z. H. Dong, Z. G. Wang, F. X. Zhang, J. Jin*2758–2764

Layered $\alpha\text{-Co}(\text{OH})_2$ Nanocones as Electrode Materials for Pseudocapacitors: Understanding the Effect of Interlayer Space on Electrochemical Activity

Tremendous improvement in rectifying performance is predicted by calculations for donor–acceptor molecular devices with odd numbers of carbon atom chains that act as spacers, to predicted values that are much higher than in all previous studies. A dramatic odd–even oscillation effect is also shown for the current rectification and negative differential resistance with increasing carbon-chain length.

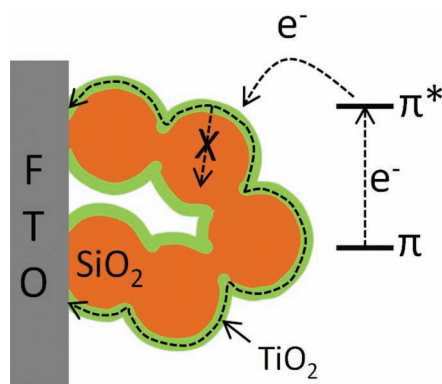


Device Calculations

Z. Zhang,* C. Guo, D. J. Kwong, J. Li, X. Deng, Z. Fan2765–2774

A Dramatic Odd–Even Oscillating Behavior for the Current Rectification and Negative Differential Resistance in Carbon-Chain-Modified Donor–Acceptor Molecular Devices

Different thicknesses of TiO_2 are deposited by atomic layer deposition on SiO_2 mesoporous templates and a critical thickness for the efficient collection of the photogenerated charge carriers in dye-sensitized solar cells is identified. An alternative photoanode with one order of magnitude higher transport rate compared to the conventional nanoparticle titanium dioxide mesoporous films is presented.



Solar Cells

A. K. Chandiran, P. Comte, R. Humphry-Baker, F. Kessler, C. Yi, Md. K. Nazeeruddin,* M. Grätzel*2775–2781

Evaluating the Critical Thickness of TiO_2 Layer on Insulating Mesoporous Templates for Efficient Current Collection in Dye-Sensitized Solar Cells