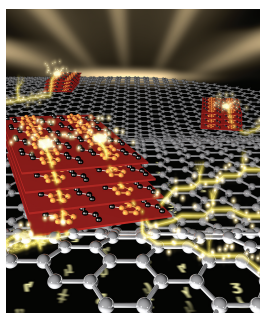


ADVANCED FUNCTIONAL MATERIALS

www.afm-journal.de

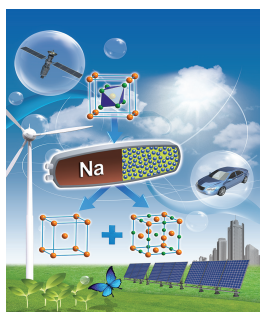


Graphene

The crystallinity and the electrical properties of thin films of the semiconducting polymer poly-3-hexylthiophene are investigated on a single layer of graphene by D. R. Barbero and team on page 664. Enhanced vertical charge transport and a much higher charge carrier mobility are measured in thicker films due to the face-on orientation induced by the graphene substrate and the formation of an interconnected path of crystallites.

Microfluidics

Liquid metals composed of gallium stay within networks of microfluidic channels due to the presence of a thin surface oxide that forms spontaneously on the surface of the metal. On page 671 M. R. Khan, C. Trlica, and M. D. Dickey use “recapillarity” to reduce the surface oxide and thereby turn on capillary behavior locally in a manner that withdraws the metal from the channels and solves the maze.

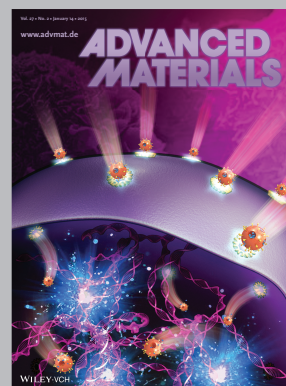
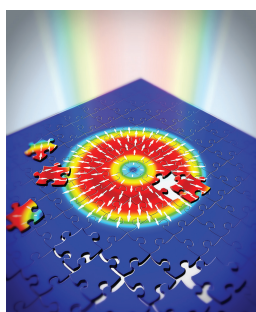


Sodium-Ion Batteries

The major challenge in advanced sodium-ion batteries (SIBs) is to find appropriate electrode materials with high capacity and good reversibility. On page 696 X.-Q. Yang, F. Cosandey, K.-W. Nam, and colleagues report a $\text{FeO}_{0.7}\text{F}_{1.3}/\text{C}$ nanocomposite as a new cathode material for SIBs, which shows a high reversible capacity and excellent cycling stability, enabled by the mechanism of both Na-intercalation and Na-conversion reactions.

Metasurfaces

The generation of a radially polarized beam based on the plasmonic metasurfaces enables to simultaneously manipulate the polarization and phase of the transmitted light. On page 704 S. Chen, J. Tian, and co-workers demonstrate that the proposed multifunctional plasmonic metasurfaces can generate broadband near-perfect anomalous refraction with high efficiency and an arbitrary optical field with complex and non-regularly spatial distribution in phase and polarization.



Advanced Materials has been bringing you the best in materials research for over twenty-five years.

With its increased ISI Impact Factor of 15.409, *Advanced Materials* is one of the most influential journals in the field. Publishing every week, *Advanced Materials* now brings you even more of the latest results at the cutting edge of materials science.

www.advmat.de



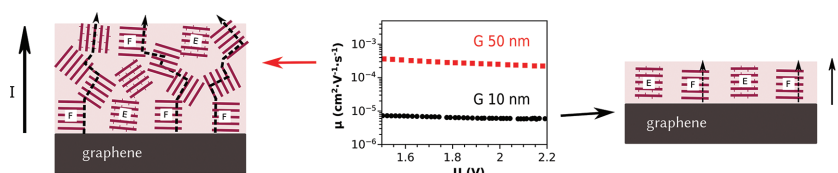
Small is the very best interdisciplinary forum for all experimental and theoretical aspects of fundamental and applied research at the micro and nano length scales.

With an ISI impact Factor of 7.514 and publishing every week in 2015 with papers online in advance of print, *Small* is your first-choice venue for top-quality communications, detailed full papers, cutting-edge concepts, and in-depth reviews of all things micro and nano.

www.small-journal.com

FULL PAPERS

The crystallinity and the electrical properties of thin films of the semiconducting polymer poly-3-hexylthiophene are investigated on a single layer of graphene. Enhanced vertical charge transport and a much higher charge carrier mobility are measured in thicker films due to the face-on orientation induced by the graphene substrate and the formation of an interconnected path of crystallites.

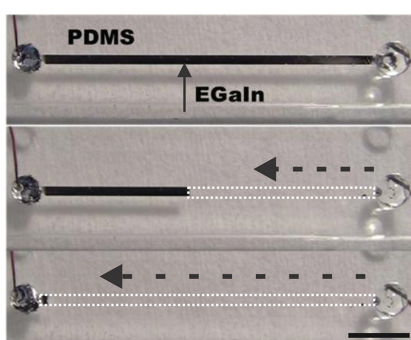


Graphene

V. Skrypnichuk, N. Boulanger, V. Yu, M. Hilke, S. C. B. Mannsfeld, M. F. Toney, D. R. Barbero*664–670

Enhanced Vertical Charge Transport in a Semiconducting P3HT Thin Film on Single Layer Graphene

The mechanistic details of a method to control the withdrawal of a liquid metal alloy, eutectic gallium indium (EGaIn), from microfluidic channels, are described. Recapillarity is a technique to repeatedly toggle on and off the capillary behavior of a liquid metal by electrochemically reducing its surface oxide. It can control the shape of liquid metal in microchannels for reconfigurable circuits.



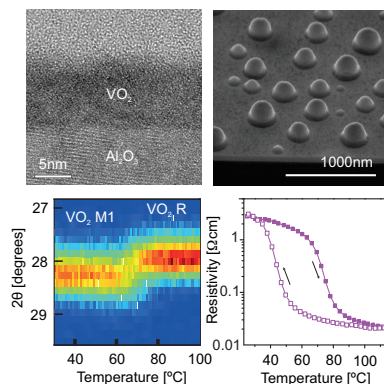
Microfluidics

M. R. Khan, C. Trlica, M. D. Dickey*671–678

Recapillarity: Electrochemically Controlled Capillary Withdrawal of a Liquid Metal Alloy from Microchannels



It is shown how nanoscale morphology of VO₂ films can be controlled to realize smooth ultrathin (<10 nm) crystalline films or nanoparticles with atomic layer deposition, opening doors to practical VO₂ metal-insulator transition (MIT) nanoelectronics. The films and particles possess both a structural and an electronic transition. Film resistivity changes by more than two orders of magnitude across the MIT.

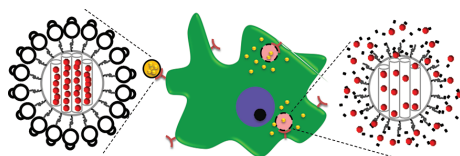


Nanostructures

A. P. Peter, K. Martens,* G. Rampelberg, M. Toeller, J. M. Ablett, J. Meersschaet, D. Cuypers, A. Franquet, C. Detavernier, J.-P. Rueff, M. Schaekers, S. V. Elshocht, M. Jurczak, C. Adelman, I. P. Radu679–686

Metal-Insulator Transition in ALD VO₂ Ultrathin Films and Nanoparticles: Morphological Control

A new CXCR4-targeted delivery system using mesoporous silica nanoparticles capped with the circular peptide T22 analogue is reported. In this design, the peptide guides nanoparticles to B-NHL cells and facilitates their uptake via the CXCR4 receptor. Once there, nanoparticles are opened by endosomal proteolytic enzymes releasing doxorubicin. This synthetic strategy could inspire other improved gated delivery systems for specific diseases.



Cancer Therapy

C. de la Torre, I. Casanova, G. Acosta, C. Coll, M. J. Moreno, F. Albericio, E. Aznar, R. Mangués,* M. Royo,* F. Sancenón, R. Martínez-Mañez*687–695

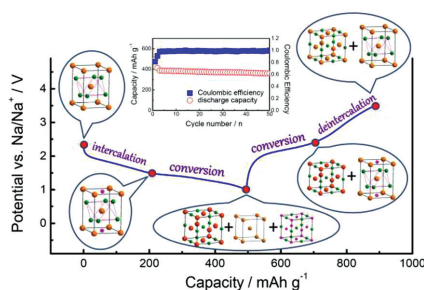
Gated Mesoporous Silica Nanoparticles Using a Double-Role Circular Peptide for the Controlled and Target-Preferential Release of Doxorubicin in CXCR4-Expressing Lymphoma Cells

FULL PAPERS

Sodium-Ion Batteries

Y.-N. Zhou, M. Sina, N. Pereira,
X. Yu, G. G. Amatucci, X.-Q. Yang,*
F. Cosandey,* K.-W. Nam*..... 696–703

FeO_{0.7}F_{1.3}/C Nanocomposite as a High-Capacity Cathode Material for Sodium-Ion Batteries

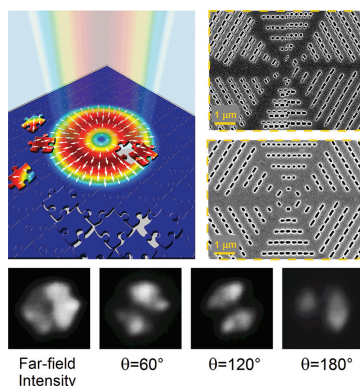


A high-capacity cathode for a sodium battery is presented. FeO_{0.7}F_{1.3}/C nanocomposite exhibits a high initial discharge capacity of 496 mAh g⁻¹ in a sodium cell at 50 °C. A reversible capacity of 360 mAh g⁻¹ is retained at the 50th cycle, demonstrating superior cycleability. Both intercalation and conversion reactions are revealed during the discharge–charge process of the FeO_{0.7}F_{1.3}/C – Na cell.

Metasurfaces

J. Li, S. Chen,* H. Yang, J. Li, P. Yu,
H. Cheng, C. Gu, H.-T. Chen,
J. Tian*..... 704–710

Simultaneous Control of Light Polarization and Phase Distributions Using Plasmonic Metasurfaces

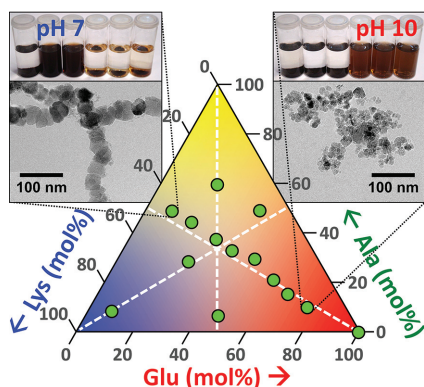


A radially polarized beam is generated based on proposed plasmonic metasurfaces that allow simultaneous manipulation of the polarization and phase of the transmitted light. Arbitrary spatial field distribution of the optical phase and polarization direction are obtained by accordingly designed plasmonic metasurfaces. The multifunctional metasurfaces are also validated by demonstrating a broadband near-perfect anomalous refraction with controllable linear polarization.

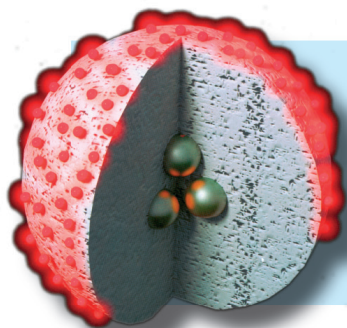
Biomimetics

J. J. M. Lenders, H. R. Zope,
A. Yamagishi, P. H. H. Bomans,
A. Arakaki, A. Kros, G. de With,
N. A. J. M. Sommerdijk*..... 711–719

Bioinspired Magnetite Crystallization Directed by Random Copolypeptides



A bioinspired slow precursor-based magnetite coprecipitation method is combined with the use of designer copolypeptides to control the size and the magnetic properties of the resulting nanocrystals as well as their dispersibility and organization in aqueous medium. Colloidally stable superparamagnetic and ferrimagnetic dispersions can both be obtained by this green one-pot synthesis through optimization of the amino acid composition.



How to contact us:

Editorial Office:

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

Reprints:

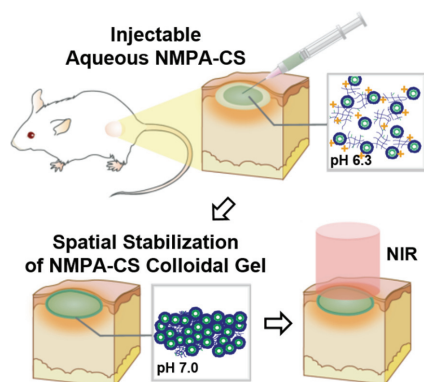
cherth@wiley-vch.de

Copyright Permission:

Fax: (+49) 6201-606-332
Email: rights@wiley-vch.de

FULL PAPERS

An injected polymer solution exhibits a rapid nanostructure transformation over a narrow range of pH values and forms a colloidal gel at the site of the abscess, providing tunable spatial stabilization. The formed colloidal gel converts near-infrared (NIR) light energy into heat and causes thermal lysis of the bacteria, reducing thermal damage to the surrounding tissues.

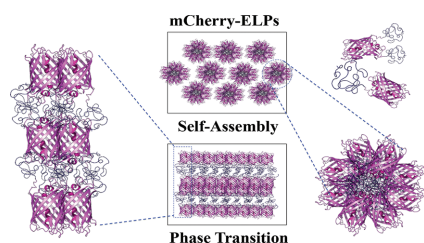


Photothermal Agents

C.-W. Hsiao, H.-L. Chen, Z.-X. Liao, R. Sureshbabu, H.-C. Hsiao, S.-J. Lin, Y. Chang,* H.-W. Sung* 721–728

Effective Photothermal Killing of Pathogenic Bacteria by Using Spatially Tunable Colloidal Gels with Nano-Localized Heating Sources

Self-assembly of fusion proteins containing a folded globular protein into solid nanomaterials is demonstrated for the first time. Using model molecules containing ELP and mCherry, the ability to tune nanostructure is demonstrated through control over the fusion topology. As fully biosynthetic analogues to protein-polymer conjugates, the mCherry-ELP fusions provide an efficient route to introduce complex biological functionality into supramolecular assemblies.

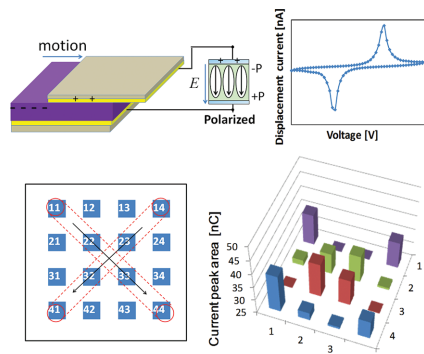


Self-Assembly

G. Qin, M. J. Glassman, C. N. Lam, D. Chang, E. Schaible, A. Hexemer, B. D. Olsen* 729–738

Topological Effects on Globular Protein-ELP Fusion Block Copolymer Self-Assembly

The output voltage produced by the contact-electrification during motion can polarize the dipole moments in the ferroelectric thin film. This mechanism can be used to design a novel self-powered memory system for recording the mechanical displacements in both 1D and 2D regions. The study shows that this memory system has good resolution, high sensitivity, and many possible applications.

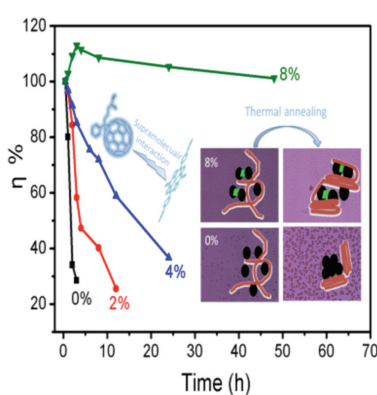


Memory Devices

X. Chen, M. Iwamoto, Z. Shi, L. Zhang, Z. L. Wang* 739–747

Self-Powered Trace Memorization by Conjunction of Contact-Electrification and Ferroelectricity

An effective strategy involving the introduction of porphyrin and the formation of the supramolecular interactions between porphyrin and PC₆₁BM is proposed to prevent PC₆₁BM from thermal-driven aggregation. The device based on the P3HT:PC₆₁BM:BL blend film shows enhanced morphological stability, good ability to maintain the electron mobility, and most importantly, excellent thermal stability (10.5% of power conversion efficiency decreases at 130 °C for 48 h).



Solar Cells

S. Wang, Y. Qu, S. Li, F. Ye, Z. Chen,* X. Yang* 748–757

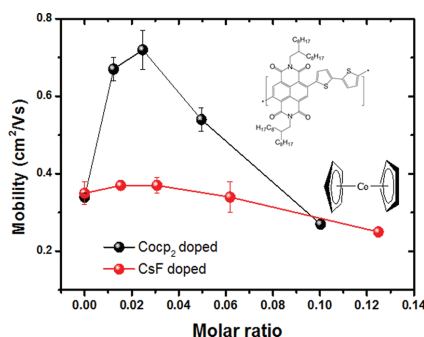
Improved Thermal Stability of Polymer Solar Cells by Incorporating Porphyrins

FULL PAPERS

Organic Electronics

C. Liu, J. Jang, Y. Xu, H.-J. Kim,
D. Khim, W.-T. Park, Y.-Y. Noh,*
J.-J. Kim* 758–767

Effect of Doping Concentration on Microstructure of Conjugated Polymers and Characteristics in N-Type Polymer Field-Effect Transistors

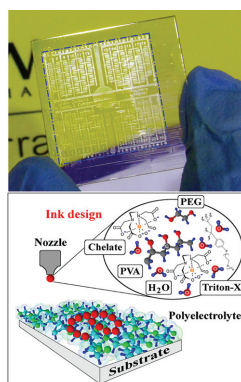


Performance and air stability is highly improved in n-type organic field-effect transistors by solution-based chemical doping. The doping effects are systematically investigated the relationship between doping concentration and electrical characteristics as well as the evolution in polymer crystallinity revealed by synchrotron X-ray diffractions.

Printed Electronics

R. Cobas,* S. Muñoz-Pérez,
S. Cadogan, M. C. Ridgway,
X. Obradors 768–775

Surface Charge Reversal Method for High-Resolution Inkjet Printing of Functional Water-Based Inks

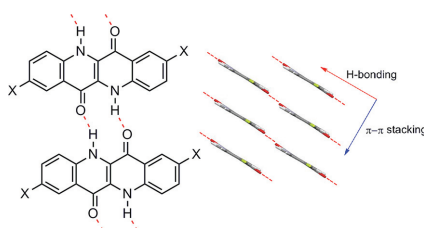


Surface charge reversal method for high-resolution inkjet printing of functional water-based inks is revealed. The proposed approach modifies the surface energy of hydrophobic substrates by coating with a polyelectrolyte layer in order to overcome dewetting effects as well as to improve adhesion and printing resolution. A suitable metal complex ink is formulated, which can be processed via inkjet printing.

Organic Semiconductors

E. D. Głowacki,* G. Romanazzi,
C. Yumusak, H. Coskun, U. Monkowius,
G. Voss, M. Burian, R. T. Lechner,
N. Demitri, G. J. Redhammer, N. Sünger,
G. P. Suranna, S. Sariciftci 776–787

Epindolidiones—Versatile and Stable Hydrogen-Bonded Pigments for Organic Field-Effect Transistors and Light-Emitting Diodes

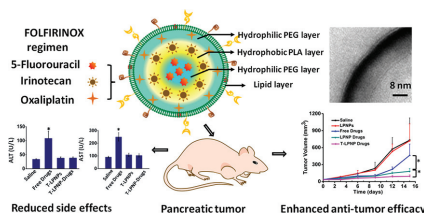


Epindolidiones are H-bonded organic pigment semiconductors with excellent operational stability, including in aqueous media. Their crystal structure, electrochemical properties, and photophysics, which are dominated by excimeric effects, are reported. Transistor and light-emitting devices are demonstrated. Routes for solution processing of epindolidiones using transient solubilizing groups are explored.

Combination Therapy

F. Li, X. Zhao, H. Wang, R. Zhao,
T. Ji, H. Ren, G. J. Anderson, G. Nie,*
J. Hao* 788–798

Multiple Layer-by-Layer Lipid-Polymer Hybrid Nanoparticles for Improved FOLFIRINOX Chemotherapy in Pancreatic Tumor Models



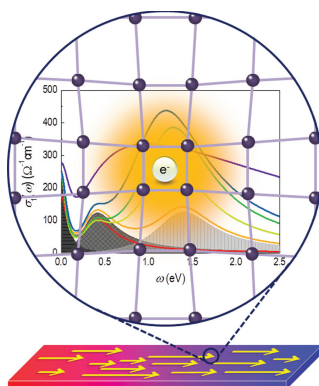
Novel multiple layer-by-layer lipid-polymer hybrid nanoparticles with targeting capability are used to encapsulate the three active antitumor constituents of the FOLFIRINOX regimen in the chemotherapy of pancreatic cancer. Relative to nanoparticles consisting of polymer alone, these novel nanocarriers have a long half-life in vivo and a higher stability in serum. These innovative drug-loaded nanoparticles achieve higher antitumor efficacy and show minimal side effects compared with the FOLFIRINOX regimen alone.

FULL PAPERS

Thermoelectrics

W. S. Choi,* H. K. Yoo,
H. Ohta799–804

Polaron Transport and Thermoelectric Behavior in La-Doped SrTiO₃ Thin Films with Elemental Vacancies

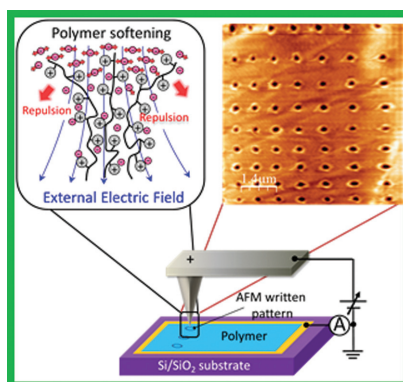


Understanding the polaron transport provides a novel route to controlling the thermoelectric properties in complex transition metal oxides. The electron–phonon coupling strength in the perovskite oxide thin films is tuned by the systematic change of the elemental vacancy concentration, which modulates the thermopower as well as the dc conductivity. This study also demonstrates the usefulness of optical spectroscopy in understanding the thermoelectric behavior.

Nanofabrication

V. Bocharova,* A. L. Agapov, A. Tselev,
L. Collins, R. Kumar, S. Berdzinski,
V. Strehmel, A. Kisliuk, I. I. Kravchenko,
B. G. Sumpter, A. P. Sokolov,
S. V. Kalinin, E. Strelcov805–811

Controlled Nanopatterning of a Polymerized Ionic Liquid in a Strong Electric Field

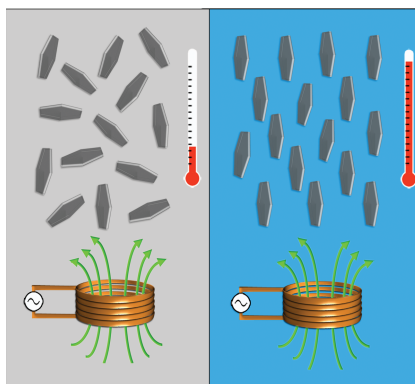


The current work represents an important step in a search for novel materials and experimental techniques that would allow for controllable and inexpensive methods of surface patterning with nanoscale resolution. The novelty of the presented nanopatterning approach lies in a combination of a new ion-containing material, a polymerized ionic liquid, and a strong localized electric field.

Magnetic Nanoparticles

Y. Yang, X. Liu, Y. Lv, T. S. Heng,
X. Xu, W. Xia, T. Zhang, J. Fang,
W. Xiao, J. Ding*812–820

Orientation Mediated Enhancement on Magnetic Hyperthermia of Fe₃O₄ Nanodisc



Highly uniform Fe₃O₄ nanodiscs are synthesized via a two-step chemical approach. Comparing with isotropic nanoparticles, the nanodisc exhibits much better hyperthermia performance. The good agreement between experimental result and micromagnetic simulation confirms that such enhancement on hyperthermia performance is attributed to the parallel alignment of the nanodisc with respect to the AC magnetic field.