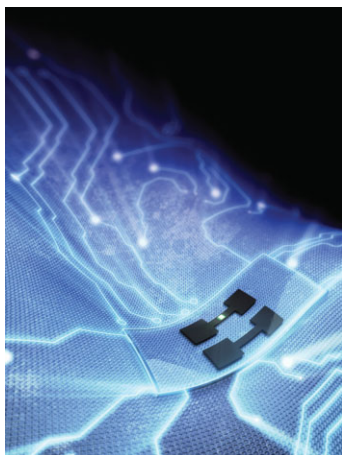


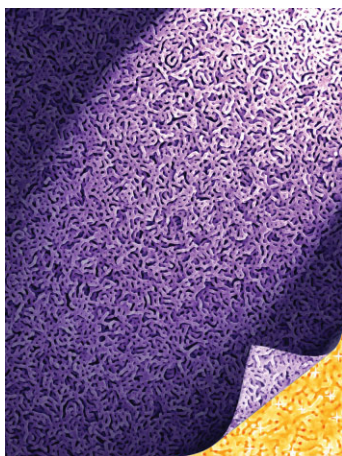
ADVANCED MATERIALS

www.advmat.de



Stretchable Batteries

The front cover illustrates an ultracompliant battery for powering stretchable electronic items useful in wearable and comfortable electronic items integrated into clothing or implants. The battery combines acrylic elastomers with functional gel electrodes and withstands stretch ratios up to 100%. Shown is a series connection of two batteries, sufficient for driving a green light-emitting diode. More details can be found in the article by Siegfried Bauer and co-workers on p. 2065. Image design by Georg Wiesner.

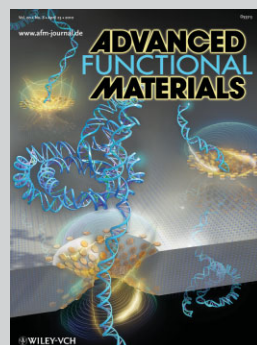
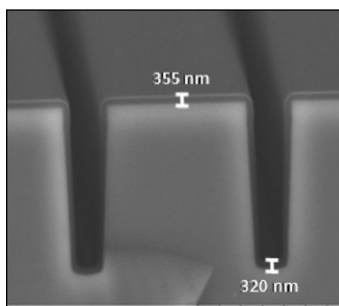


Nanoporous Metal Membranes

Nondestructive preparation of bicontinuous nanoporous metal membranes by replication of bicontinuous nanoporous polymeric membranes consisting of a recoverable asymmetric block copolymers (BCPs) is reported by Yong Wang, Martin Steinhart, and co-workers on p. 2068. The BCP membranes are generated by swelling the minority domains of the BCP with selective solvents accompanied by reconstruction of the glassy matrix formed by the majority component.

CVD Polymerization

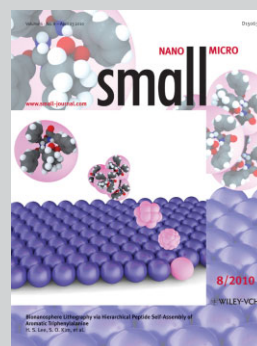
On p. 1993, Karen Gleason and coworkers review recent progress in using CVD as a method of polymerization. CVD polymerization bridges all-dry microfabrication technology with the chemistry of functional and responsive organic materials. In a single step, vapor-phase monomers can be transformed through selective reaction for surface modification of micro- and nanostructured surfaces. Relevant background, fundamental principles, and selected applications are reviewed.



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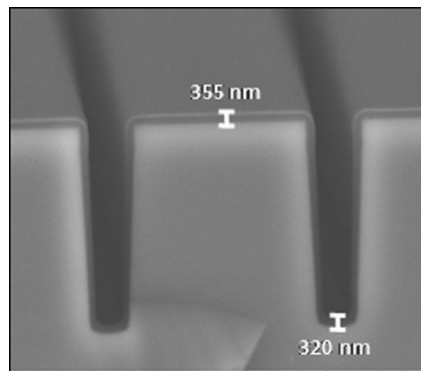
www.small-journal.com

REVIEW

Functional Coatings

M. E. Alf, A. Asatekin, M. C. Barr,
S. H. Baxamusa, H. Chelawat,
G. Ozaydin-Ince, C. D. Petruczok,
R. Sreenivasan, W. E. Tenhaeff,
N. J. Trujillo, S. Vaddiraju, J. Xu,
K. K. Gleason* 1993–2027

Chemical Vapor Deposition of Conformal, Functional, and Responsive Polymer Films



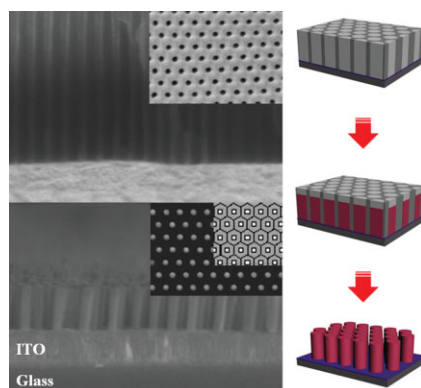
Chemical vapor deposition (CVD) polymerization bridges all-dry microfabrication technology with the chemistry of functional and responsive organic materials. In a single step, vapor-phase monomers can be transformed through selective reaction for surface modification of micro- and nanostructured surfaces. Shown is conformal CVD polymer deposition, ~350 nm thick, on trenches 7 μm deep and 2 μm wide etched on silicon.

COMMUNICATIONS

Nanorod Arrays

J. Byun, J. I. Lee, S. Kwon, G. Jeon,
J. K. Kim* 2028–2032

Highly Ordered Nanoporous Alumina on Conducting Substrates with Adhesion Enhanced by Surface Modification: Universal Templates for Ultrahigh-Density Arrays of Nanorods

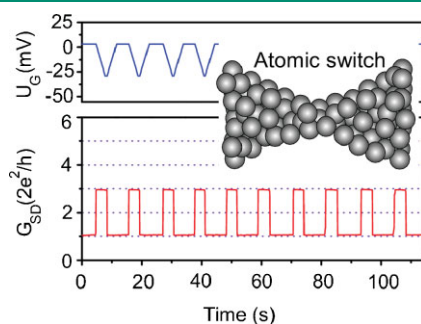


A highly ordered nanoporous anodized aluminum oxide template with excellent adhesion is fabricated on various conducting substrates by surface modification of the substrates. This template can be universally utilized to fabricate laterally long-range-ordered and hexagonally packed arrays of freestanding and vertically aligned metal, semiconductor, and conducting polymer nanorods on various substrates, including flexible substrates (see image).

Transistors

F.-Q. Xie, R. Maul, C. Obermair,
W. Wenzel,* G. Schön,
T. Schimmel* 2033–2036

Multilevel Atomic-Scale Transistors Based on Metallic Quantum Point Contacts

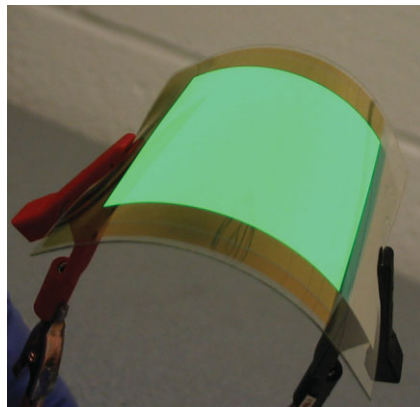


Multilevel logic and storage devices on the atomic scale are of great interest as they allow more efficient data storage and processing with a smaller number of logical gates. Here we demonstrate a multilevel atomic quantum transistor, allowing for the gate-controlled switching between different quantized conducting states providing a basis for the future development of novel ultra-small quantum-electronic devices.

Organic Light-Emitting Diodes

M. G. Helander,* Z. B. Wang,
M. T. Greiner, Z. W. Liu, J. Qiu,
Z. H. Lu* 2037–2040

Oxidized Gold Thin Films: An Effective Material for High-Performance Flexible Organic Optoelectronics

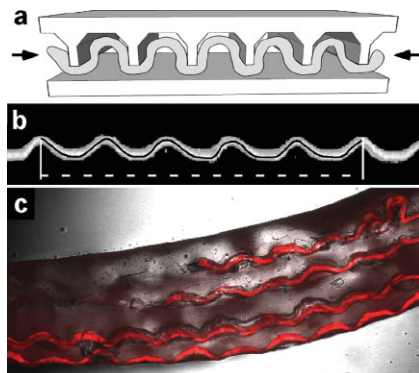


Oxidized Au thin film is shown to function as a direct drop-in replacement for the de facto standard indium tin oxide anode in high-performance flexible organic light-emitting diodes fabricated on plastic substrates (see image). The thin films offer a new materials-technology platform for enabling the roll-to-roll processing of next-generation flexible organic optoelectronics for applications such as solid-state lighting.

COMMUNICATIONS

A flexible membrane templating technique

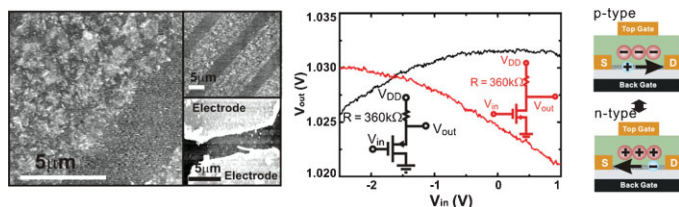
(a) is developed for the fabrication of microcrimped collagen microfibrils (b) that are embedded in an elastin-like protein matrix to generate hierarchical, biologically inspired fiber-reinforced composites (c). The microcrimped structure is stable under cyclic loading and the mechanical response of the engineered collagen-elastin composite mimics that of native tissue.

**Composites**

J. M. Caves, V. A. Kumar, W. Xu, N. Naik, M. G. Allen, E. L. Chaikof*2041–2044

Microcrimped Collagen Fiber-Elastin Composites

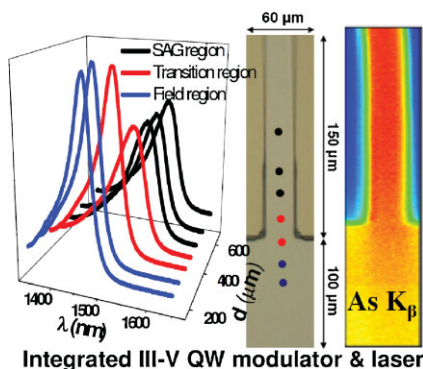
A directed-assembly method on the basis of graphene oxide (GO) pieces is developed, which allowed us to mass-produce a uniform array of graphene-based ambipolar memory devices using only conventional microfabrication facilities. Significantly, we successfully demonstrated that this device can be operated as both conventional *conductivity-switching memory* and new *type-switching memory* by adjusting the charge density on the nanoparticles.

**Graphene**

S. Myung, J. Park, H. Lee, K. S. Kim,* S. Hong*.....2045–2049

Ambipolar Memory Devices Based on Reduced Graphene Oxide and Nanoparticles

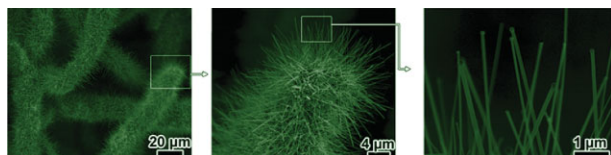
Advanced optoelectronic devices require monolithic integration of different functions at chip level. This is the case of multi-quantum well (MQW) electro-absorption modulated lasers (EMLs) realized by using the selective area growth (SAG) technique, and which can be employed in long-distance, high-frequency optical fiber communication applications. We demonstrate that a micrometer-resolved X-ray beam available at third-generation synchrotron radiation sources allows direct measurement of determinant structural parameters of MQW EML structures.

**Lasers**

L. Mino, D. Gianolio, G. Agostini, A. Piovano, M. Truccato, A. Agostino, S. Cagliero, G. Martinez-Criado, S. Codato, C. Lamberti*2050–2054

Structural Characterization of Multi-Quantum Wells in Electroabsorption-Modulated Lasers by using Synchrotron Radiation Micrometer-Beams

B₄C-nanowire/carbon-microfiber hybrid structures are synthesized using cotton T-shirts as both the template and carbon source. The B₄C nanowires exhibit a high elastic modulus of 428.1 ± 9.3 GPa and elastic recovery after multiple high-strain bending cycles without brittle failure or obvious residual deformation for the strain up to 45%. The hybrid structures can block 99.8% UV irradiation and achieve a superior reinforcing effect in epoxy composites.

**Nanocomposites**

X. Y. Tao, L. X. Dong, X. N. Wang, W. K. Zhang, B. J. Nelson, X. D. Li*2055–2059

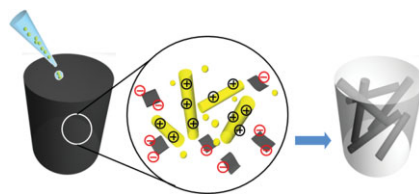
B₄C-Nanowires/Carbon-Microfiber Hybrid Structures and Composites from Cotton T-shirts

COMMUNICATIONS

Core/Shell Nanowires

T. H. Han, W. J. Lee,
D. H. Lee, J. E. Kim, E.-Y. Choi,
S. O. Kim*2060–2064

Peptide/Graphene Hybrid Assembly into Core/Shell Nanowires



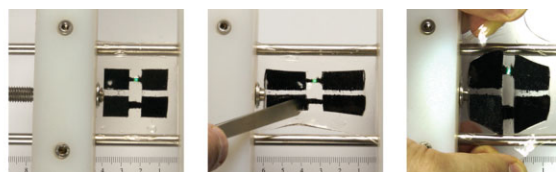
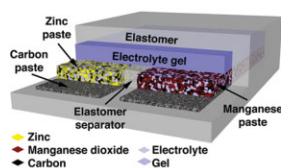
Hybrid assembly of peptides and graphene into core/shell nanowires is presented here. Electroconductive nanowires comprised of multilayered graphene shells wrapped around peptide nanowire cores were readily assembled upon diluting peptide solution into an aqueous reduced graphene dispersion. Calcination of peptide cores generated a hollow graphene-shell network with large surface area and high thermal/chemical stability.

Batteries

M. Kaltenbrunner,* G. Kettlgruber,
C. Siket, R. Schwödauer,
Siegfried Bauer2065–2067

Arrays of Ultracompliant Electrochemical Dry Gel Cells for Stretchable Electronics

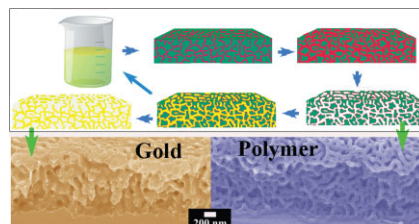
Ultracompliant electrochemical dry cells are connected in series powering an embedded light emitting diode in different states of mechanical stretch.



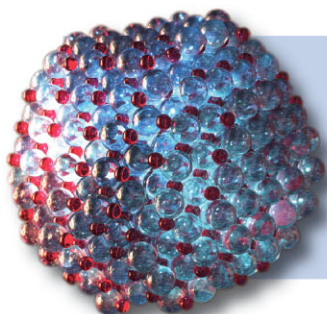
Membranes

Y. Wang,* C. He, W. Xing,*
F. Li, L. Tong, Z. Chen, X. Liao,
M. Steinhart*2068–2072

Nanoporous Metal Membranes with Bicontinuous Morphology from Recyclable Block-Copolymer Templates



Nondestructive preparation of bicontinuous nanoporous metal membranes by replication of bicontinuous nanoporous polymeric membranes consisting of recoverable asymmetric block copolymers (BCPs) is reported. The BCP membranes are generated by swelling the minority domains of the BCP with selective solvents accompanied by reconstruction of the glassy matrix formed by the majority component (see figure).



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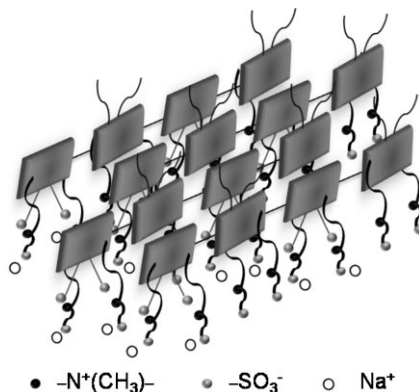
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COMMUNICATIONS

We report on a **conjugated polyelectrolyte (CPE)** based on fluorene repeat units, which forms a supramolecular complex with a zwitterion surfactant. The complex self-assembles into multilamellar structures on solid substrates. The luminescence efficiency, low in the uncomplexed polymer, is strongly increased after complexation. This originates from the phase segregation between the aromatic backbone and ionic sides, reducing conformational defects and ionic dipole-induced quenching.

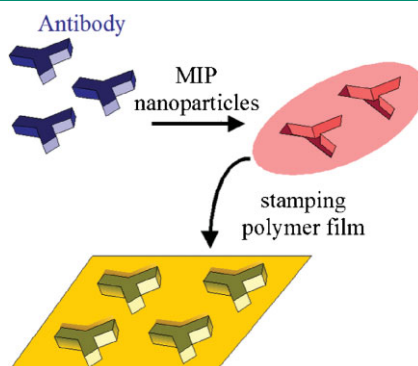


Conjugated Polyelectrolytes

G. Pace, G. Tu, E. Fratini, S. Massip, W. T. S. Huck, P. Baglioni, R. H. Friend2073–2077

Poly(9,9-dioctylfluorene)-Based Conjugated Polyelectrolyte: Extended π -Electron Conjugation Induced by Complexation with a Surfactant Zwitterion

“**Plastic replicas**” of natural antibodies are accessible by molecular imprinting procedures. The first step involves the synthesis of molecularly imprinted polymer (MIP) particles templated with human immunoglobulin. They then can be utilized as templates for a stamp-based surface imprinting procedure that results in polymer surface structures exactly mimicking the initial globulin. Compared to their natural counterparts, these artificial antibodies show improved selectivity and sensitivity on quartz crystal microbalance sensors.

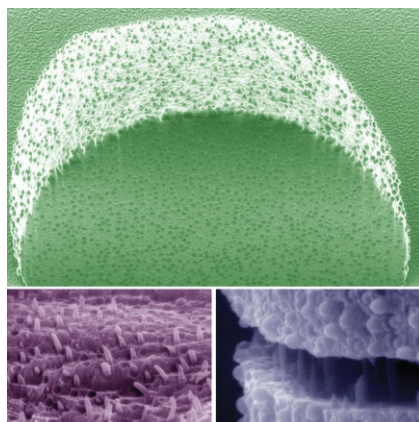


Molecular Imprinting

R. Schirhagl, P. A. Lieberzeit, F. L. Dickert*2078–2081

Chemosensors for Viruses Based on Artificial Immunoglobulin Copies

Calcite single crystals containing polystyrene particles are synthesized using a straightforward, one-pot method, through control of the particle surface structure and the crystallization conditions. Investigation of the mechanical behavior of these composite crystals using nanoindentation shows enhanced fracture toughness via a crack bridging mechanism.

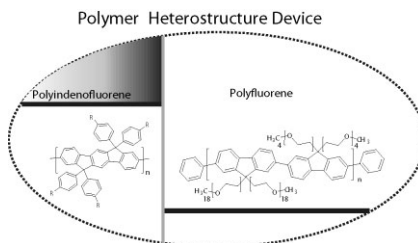


Composites

Y.-Y. Kim, L. Ribeiro, F. Maillot, O. Ward, S. J. Eichhorn,* F. C. Meldrum*2082–2086

Bio-Inspired Synthesis and Mechanical Properties of Calcite–Polymer Particle Composites

An **all-solution processed organic light-emitting diode** with enhanced device efficiency based on an additional methanol-soluble polyfluorene layer (see figure) with nonionic ethylene glycol side chains is presented. Due to an asymmetric shift of the energy levels at the polymer/polymer interface, significant efficiency enhancements were obtained.



Light-Emitting Diodes

S. Sax, N. Rugen-Penkalla, A. Neuhold, S. Schuh, E. Zojer, E. J. W. List,* K. Müllen*2087–2091

Efficient Blue-Light-Emitting Polymer Heterostructure Devices: The Fabrication of Multilayer Structures from Orthogonal Solvents

CORRECTIONS

Chemosensors for Viruses Based on Artificial Immunoglobulin Copies

By Romana Schirhagl, Peter A. Lieberzeit, and Franz L. Dickert*

Adv. Mater., **2010**, 22, 2078

DOI: 10.1002/adma.200903517

Prof. Blaas was originally listed as a co-author of this paper. With the agreement of Prof. Blaas and the other co-authors, he is now not listed as a co-author. A note has been added to the Acknowledgements to credit his contributions to the paper.

Engineering a Material Surface for Drug Delivery and Imaging using Layer-by-Layer Assembly of Functionalized Nanoparticles

By Thomas Soike, Amanda K. Streff, Chenxia Guan, Ryan Ortega, Mohammed Tantawy, Christopher Pino, and V. Prasad Shastri*

Adv. Mater., **2010**, 22, 1392

DOI: 10.1002/adma.200903069

The affiliation in the above article was incorrect. The correct affiliation is shown here:

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The editorial office apologizes for any inconvenience caused.