ADVANCED MATERIALS

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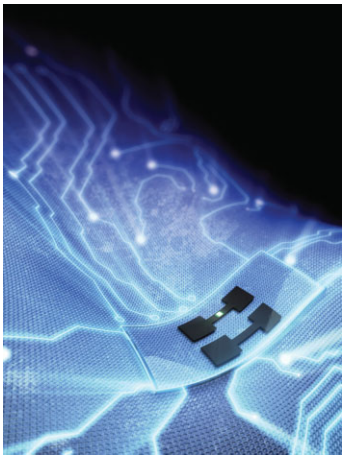
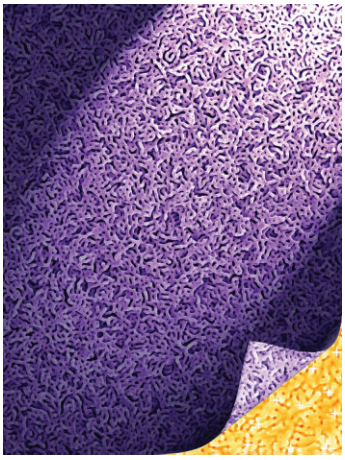


Stretchable Batteries

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.

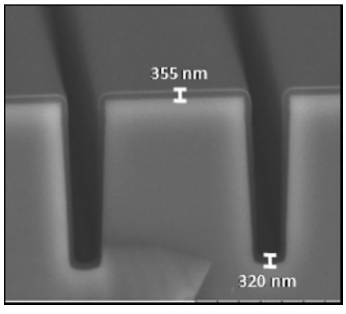


Nanoporous Metal Membranes

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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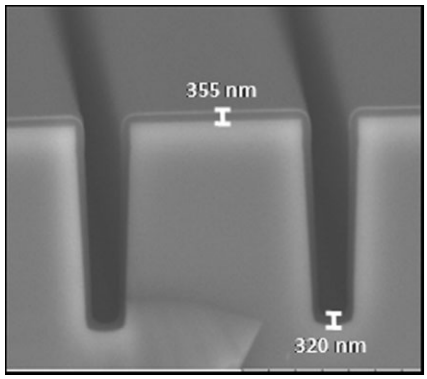
REVIEW

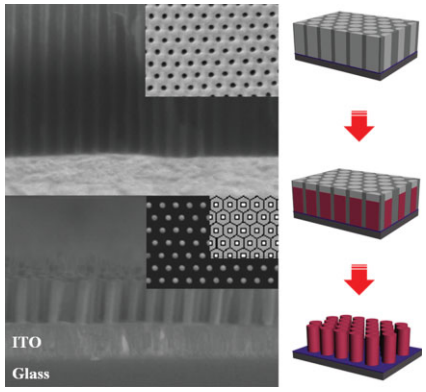
Functional Coatings



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.

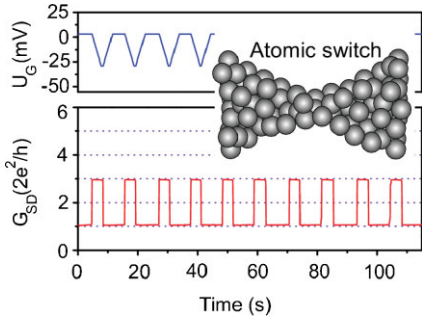
COMMUNICATIONS

Nanorod Arrays



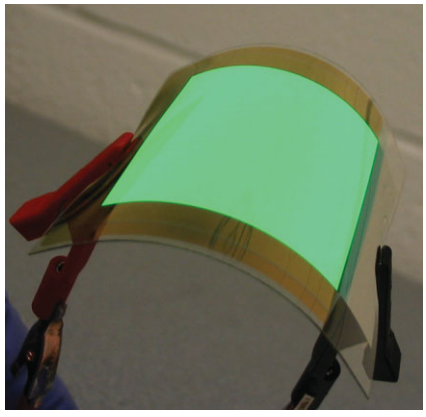
A highly ordered nanoporous anodized aluminum oxide template with excellent adhesion is fabricated on various conducting substrates by surface modification of the substrates. This template can be universally utilized to fabricate laterally long-range-ordered and hexagonally packed arrays of freestanding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

Transistors



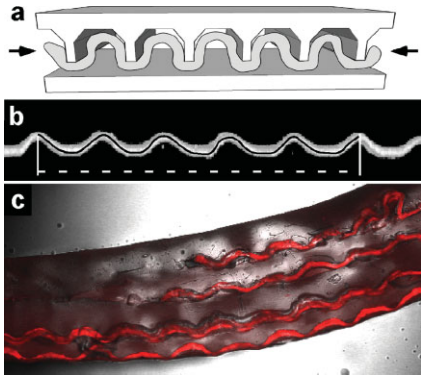
Multilevel logic and storage devices on the atomic scale are of great interest as they allow more efficient data storage and processing with a smaller number of logical gates. Here we demonstrate a multilevel atomic quantum transistor, allowing for the gate-controlled switching between different quantized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

Organic Light-Emitting Diodes



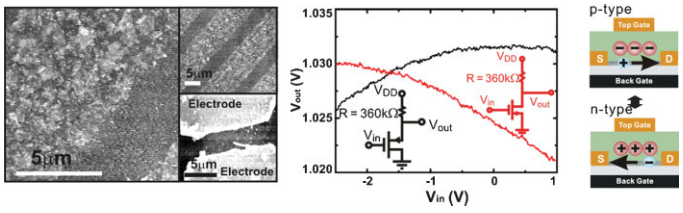
Oxidized Au thin film is shown to function as a direct drop-in replacement for the de facto standard indium tin oxide anode in high-performance flexible organic light-emitting diodes fabricated on plastic substrates (see image). The thin films offer a new materials-technology platform for enabling the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

A flexible membrane templating technique (a) is developed for the fabrication of microcrimped collagen microfibers (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.



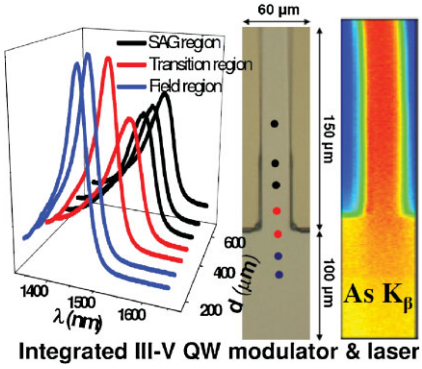
Composites

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.



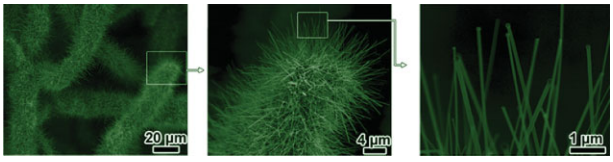
Graphene

Advanced optoelectronic devices require monolithic integration of different functions at chip level. This is the case of multi-quantum well (MQW) electroabsorption 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

B_4C-nanowire/carbon-microfiber hybrid structures are synthesized using cotton T-shirts as both the template and carbon source. The B_4C 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

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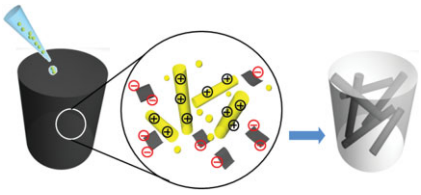
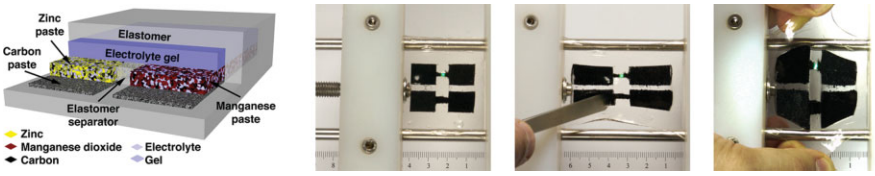
Core/Shell Nanowires



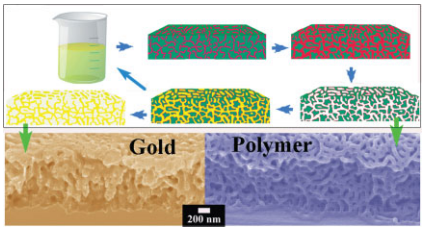
Hybrid assembly of peptides and graphene into core/shell nanowires is presented here. Electroconductive nanowires comprised of multilayered graphene shells wrapped around peptide nanowire cores were readily assembled upon diluting peptide solution into an aqueous reduced graphene dispersion. Calcination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

Batteries

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



Membranes



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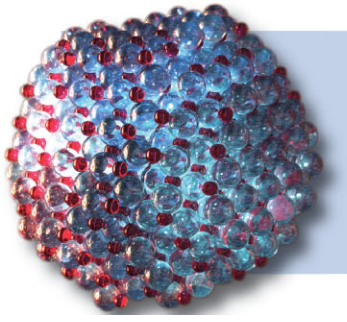

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Editorial Office:
Phone: (+49) 6201-606-235/432
Fax: (+49) 6201-606-500
Email: advmat@wiley-vch-de

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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:

[*] Prof. V. P. Shastri
Institute for Macromolecular Chemistry and Bioss-Center for Biological Signalling Studies
University of Freiburg
79104 Freiburg (Germany)
E-mail: prasad.shastri@bioss.uni-freiburg.de; prasad.shastri@makro.uni-freiburg.de

Prof. V. P. Shastri, T. Soike, A. K. Streff, C. M. Guan, R. Ortega, Dr. C. Pino
Department of Biomedical Engineering
Vanderbilt University
Nashville, TN 37232 (USA)

Dr. M. N. Tantawy
Department of Radiology
Vanderbilt Institute of Imaging Sciences
Nashville, TN 37232 (USA)

The editorial office apologizes for any inconvenience caused.