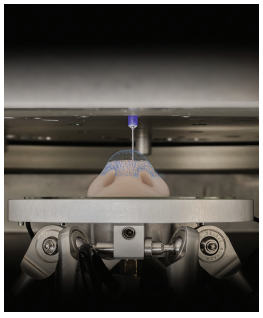
ADVANCED FUNCTIONAL MATERIALS

www.afm-journal.de

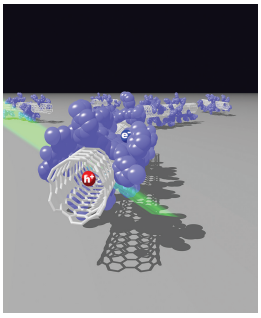


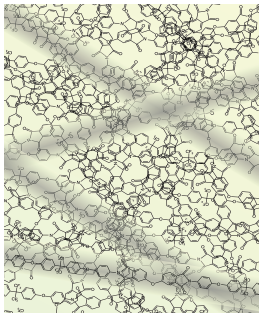
Bioprinting

On page 7406, M. Zenobi-Wong and co-workers present a bioink which allows the bioprinting of complex cell-laden cartilaginous structures with regulatory-compliant biomaterials. The printed grafts have tunable mechanical properties and, since they can be developed to contain extracellular matrix particles, are also tissue-specific. Complex and overhanging structures can be printed using a co-extruded support polymer, which also acts as a cation-reservoir to rapidly crosslink the bioink.

Carbon Nanotubes

A novel approach for producing water-soluble, electron-donor single wall carbon nanotube (SWCNT) hybrids is demonstrated by A. de la Escosura, D. M. Guldi, T. Torres, and co-workers on page 7418. The method is based on supramolecular immobilization of quaternized pyridyloxy phthalocynanines (ZnPc). The water-solubility and excellent electron-accepting features of these ZnPc derivatives switch the redox and photophysical properties of the SWNTs , which can actually be used for energy conversion.



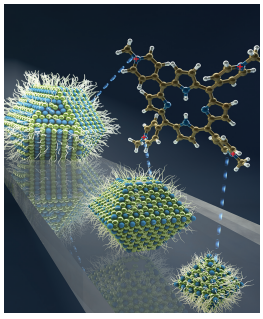


Flexible Electronics

A thermally and mechanically robust, smooth, and transparent conductor composed of silver nanowires embedded in a colorless polyimide substrate is introduced by C. B. Arnold and co-workers on page 7428. This material is a new substrate-cum-electrode for optoelectronics devices and exhibits excellent thermal, mechanical, and chemical stability. As a substrate for a flexible organic light-emitting diode, improved device performance is achieved compared to a control device made on ITO coated glass.

Quantum Dots

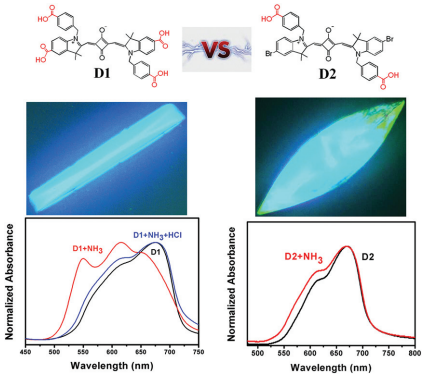
The interfacial electrostatic interaction between the positively-charged porphyrin and the negatively-charged quantum dot (QD) surface provides an additional driving force for efficient charge transfer (CT). On page 7435, O.F. Mohammed and co-workers show the occurrence of an ultrafast CT from small bandgap (>1 eV) and large bandgap (<1 eV) PbS QDs to a molecular acceptor, reaching beyond the previously reported cut-off CT bandgaps for PbS QDs.



FULL PAPERS

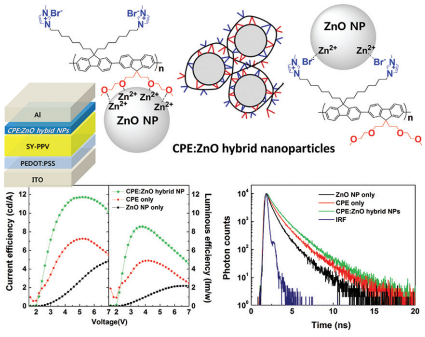
FULL PAPERS

Solid Gas Sensors



Squarylium cyanine dyes D1 and D2, containing different numbers of carboxylic acid groups, are utilized as a model system to investigate the self-assembly behaviors based on hydrogen bonding and π–π stacking. These driving forces synergistically construct the unique morphologies of **D1** and **D2** by forming distinct distances in repeated units, which makes the **D1** reversibly responsive to ammonia gas.

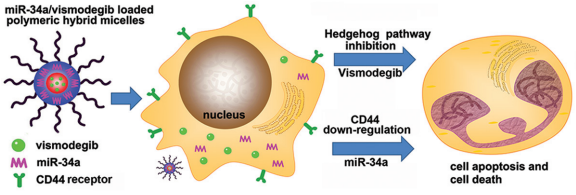
Cathode Interfaces

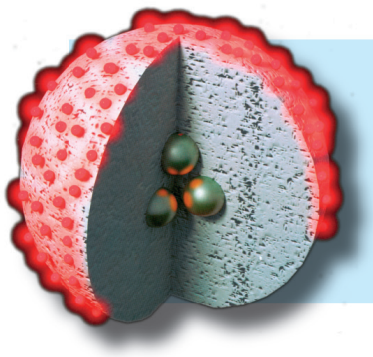


High-efficiency polymer light-emitting diodes (11.7 cd A^{-1} at 5.2 V and 8.6 lm W^{-1} at 3.8 V) are demonstrated using $F8imFO_4$ conjugated polyelectrolyte (CPE)-hybridized zinc oxide nanoparticles (ZnO NPs) as a cathode interfacial layer. The alkoxy sidechains and bromide anions of $F8imFO_4$ form a coordination bond to the ZnO surface, thus reducing fluorescence quenching of light-emitting polymer.

Hybrid Micelles

A polymeric hybrid micelle system with highly tunable properties is rationally designed and optimized to co-deliver Hedgehog pathway inhibitor vismodegib and microRNA-34a for melanoma therapy. The co-delivery system shows synergistic anticancer efficacy on B16F10-CD44$^+$ cells in vitro and in vivo, indicating the potential of PHM in co-delivery of small molecule and nucleic acid drugs.





How to contact us:

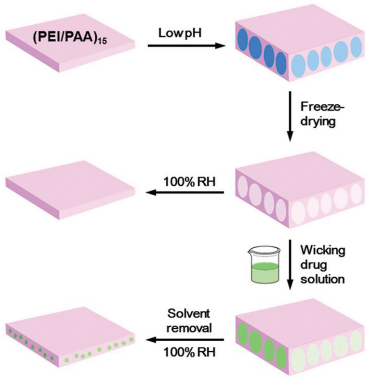
Editorial Office:
Phone: (+49) 6201-606-286/531
Fax: (+49) 6201-606-500
Email: afm@wiley-vch.de

Reprints:
cherth@wiley-vch.de

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

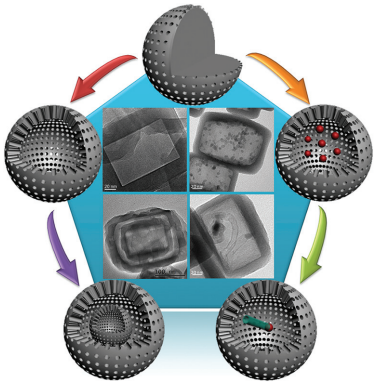
FULL PAPERS

Humidity can serve as a feasible trigger to activate the self-healing of microporous polyelectrolyte multilayer film. Based on this, a facile and versatile means is suggested to directly integrate hydrophobic drugs into the films for biomedical coatings.



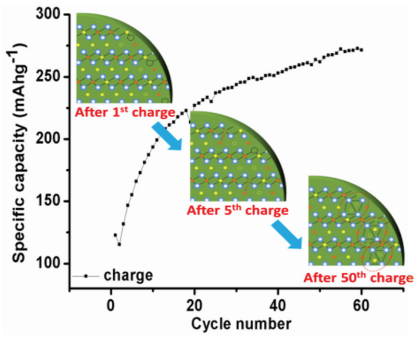
Drug Delivery

Hollow ZSM-5 single crystals with double shells, regular void in the crystal interior, enhanced acidity, increased Brönsted acid sites, silicon-rich exterior, adjustable Si/Al ratio, and crystal size, as well as with Fe_2O_3, bimetals ca. Cu-Pd, Cu-Pt, Fe-Au, and carbon nanotubes functionalized interior are prepared by "dissolution–recrystallization" strategy in tetrapropylammonium hydroxide solution.



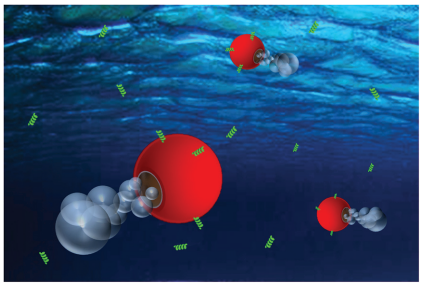
Hollow Crystals

A Li-rich cathode material $Li_{1.87}Mn_{0.94}Ni_{0.19}O_3$ with low level of Ni doping exhibits interersting slow activating process of Li_2MnO_3 phase, offering excellent platform to fundamentally understand the structural evolution of Li_2MnO_3 during activation. Detailed electrochemical study and in situ structure characterization reveals that the transition metal diffusion process features much slower kinetics than O_2 generation and determines the Li_2MnO_3 activation rate.



Li-Rich Cathodes

Cell-mimicking Janus micromotors are constructed by integrating red blood cell (RBC) membranes and gold nanoparticles onto the exposed surface areas of magnesium microparticles to achieve efficient water-driven propulsion and rapid detoxification in biological matrices. The RBC-Mg Janus micromotors represent an exciting progress toward cell-mimicking microscale motors that hold considerable promise for diverse biomedical and biodefense applications.



Biodetoxification

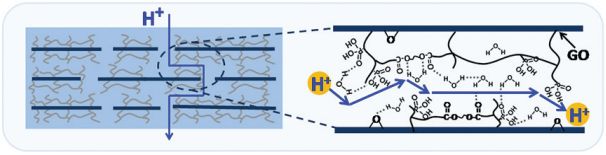
CONTENTS

FULL PAPERS

Functionalized Graphene

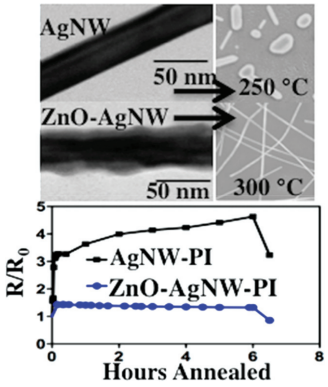
Tunable Nanochannels along Graphene Oxide/Polymer Core–Shell Nanosheets to Enhance Proton Conductivity

A novel approach to construct tunable nanochannels via direct assembly of graphene oxide/polymer core–shell nanosheets is developed. Through molecular-level engineering of the nanosheets, ordered and continuous nanochannels with well-tailored chemical structures can be created. The resulting membrane exhibits a proton conductivity of 32 mS cm^{-1} at 51% RH, surpassing state-of-the-art Nafion membrane and all previously reported GO-based materials.



Silver Nanowires

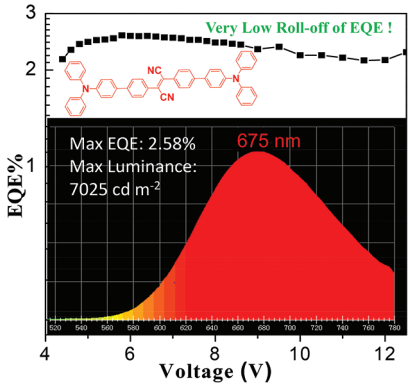
Thermally Stable Silver Nanowire–Polyimide Transparent Electrode Based on Atomic Layer Deposition of Zinc Oxide on Silver Nanowires



Silver nanowires are made thermally stable with a thin layer of ZnO deposited using atomic layer deposition. This ZnO layer prevents the melting and coalescence of AgNWs observed at annealing temperatures above 180 °C, while maintaining a porous network structure. When transparent, colorless polyimide is infiltrated between the nanowires, the resulting freestanding films are able to withstand 300 °C annealing for over 6 h, showing little to no degradation in electrical or optical properties.

Organic LEDs

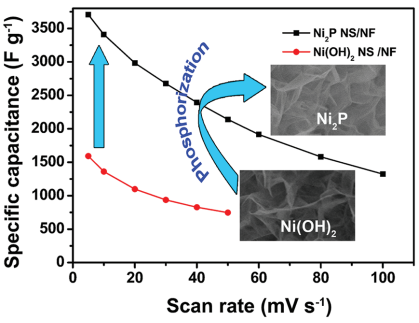
Highly Efficient Solid-State Near-Infrared Emitting Material Based on Triphenylamine and Diphenylfumaronitrile with an EQE of 2.58% in Nondoped Organic Light-Emitting Diode



The development of near-infrared (NIR) emitting material is of increasing interest. TPATCN with a strong NIR emission and a film efficiency of 33% is obtained. It benefits from a large dipole moment of CT state and a certain degree of orbital overlap of LE state. The maximum EQE of nondoped device reaches 2.58%, which is among the highest values of NIR OLEDs.

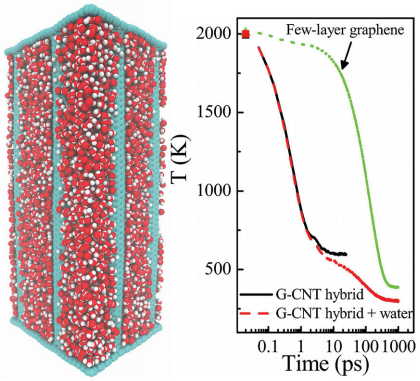
Pseudocapacitors

Ultrahigh-Performance Pseudocapacitor Electrodes Based on Transition Metal Phosphide Nanosheets Array via Phosphorization: A General and Effective Approach



Ultrahigh-performance pseudocapacitor electrodes are prepared with a general and effective phosphorization strategy to enhance supercapacitor performance of various transition metals oxide or hydroxide. The Ni foam supported Ni_2P nanosheets array electrode shows a remarkable specific capacitance of more than 3000 F g^{-1}, much larger than the corresponding $Ni(OH)_2$ nanosheets array before phosphorization.

An improvement for the *c*-axis heat transfer of few layer graphene by a covalently bonded graphene–carbon nanotube (G-CNT) hybrid is demonstrated. The G-CNT exhibits a thermal resistance that is three orders of magnitude lower than state-of-the-art thermal interface materials. The G-CNT can be immersed in a circulating liquid for the ultrafast cooling of hot surfaces such as integrated circuits.



Thermal Interfaces