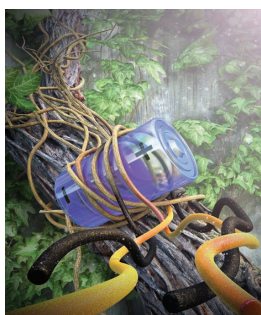


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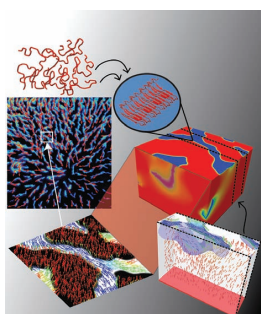
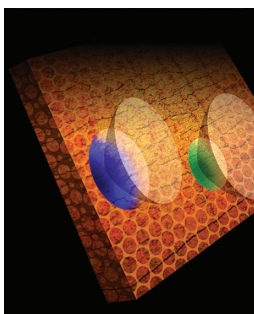


Nanonets

On page 6029, S.-Y. Lee, S.-Y. Lee, and co-workers present cellulose nanofibril/multiwall carbon nanotube-based hetero-nanonet paper batteries as 1D material-mediated cell architectures to enable ultrahigh energy density and shape versatility far beyond those achievable with conventional battery technologies. Benefiting from 3D bicontinuous electron/ion transport pathways and exceptional mechanical compliance, the hetero-nanonet paper batteries provide unprecedented improvements in the electrochemical reaction kinetics, energy density, and origami foldability.

Mechanochromic Sensors

Traumatic brain injuries can cause permanent damage to the brain, leading to concussion and memory loss. As shown on page 6041, S. Yang and co-workers have developed a power free, light weight, and highly sensitive polymer-based inverse opal as a mechanochromic sensor that changes color upon impact with pressures in the MPa range. Depending the amount and rate of applied force, the colour change is permanent, so the impact can be determined without complicated in situ optical experiments.

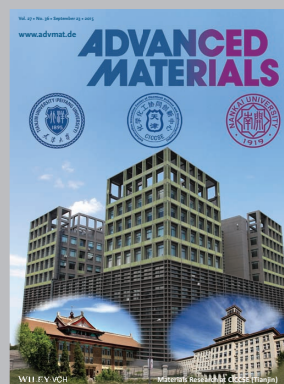
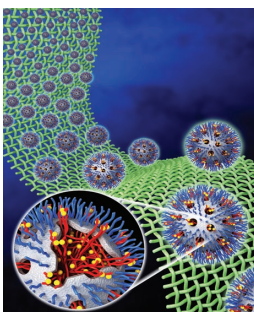


Sensors

On page 6050, J. J. de Pablo and co-workers demonstrate detection of Nanomolar concentrations of peptides by polarized light microscopy. Liquid crystals exhibit a specific response to beta-sheet structures. The unstructured peptides involved in various diseases form beta-sheet rich amyloid fibrils at lipid-decorated liquid crystal interfaces, thereby altering the orientation of the underlying liquid crystal and yielding characteristic optical signatures that are interpreted in terms of detailed molecular models.

Inorganic Micelles

W. S. Choi, H.-J. Lee and co-workers present superhydrophobic hollow SiO_2 micelles (SHSMs) with hydrophilic cores and amphiprotic (superhydrophobic/hydrophilic) shells on page 6061. The unique amphiprotic functionality makes the SHSMs suitable as smart nanomaterials for multiple applications, such as amphiprotic catalytic reactions in aqueous or organic solutions, oil/water separation and pollutant purification, and enzyme immobilization, with great stability and efficient recyclability.



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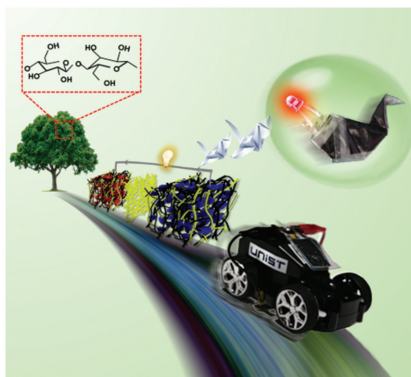
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FULL PAPERS

CNFs/CNTs-based hetero-nanonet paper batteries are presented as a 1D material-mediated cell architecture strategy to enable ultrahigh energy density and shape versatility far beyond those achievable with conventional battery technologies. Owing to the 3D bicontinuous electron/ion transport pathways and exceptional mechanical compliance, the hetero-nanonet paper batteries provide unprecedented improvements in the electrochemical reaction kinetics, energy density, and origami foldability.

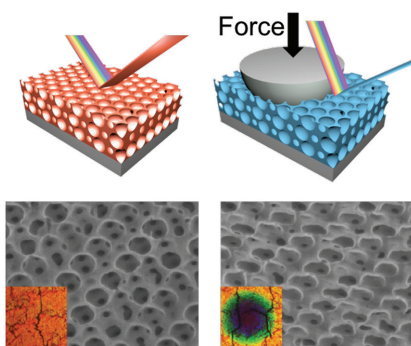


Nanonets

S.-J. Cho, K.-H. Choi, J.-T. Yoo, J.-H. Kim, Y.-H. Lee, S.-J. Chun, S.-B. Park, D.-H. Choi, Q. Wu, S.-Y. Lee*, S.-Y. Lee*6029–6040

Hetero-Nanonet Rechargeable Paper Batteries: Toward Ultrahigh Energy Density and Origami Foldability

Power-free and highly sensitive mechanochromic sensors that can quantitatively measure the magnitude of mechanical force are prepared from uncrosslinked SU-8 inverse opals. They can record impact forces by exhibiting different visible colors depending on the amount and rate of the applied forces. Experiments and finite element simulations attribute this to the elastoplastic deformation of the crystals.

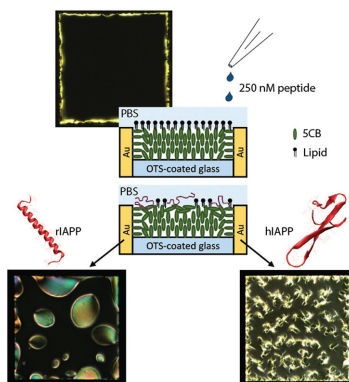


Mechanochromic Sensors

Y. Cho, S. Y. Lee, L. Ellerthorpe, G. Feng, G. Lin, G. Wu, J. Yin, S. Yang*6041–6049

Elastoplastic Inverse Opals as Power-Free Mechanochromic Sensors for Force Recording

Liquid-crystal-based sensors exhibit unique responses to peptides that aggregate at membrane interfaces. β -sheet forming peptides, such as human islet amyloid polypeptide, aggregate into fibrils at lipid-decorated liquid crystal interfaces, giving rise to branch-like structures. By contrast, rat islet amyloid polypeptide molecules, which possess α -helical character, exhibit weak protein-lipid interactions and form circular domains.

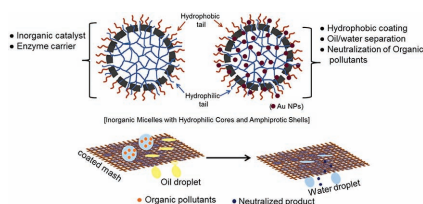


Sensors

M. Sadati, A. I. Apik, J. C. Armas-Perez, J. Martinez-Gonzalez, J. P. Hernandez-Ortiz, N. L. Abbott, J. J. de Pablo*6050–6060

Liquid Crystal Enabled Early Stage Detection of Beta Amyloid Formation on Lipid Monolayers

Superhydrophobic hollow SiO_2 micelles (SHSMs) with hydrophilic cores and amphiprotic (superhydrophobic/hydrophilic) shells are prepared and their multiple applications are demonstrated. The unique amphiprotic functionality makes the SHSMs suitable as smart nanomaterials for multiple applications, such as amphiprotic catalytic reactions in aqueous or organic solutions, oil/water separation and pollutant purification, and enzyme immobilization, with great stability and efficient recyclability.



Inorganic Micelles

Md. S. Islam, W. S. Choi,* S. H. Kim, O. H. Han, H.-J. Lee*6061–6070

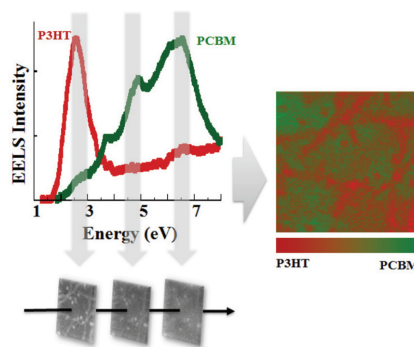
Inorganic Micelles (Hydrophilic Core@Amphiprotic Shell) for Multiple Applications

FULL PAPERS

Organic Semiconductors

C. Guo, F. I. Allen, Y. Lee, T. P. Le,
C. Song, J. Ciston, A. M. Minor,
E. D. Gomez* 6071–6076

Probing Local Electronic Transitions in Organic Semiconductors through Energy-Loss Spectrum Imaging in the Transmission Electron Microscope

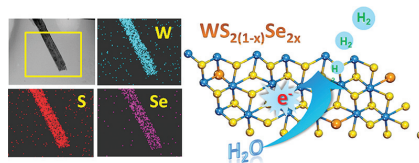


Monochromated transmission electron microscopes can generate contrast in organic thin films based on differences in the valence electronic structure at energy losses below 10 eV. By applying principal component analysis to the spectroscopic image series, further details about phase compositions and local electronic transitions in the active layer of organic semiconductor mixtures can be explored.

Hydrogen Evolution

F. M. Wang, J. Li, F. Wang, T. A. Shifa,
Z. Cheng, Z. Wang, K. Xu, X. Zhan,
Q. Wang, Y. Huang, C. Jiang,
J. He* 6077–6083

Enhanced Electrochemical H₂ Evolution by Few-Layered Metallic WS₂(1-x)Se_{2x} Nanoribbons

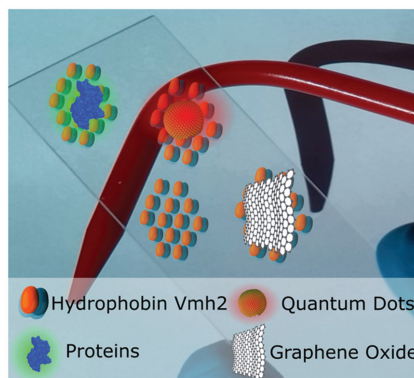


Few-layered ternary WS₂(1-x)Se_{2x} nanoribbons (NRs) with metallic 1T phases are prepared. The favorable Gibbs free energy for hydrogen absorption (ΔG_{H^+}) of the WS₂(1-x)Se_{2x} NRs, introduced by the tensile region and local lattice distortions, greatly promotes the hydrogen evolution reaction (HER). The results suggest that the metallic WS₂(1-x)Se_{2x} NRs are potential alternatives for HER electrocatalysts.

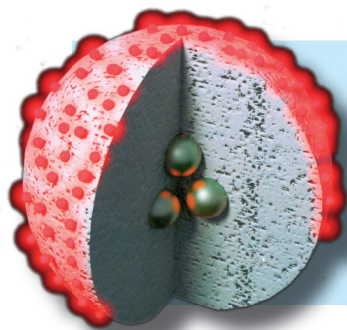
Surface Functionalization

A. M. Gravagnuolo, E. Morales-Narváez,
C. R. S. Matos, S. Longobardi,
P. Giardina, A. Merkoçi* 6084–6092

On-the-Spot Immobilization of Quantum Dots, Graphene Oxide, and Proteins via Hydrophobins



Immobilization of optically active nanomaterials and proteins (particularly, cadmium telluride quantum dots, graphene oxide, antibodies, and bovine serum albumin) on glass is achieved using a Janus-faced fungal protein, hydrophobin Vmh2, which is extracted from *Pleurotus ostreatus*. The proposed glass nanobiofunctionalization is fast, easily scalable, and environmental friendly, which is appealing for new bioanalytical and nanobioenabled applications.



How to contact us:

Editorial Office:

Phone: (+49) 6201-606-286/531
Fax: (+49) 6201-606-500
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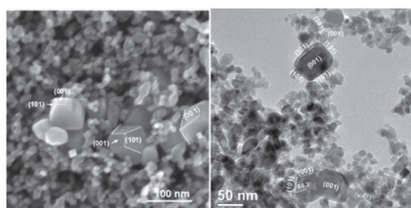
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FULL PAPERS

A cost-efficient TiO₂ composite photoanode for YD2-oC8 dye-sensitized cells (DSCs) with a Co(polypyridyl) mediator is fabricated by blending exposed {001}-faceted TiO₂ nanoparticles (approximately 50 nm) with commercial 20 nm TiO₂. This photoanode simultaneously overcomes sensitizer aggregation, interfacial recombination, and ionic diffusion in cobalt-mediated, porphyrin-sensitized DSCs.

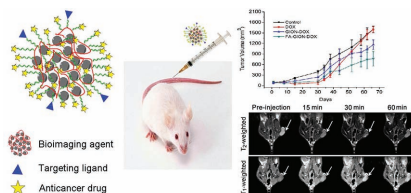


Composite Photoanodes

P. Zhai, T.-Y. Hsieh, C.-Y. Yeh, K. S. K. Reddy, C.-C. Hu, J.-H. Su, T.-C. Wei,* S.-P. Feng*6093–6100

Trifunctional TiO₂ Nanoparticles with Exposed {001} Facets as Additives in Cobalt-Based Porphyrin-Sensitized Solar Cells

FA-GION-DOX is designed as high specific bioimaging agent and targeted drug delivery system. Systemic delivery of the FA-GION-DOX significantly inhibits the growth of tumors and shows good magnetic resonance enhancement in a human cervical cancer xenograft model, which makes FA-GION-DOX a good candidate for the targeted and MRI-guided therapy of cervical cancer.

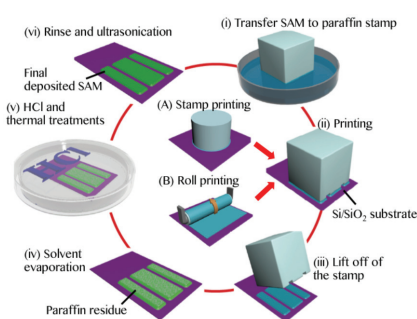


Drug Delivery

G. Zhang, R. Du, L. Zhang, D. Cai, X. Sun, Y. Zhou, J. Zhou, J. Qian, K. Zhong, K. Zheng, D. Kaigler, W. Liu, X. Zhang,* D. Zou,* Z. Wu*6101–6111

Gadolinium-Doped Iron Oxide Nanoprobe as Multifunctional Bioimaging Agent and Drug Delivery System

A novel printing method to deposit self-assembled monolayers (SAMs) on different substrates is introduced with the assistance of hydrocarbon molecules. By using this method, a crystallized SAM layer is formed and characterized, organic field-effect transistors based on dinaphtho[2,3-b:2',3'-f]thieno[3,2-b]thiophene (DNTT) with mobility as high as 3.02 cm² V⁻¹ s⁻¹ and complementary inverter with gain of 102 are fabricated.

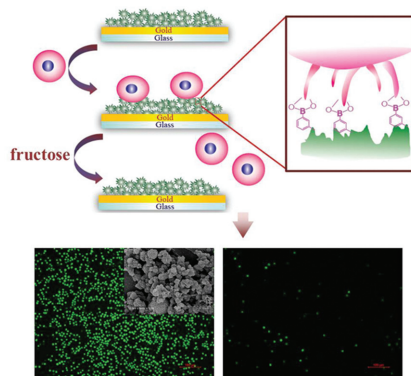


Field-Effect Transistors

Z. Zhang, X. Ren, B. Peng, Z. Wang, X. Wang, K. Pei, B. Shan, Q. Miao, P. K. L. Chan*6112–6121

Direct Patterning of Self-Assembled Monolayers by Stamp Printing Method and Applications in High Performance Organic Field-Effect Transistors and Complementary Inverters

A synergistic effect of topographical interactions and surface chemistry of phenylboronic acid functional groups on nanostructures is proposed to achieve an enhanced capture efficiency of human leukemic lymphoblasts with reduced damage. Boronic acid derivative polyaniline bioinspired nanostructures with controlled morphology are prepared. The phenylboronic acid is used to reversibly capture and release circulating tumor cells.



Cell Capture

J. Ouyang, M. Chen, W.-J. Bao, Q.-W. Zhang, K. Wang, X.-H. Xia*6122–6130

Morphology Controlled Poly(aminophenylboronic acid) Nanostructures as Smart Substrates for Enhanced Capture and Release of Circulating Tumor Cells

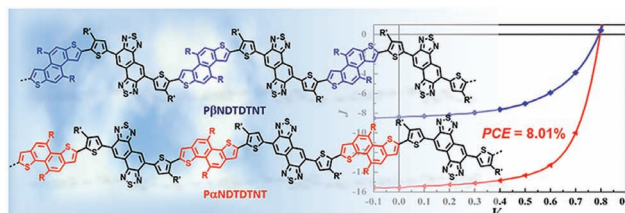
FULL PAPER

Copolymers

S.-W. Cheng, D.-Y. Chiou, C.-E. Tsai,
W.-W. Liang, Y.-Y. Lai, J.-Y. Hsu,
C.-S. Hsu, I. Osaka, K. Takimiya,*
Y.-J. Cheng* 6131–6143

Angular-Shaped 4,9-Dialkyl α - and β -Naphthodithiophene-Based Donor–Acceptor Copolymers: Investigation of Isomeric Structural Effects on Molecular Properties and Performance of Field-Effect Transistors and Photovoltaics

Two new 4,9-dialkyl α - and β -naphthodithiophene-based D-A copolymers, P α NDTDTNT and P β NDTDTNT, are presented. With the better ordered structures in the solid state, P α NDTDTNT exhibits a greater field-effect transistor hole mobility of $0.214 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ and a superior solar cell efficiency of 8.01% than P β NDTDTNT with a mobility of $0.038 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ and a PCE of 3.6%.



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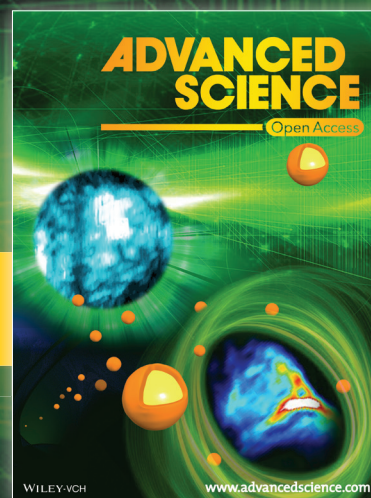
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