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Hydrogen-bonded organic frameworks for photocatalytic synthesis of hydrogen peroxide

Hydrogen-bonded organic frameworks (HOFs) are promising candidates for photocatalysis. These materials are known for their structural diversity, high porosities and facile tailor and optimize the function. Jianfeng Li et al.

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Ion transport in helical polypeptide polymerized ionic liquid block copolymers

Polymerized ionic liquid block copolymers (PILBCPs) are promising materials for energy storage and conversion devices. Here, the authors report the synthesis of helical PILBCPs and their ion transport properties. Hong Chul Moon, Christian Wang, Christopher M. Bates et al.

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Sensing molecular structures and interactions by enhanced confinement effect in electron microscopy

Electron microscopy can provide structural information at the molecular level, but the confinement effect and the dose sharpness is found for contrast molecular and interaction imaging. Here, the authors report a method... Mingsheng Xu, Samuel M. Stavis, Haiguang Liu et al.

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Efficient and ultrafast infrared to quantum dot light emitting diodes

Infrared light emitting diodes (IR-LEDs) based on PbS quantum dots (QDs) have received significant attention, but their performance is still limited by inefficient charge injection. Here, the authors report efficient and ultrafast IR-LEDs with an external quantum efficiency of 10.6% and an EL... Yi Liu, Jiaqi Li, Zhenyu Zhang et al.

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Isotopic topological defects offer a methodology to quantify and classify active cell monolayers

The orientation of elongated cells often creates stress around the center to favour 'core' topological defects. Here, the authors show that cell division can also create 'isotopic' topological defects, which are characterized by a vanishing stress at the defect core. Ricard Alert, Jaume Casademunt, Jens Elgeti et al.

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Urinary electrosynthesis for energy-saving hydrogen generation

Water electrolysis offers an energy-saving route for hydrogen production, but the sluggish anodic oxygen evolution reaction (OER) limits its efficiency. Here, the authors report urinary electrosynthesis coupled with efficient hydrogen production. Yuanyuan Liu, Xiaoyuan Zeng, Xin Wang et al.

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Surface-bonding single-atom catalyst with an isolated Co-O-Zn configuration achieves high selectivity in nonoxidative active sites

Single-atom catalysts (SACs) are promising candidates for catalysis, but the metal-support interaction can affect the catalytic behavior and hinder rational design of SACs. Here, the authors report a surface-bonding SAC with a unique isolated Co-O-Zn configuration... Qin Quan, Zhang Yi, Lin Guan Ye Tian Gao et al.

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Dual-wavelength Brillouin laser terahertz source stabilized to a phase-coherent radio-frequency reference

The authors experimentally demonstrated a stabilized dual-phase-noise optical frequency comb with a relative phase noise of 1 mrad integrated from 1 Hz to 1 MHz. Alexander Lamberty, Jan Stanzel, Jan Hendrik Pöld et al.

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Cathode leaching recycling of spent lithium-ion batteries via low-pressure electrostatic screening

The existing recycling methods for spent lithium-ion batteries have high energy consumption and low efficiency. Here, the authors report a low-pressure electrostatic screening method to realize cathode materials and achieve a 10-fold increase in leaching kinetics. Yanfang Fan, Yingjie Cui, Bo Wang et al.

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Full-color tuning in multi-layer core-shell nanoparticles from single-wavelength excitation

Core-shell nanoparticles are promising candidates for optical encoding and anti-counterfeiting applications. Here, the authors report a method for full-color tuning from single excitation wavelength through modulating energy transfer and time gating. Yi Chen, Hongyu Li, Min Gu, Qiwen Zhan et al.

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Metasurface-enabled high-order differentiator

Here, the authors present a scalable approach for arbitrary high-order spatial analog differentiation by a single-layer metasurface. The proposed metasurface can perform high-order differentiation with a large numerical aperture and is capable of real-time measurements for optical alignment in high-precision semiconductor lithography. Yuanmu Yang, Jingxuan Kang, Kebin Fan, Xin Zhang et al.

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In situ ultraviolet-light-mediated exciton-enabled mercury vapor capture over air-hybridized oxyanionyne

Mercury pollution is a global environmental issue. Here, the authors report a mercury capture material with ultrahigh capacity and rapid kinetics under ambient air and hydrothermal conditions, that can serve as a "trap" for mercury by storing... Jie Zhang, Yuanyuan Li, Xiaoyu Han, Yong Liu et al.

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Light-matter coupling via quantum-defect cavities interfaced with hexagonal boron nitride monolayers

Light-matter interactions in quantum materials have primarily been studied from the perspective of optical cavities. Here, the authors report the coupling of quantum-defect cavities interfaced with hexagonal boron nitride monolayers. Xiyuan Lu, Jiahua Li, Kyoung-Duck Park, Jun Kim, Hyeon Bin Ai Byung Chun Park et al.

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Sub-nitrous cycloheks and modulation of B-S, Mo-Ti-, -Zr-, ceramics towards accessible heat storage

Thermochemical energy storage (TCES) is a promising technology for concentrated solar power plants. Here, the authors report a TCES material based on earth-abundant compounds and demonstrate its integration in a kilowatt-scale thermal energy storage... Pablo Ortiz, Evangelos P. Athanasopoulos et al.

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Improving the fast-charging capability of NMNO-based Li-ion batteries

Fast charging of Li-ion batteries can cause severe charging dynamics-related degradation. Here, the authors report a Na-doped layered oxide cathode material with P2-O2 biphasic structure, delivering fast charging capability and long cycle life. Haiqing Yuan, Jin-Yan Hwang, Yang-Kook Sun et al.

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Eutectic high-entropy alloys (EHEAs) are promising candidates for structural applications. Here, the authors report the magnetic and mechanical hardening of nano-lamellar EHEAs via dynamic magnetic fields. Yuan Wu, Yi Tong, Yang Ren et al.

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Emergent quantum Mpemba metal from a chiral spin liquid

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Binary peptide copolymers as an active model for biomolecular condensates

Tools of scientific use are urgent for intracellular condensates. Can peptide-based copolymers be used as model systems for biomolecular condensates? Here, the authors report a binary peptide copolymer system that shows features of biomolecular condensates. Zhenqiang Sun, Yong Zhou, Ke Li Lewis Ali Shin

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Improved cathode-coupling growth under CaPb-Ca(OH)2 interface to silicon-cell supply and its promotion for hydrolysis application

Stable and efficient solid-supported perovskite solar cells are essential for the development of photovoltaic technology. Here, the authors report a cathode-coupling growth under CaPb-Ca(OH)2 interface to silicon-cell supply and its promotion for hydrolysis application. Cunli Liangchen, Yuanchang Zhou, Yuanchang Zhou et al.

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Microsegment nanos- and microfiber aerogels for effective management of functional biomaterials

Deep-tissue drug and cell delivery are a prominent issue of cosmetic studies. Here, the authors report a microsegment nanos- and microfiber aerogels for effective management. Wenbing Li, Jing Liu Jinshuai Guo et al.

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Observation of first- and second-order dissipative phase transitions in a two-photon driven Kerr resonator

Dissipative phase transitions have been studied in light-matter interactions recently. Here, the authors report experimental observation of first- and second-order dissipative phase transitions in a two-photon driven Kerr resonator. Yuanchang Zhou, Yuanchang Zhou, Yuanchang Zhou et al.

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Magnetically triggered thermoelectric nanocomposite hydrogels with efficient magnetic-thermo-electric energy cascade conversion for synergistic cancer therapy

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Ultralow trap density FAPbBr$_3$ perovskite films for efficient blue perovskite diodes and amplified spontaneous emission

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Single-spin laser-printed integrated wafer cathode toward high-performance lithium–sulfur batteries

Lithium–sulfur batteries have attracted much attention because of their high energy density and low cost. However, the poor conductivity of sulfur and the shuttle effect of lithium polysulfides (LiPSs) have hindered their practical application. Here, we report a laser-printed integrated wafer cathode with good... Yuanchang Zhou, Yuanchang Zhou, Yuanchang Zhou et al.

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Robotic hands with tactile sensing have potential for a wide range of applications. However, the lack of coordination between tactile sensing and finger movements limits their performance. Here, the authors report a self-robotic hand with tactile pulse-finger coordination for improved robotic operation and perception. Yuanchang Zhou, Yuanchang Zhou, Yuanchang Zhou et al.

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Existing taekwon-x training devices are often bulky, lack energy-recovering ability, and require external power sources. Here, the authors present a power-free knee rehabilitation robot that can record lower-limb motion and store energy for reuse.
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Criegee intermediates are central to atmospheric oxidation chemistry. Here, the authors report the confinement-specific left-and-right-conveyor of cationic Criegee intermediates, specifically cis- and anti-CH$_3$CHOO$^+$, using vacuum ultraviolet photoionization coupled with a cryogenic ion trap.
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The coupling of defect centers in hBN to phonons has been mostly studied using optical techniques. Here, the authors report ultrafast phonon-mediated photodoping of color centers in hBN and its direct observation in real space by electron beams at cryogenic conditions.
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Here, authors report quasi-1s MIL-11 nanowires inducing ferromotors and immunogenic cell death for cancer immunotherapy, which can enable high-performance cancer immunotherapy.
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Dynamic boron-doping switched chitin-based single-atom Fe catalysis for chemo-selective hydrogenation
Boron-doping switched chitin-based single-atom Fe catalysis for chemo-selective hydrogenation of nitroarenes to anilines is reported. Here, authors report a chitin-based single-atom Fe catalysis for chemo-selective hydrogenation of nitroarenes to anilines, which can enable high-performance chemo-selective hydrogenation.
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