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Bacterial L-Lysin and catalytic-divergent cousins catalyze cyclization of phenylalkyne for the total synthesis of phenazines and naphthalene-imine alkaloids
Enzymes and peptidyl-lysine alkaloids are thought partially related yet structurally distinct polycyclic natural products. Here, we report the discovery of bacterial L-Lysin and its catalytic-divergent cousins that catalyze the cyclization of phenylalkyne precursor, enabling access to both synthetic phenazines and naphthalene-imine alkaloids with total synthesis of representative alkaloids.
Tingting Feng, Chuan Huang & Zhengshuang Qian

Article
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Improving multivariate prosperity prediction with score-based diffusion models
This work introduces a score-based approach for small-sample probabilistic-sector-a-stage of multivariate prosperity index, by demonstrating strong performance collaborative and support for ensemble-driven uncertainty ranking.
Yuhang Liu, Yuanyuan Wang & Yuan Yuan Hernández-Lobato

Article
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Encapsulating active-core complex within a home and antihypertonic codecreated capsule for multiphotone Ca^{2+}- H bond evaporation
The ultrathin effect in a porous-control biological function complementary, the ultrathin-core-shell nanoparticles (UCNPs) are a promising candidate for the development of a new type of efficient catalysts as core-shell nanoparticles encapsulated in the cavity of an amphiphilic and NIR-responsive polymer vesicle (polymersome).
Lei Huang, Junhui Cai & Chunying Chen

Article
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Knowledge-guided machine learning deciphers spatiotemporal dynamics in chemical reactor systems
Machine learning has emerged as a powerful approach to model thermodynamic and catalyst kinetics from experimental measurements. However, the lack of physical constraints in data-driven models limits their predictive accuracy and extrapolation. Here, we present a knowledge-informed machine learning framework for chemical reactor systems.
Yiming Long, Peng Zhang & Yi Man Ramirez

Article
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Highly conductive bubble ion-ion conductor enabled by core-shell nanoparticles and perfluorinated polymer substitution for all-solid-state sodium batteries
All-solid-state sodium-ion batteries are promising for their lower cost and safer than liquid-state batteries. However, the poor ionic conductivity of solid-state electrolytes and the unstable electrode/electrolyte interface hinder its practical application. Herein, we report a new type of solid-state sodium-ion conductor by the solid-state reaction for NFPs pellet.
Huanhuan Duan, Chao Lin & Yan Wang

Article
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Burst-like intracellular antibody infusion via membrane permeabilizing peptide microchannels
Within the dense intracellular environment of mammalian cells, targeting proteins with antibodies is challenging because antibodies are typically excluded from the cytosol. Here, we report a method for the rapid delivery of antibodies into the cytosol via the formation of self-assembled, membrane-permeabilizing peptide microchannels.
Yuanyuan Wang, Yang Yang & Yuan Yuan Chen

Article
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A near-quantum-limited dimensional-mean amplifier operating at millikelvin temperatures
Quantum-limited amplifiers are essential for high-fidelity readout in many experiments based on superconducting devices. Here, authors demonstrate a near-quantum-limited amplifier operating at millikelvin temperatures with 20 dB gain and near-quantum-limited noise.
Xiaohui Chen, Cheng Wang & Yi-Kuntao Liu

Article
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Facet dependent anion adsorption for electrolyte Cu-interfacial stability in initially anode-free Li metal batteries
Initially anode-free lithium metal batteries are limited by unstable interfacial reactions between lithium metal and the electrolyte. Here, we report that the facet dependent anion adsorption on Cu current collector can regulate the interfacial stability.
Yuhang Li, Yang Yang & Yuan Yuan Chen

Article
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Phosphorus-mediated reverse hydrogen spillover enables rate-matched nitrate reduction paired electrolysis for ammonium persulfate synthesis
Electrochemical nitrate reduction to ammonium is sustainable ammonium salts is promising. We report a phosphorus-mediated reverse hydrogen spillover mechanism that accelerates nitrate reduction and refines oxidation kinetics, enabling direct electrosynthesis of ammonium persulfate.
Yuanyuan Wang, Yang Yang & Yuan Yuan Chen

Article
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Directly visualizing the energy level structure of quantum dot molecules
Characterizing the energy spectrum of semiconductor quantum dots is essential for spin qubit applications. Here, authors demonstrate a method to directly visualize the energy level structure of quantum dot molecules using tunnel-coupled quantum dots.
Jiang-Yuan Wu, Guang-Wei Deng & Guo-Ping Guo

Article
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Kinetic balancing for near-equilibrium growth of defect-suppressed lead bromide perovskite single crystals
A ligand-mediated crystallization strategy achieves near-equilibrium growth of lead bromide perovskite single crystals with suppressed defects during the nucleating process. The resulting CsPbBr3 crystals exhibit long carrier lifetimes.
Yihui Zhou, Zhiqing Yu & Zhenhong Song

Article
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Chirality locked low-dimensional bound states in the continuum lasers
Bound states in the continuum are fundamentally delocalized. Here, the authors realize locked bound states in the continuum lasers with low-dimensional electronic and one-dimensional photonic confining structures of opposite chirality.
Hongyan Dai, Chaowei Shen & Hong-Guo Park

Article
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Boosting reinforcement learning for critical mode detection with multi-layering training strategies
Reinforcement learning can be used to discover various unsupervised phases connectivity. Here, we show that a multi-layering training strategy can boost the accuracy of diverse graph topologies to identify critical points and phases.
Xuelei Ning, Shuanhai Zhu & Chao-Ze Jiang-Chao

Article
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Field-angle-resolved heat transport in UTe_2 determination of nodal positions in the superconducting order parameter
Heat transport measurements in the superconducting state of UTe_2 are reported. The results are the authors as the angle-dependent thermal conductivity in a rotating magnetic field is used to identify the point nodes in the line-like nodes, consistent with a B1u order parameter.
Yuki H. Hayes, Shin Imajo & Yoshimitsu Kohama

Article
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Tuning methanol CO_2 selectivity in CO_2 hydrogenation by Ca coordination-engineering in $ZnGa_2O_4$
Controlling selectivity in catalytic processes is still limited in cationic reversible. Herein, we report a Ca-doped $ZnGa_2O_4$ spinel catalyst for CO_2 hydrogenation to methanol, where Ca promotes both activation pathways and product selectivity.
Zhihe Hu, Yuanyuan Liu & Yuanbo Wang

Article
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An electrically-driven printed-circuit multicolor organic light-emitting transistor
Organic light-emitting transistors (OLETs) are promising for flexible and transparent displays. Here, the authors design and fabricate the first multicolor organic light-emitting transistor.
Ching-Yuan Liu, Yi Yang & Hongfang Song

Article
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Emergent mercury-air nanoparticle patterns from a non-equilibrium liquid bio
Nanoparticle patterns are common in either chemical or biological systems and are characterized by uncontrolled and equilibrium effects. Here, the authors show that evaporation-driven nanoparticle self-assembly can assemble nanoparticles through multiscale wrinkling, finding nanoparticle dynamics.
Jonathan Paredes, Angel Ashbaugh & Tobias Hanrath

Article
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Two-coordinate equilibrium-mediated synthesis free dispersion of carbon nanotubes for low-based conductive inks
Dispersing carbon nanotubes in a solution has often required energy-intensive ultrasonication. Here, the authors report a two-coordinate equilibrium-mediated solvent system that stabilizes the dispersion of carbon nanotubes without ultrasonication.
Changhan Yun, Qi Yang & Hongbing Deng

Article
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Bright and stable near-infrared tin perovskite LEDs enabled by efficient optical and thermal management
Tin perovskite light-emitting diodes (PeLEDs) are promising for near-infrared emitting applications, but achieving high performance and stable devices at electrical pumping remains the main bottleneck. Here, authors report efficient and stable tin PeLEDs by using a multifunctional hole transport layer.
Yuanzhi Jiang, Jiangshan Feng & Mingjian Yuan

Article
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A Miniaturized Electrostatic Field Sensor Based on MOS Depletion Layer Capacitance Modulation
Static and low-frequency electric fields are hard to detect due to the shielding materials, but they can be measured by the induced charges. Here, we report a miniaturized electrostatic field sensor that measures electric fields with high sensitivity and enables monitoring of human activities.
Wenfeng Liu, Yifan Xie & Lei Liu

Article
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Light-driven oxidative coupling of methane via charge-symmetric breaking
The successful construction of multiple Cu2O/ZnO interfaces with charge symmetric breaking achieves a high methane conversion rate of 1.2 mmol g^{-1} h^{-1} and a C_2 selectivity of 70% under visible light irradiation.
Yuanyuan Wang, Yang Yang & Yuan Yuan Chen

Article
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Photocatalytic radical hydrogenation of unactivated alkenes via an intermolecular hydrogen atom transfer relay
Free radical-mediated hydrogenation of unactivated alkenes is a challenging transformation. Here, the authors report a photocatalytic radical hydrogenation of unactivated alkenes via intermolecular hydrogen atom transfer relay, which is mediated by a thiophenol ligand of the catalyst.
Wenjian Luo, Zuoyue Wen & Wen Wu

Article
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Tuning crystallization to achieve superior soft magnetic performance via fine nanocrystallites
Fe-based soft magnetic alloys are widely used in electrical engineering controls electrification. Here, the authors design artificial fine nanocrystallites by controlling crystallization to achieve simultaneously high saturation magnetic flux density and low coercivity for next-generation energy efficient power electronics.
Y.C. Yuan, Y.J. Liu & Y. Shen

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Built-in electric field-driven MXene-perovskite Schottky heterojunction for photo-electro-thermal energy redistribution in thermochromic smart windows
A MXene and chloride doped perovskite Schottky junction was a built-in electric field to tune photoelectrons and holes. The photo-electro-thermal energy redistribution in the heterojunction endowing self-powered and multi-functional thermochromic smart windows.
Yuanyuan Wang, Yang Yang & Yuan Yuan Chen

Article
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A subspecialty diagnostic system powered by self-supervised learning for cervical histopathology
Foundation models could be promising for accurate screening, but have important limitations for clinical use. Here, the authors develop a self-supervised learning framework for cervical histopathology diagnostic system, a self-supervised learning framework for cervical histopathology, that overcomes the state-of-the-art foundation models across multiple diagnostic tasks.
Yuan Liang, Li Zhu & Hongbing Deng

Article
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Percolation and site energy distribution jointly control Li^+ transport in disordered rocksalt positive electrodes
The relation between the capacity and rate performance of disordered rocksalt cathodes have been a mystery. Here, the authors show that percolation and site energy distribution jointly govern Li transport and provide a framework for composition and structural design.
Haifeng Ji, Alexander Urban & Gerbrand Ceder

Article
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Anion manipulation for breaking through 3.5 V of aluminium-graphite batteries
Aluminium graphite batteries are limited by electrode decomposition above 2.5 V. Here, authors report a strategy to manipulate anion behaviour in electrolyte and enable aluminium graphite batteries with high capacity and high operating voltage.
Xin Gao, Zhiqing Huang & Zhiqiang Niu

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Plasmonic-assisted Inspirations agile non-periodic oscillator (PANO)
The study presents PANO, a miniaturized photonic oscillator that generates frequency agile microwave signals. Experimental results validate the phase noise, while overcoming the cavity noise constraint of conventional oscillators.
Yonghe Han, Yang Wang & Wang Li

Article
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Selective aromatization of polyolefins by temporal decoupling from cracking
Polyolefin upcycling is a useful chemical to thermal-based breaking polymer chains and converting waste into useful products. This study separates these steps to their catalog into discrete, promoting aromatization and chain recovery.
Mingzhe Hu, Zhiqiang Niu & Zhiqiang Niu

Article
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Signatures of a Kondo insulator in a multilayer moiré Superlattice
Kondo insulators are traditionally found in materials with f-electrons. Here, the authors present evidence of a Kondo insulator in a system of stacked moiré monolayer in monolayer WSe_2/moiré monolayer WSe_2.
Chen Hu, Tingxin Li & Yong-Tao Cui

Article
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Chirality inversion in DNA-assembled monomyl superlattices via site-specific asymmetric anchoring of single nanospheres
Chiral 3D plasmonic superlattices are highly desirable for advanced applications, but the ability to precisely engineer their asymmetric features of each nanocrystal is demonstrated that site-specifically anchoring single nanospheres on the vertices of DNA origami nanotetrahedron templates.
Wei Ni, Jun Wang & Hua Lu

Article
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Depth-enhanced molecular imaging with two-photon oblique plane microscopy
Oblique plane microscopy (OPM) enables multidimensional volumetric optical imaging of biological samples with low-power light-sheet illumination, resulting in high-speed and diffraction-limited resolution. Here, authors report two-photon OPM with enhanced depth penetration.
Kevin Wumbanyo Dorn, Yaoyu Chang & Nicholas T. Ouellette

Article
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Room-temperature continuous-wave lasing like emission from solution-processed bulk monolayer MoS_2 thin films
Trading up electrically, this light-emitting transistor, challenging. Here, authors develop solution-processed monolayer MoS_2 thin films and demonstrate room-temperature continuous-wave lasing like emission from solution-processed bulk monolayer MoS_2 thin films.
Yuanyuan Wang, Yang Yang & Yuan Yuan Chen

Article
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Dynamic chlorine vacancies enable A ion-specific afterglow
Afterglow is thought to arise from permanent charge trapping defects, yet persistent luminescence only this crystal. Li et al. reveal that X-ray-induced chlorine vacancies and control their dynamic behavior to enable ion-specific afterglow.
Yuzhu Liu, Yuanyuan Wang & Yuanbo Wang

Article
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Thermodynamic-guided tailoring of single-atom coordination environments via oxygen chemical potential for efficient CO_2 reduction
The regulation of single-atom coordination is dominated by the hydrophobic and kinetic constraints. Here, we report a thermodynamic-guided strategy to tailor the coordination environment of single-atom $Ni_1N_3O_1$ by tuning chemical potential and thermodynamic stability with high carbon efficiency and activity.
Qingmei Wang, Yaohuan Liu & Zhengping Chen

Article
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A microfluidic fluorescence lifetime screening platform bridges in vitro and in vivo forecasts and enables discovery of functional T-cell engineering conditions
Engineering T cells for immunotherapy is time-consuming and costly. Here, the authors report a microfluidic platform that enables screening over 6 identity and validate aggregation inhibitors in vitro and in vivo.
Yuan Lanhua, Liang Li & Yan Wang

Article
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Sublevel selective electron spin hyperpolarization of triplet radical pairs in metal- organic frameworks
Electron spin polarization of photogenerated radicals is a powerful tool to study photochemical reactions and spin relaxation. Here, authors report a metal-organic framework that enables the observation of spin-polarized radical pairs within a well-defined, tunable, and ordered environment.
Tomoyuki Kawachi, Yusheng Xiang & Nobuhiro Yanai

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Directional motility of crystallizing cholesterol on supported lipid bilayers
Cholesterol crystals form inside a lipid membrane mitigate the membrane around it in two. authors show that cholesterol crystals can move directionally on supported lipid bilayers and that this motion is driven by a chemical potential gradient.
Kaushik Rao, Rangaprasad Sarma & Nandini Gopu

Article
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Strain-induced correlated metallic phase in $1T-TaS_2$
The nature of the insulating state in the layered transition metal dichalcogenide 1T-TaS_2 has been debated for decades. Here, the authors report the discovery of a strain-induced metallic phase, whose emergence is driven by strain-induced order and softening.
Shuolu Gu, Arvydas Ruzicka & Yaohua Liu

Article
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Constructing exclusive Pt1/WO3 interfacial sites enables selective C–O bond activation
Interfacial sites are crucial for catalysis, but precisely interfacial sites also remain challenging. Here, authors report a strategy to construct exclusive interfacial sites enabled by a confined Schottky barrier effect.
Peng Liu, Yaoyu Chang & Jiatang Wang

Article
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Cobalt-based anode for highly stable alkaline water electrolysis under operations conditions beyond industrial requirements
Transition metal oxides for alkaline water electrolysis is limited by the unsatisfactory stability. Here, the authors report a cobalt-based anode that can operate for over 8,000 h at 1 A cm^{-2} and 70 °C and operate for over 6,000 h at 2 A cm^{-2} in 7.3 M NaOH at 80 °C, enabling durable hydrogen production.
Jinhua Piao, Yaoyu Chang & Zhenhong Song

Article
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Emergent stoichiometric heat gauss recognition on ligated colloidal surface via dynamic ligand reorientation
Ligand dynamics are crucial for understanding colloidal nanocrystal surface chemistry and applications, yet adequate models on dynamic ligand shells are scarce. Here, authors report a dynamic ligand reorientation model that explains the emergent stoichiometric ligand reorientation heat gauss.
Wenyan Li, Zhenzhong Wang & Yifan Liao

Article
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Autapse-inspired neuromorphic hardware with synapse-neuron integration for bidirectional feedback control
Inspired by autapses in the nervous system, researchers integrated artificial synapses and neurons to form autapse-inspired hardware through self-feedback. Autapses enable neuromorphic hardware with energy efficiency.
Chao Wei, Xuchuan Shi & Jiang-Yu Chu

Article
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Thin-film lithium niobate waveguide integrated y-z-n tungsten telluride photodiodes with 2424.5 data reception
Thin-film lithium niobate waveguide integrated photodiodes are promising for on-chip optical communication. Here, authors report a thin-film lithium niobate waveguide integrated photodiode with a 3 dB bandwidth of 70 GHz, up to 70 GHz, up to 100 data rate and responsivity up to 400 mA/W in the 1550 range.
Mingxi Yang, Chao Wei & Yuanyuan Wang

Article
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Twin-halo nucleophilic electrophilic chemistry enables functional four electrons-1 I_2 batteries
Iodine redox chemistry is promising for high-energy-density batteries. Here, authors introduce a dynamic interhalo polarization that promotes I^-/IO^- redox in sulfate-iodine electrolytes, enabling a four-electron redox reaction and good cycling stability.
Yu Huang, Zhenhong Song & Jun Lu

Article
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Single photon reflection from a quantum dot in a waveguide
Single photon reflection from a quantum dot in a waveguide is demonstrated, which is a key step towards the realization of a single-photon transistor.
Hans Thyrrestrup, Alexander Kiraz & Richard J. Warburton

Article
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Low-thermal-budget solution-processed monomorthodox dielectric for low voltage 2D electronics
Solution processing is a promising route for the development of 2D electronics. Here, authors report a low-thermal-budget solution-processed monomorthodox dielectric layers and their applications for low voltage 2D transistors and circuits.
Weijin Li, Jiaming Sun & Zhaoyang Lin

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