

Materials Horizons

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EDITORIAL

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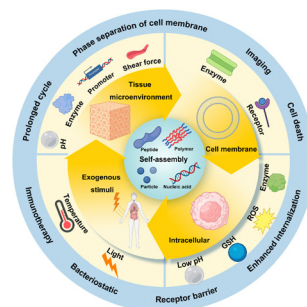


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***In situ* stimulus-responsive self-assembled
nanomaterials for drug delivery and disease
treatment**

Ziling Yan, Yanfei Liu, Licheng Zhao, Jiaxin Hu,
Yimin Du, Xingxing Peng and Zhenbao Liu*



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Building and designing systems from the molecular level

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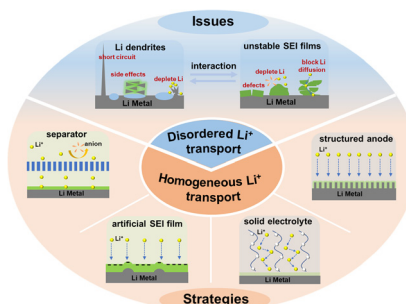


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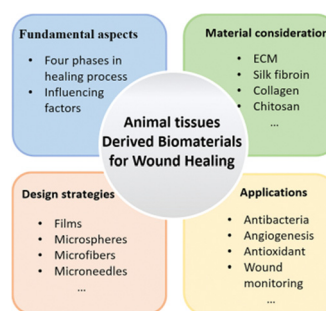
Ce Wang, Jiahao Zhu, Yuhong Jin,* Jingbing Liu, Hao Wang* and Qianqian Zhang*



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Animal tissue-derived biomaterials for promoting wound healing

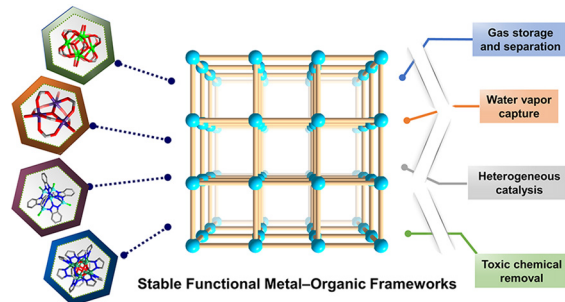
Xinyue Cao, Xiang Lin, Ning Li, Xiaozhi Zhao,* Min Zhou* and Yuanjin Zhao*



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Rational design of stable functional metal–organic frameworks

Zhijie Chen,* Kent O. Kirlikovali, Le Shi and Omar K. Farha*



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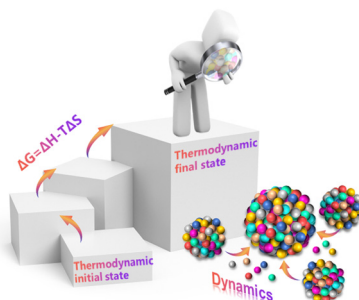
Bio-inspired artificial synaptic transistors: evolution from innovative basic units to system integration

Xin Wang, Yixin Ran, Xiaoqian Li, Xinsu Qin, Wanlong Lu, Yuanwei Zhu and Guanghao Lu*



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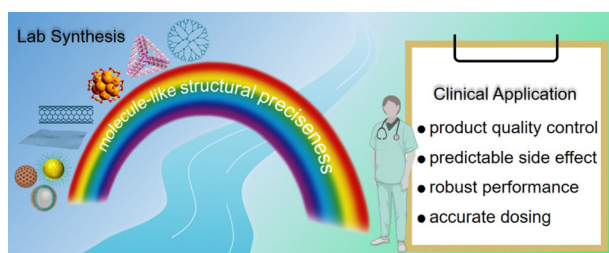
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Insights into high-entropy material synthesis dynamics criteria based on a thermodynamic framework

Zeshuo Meng, Zijin Xu, Hongwei Tian* and Weitao Zheng*

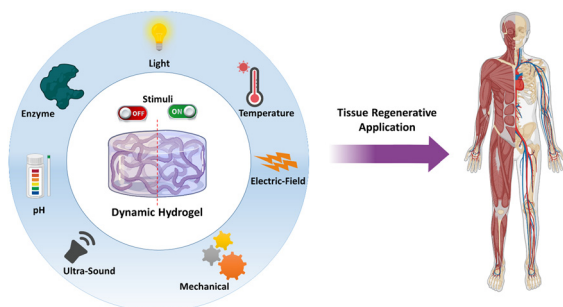
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Jie Wang, Ping Li, Chao Wang,* Ning Liu* and Dongming Xing*

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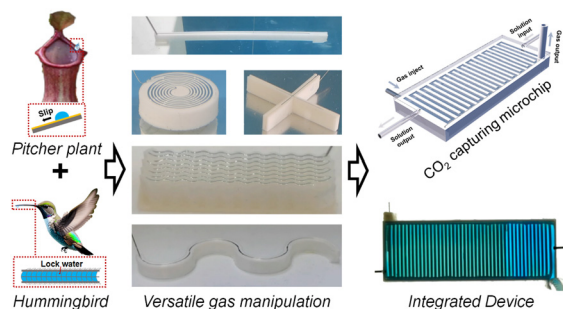


Stimuli-responsive dynamic hydrogels: design, properties and tissue engineering applications

Sivashanmugam Amirthalingam, Arun Kumar Rajendran, Young Gi Moon and Nathaniel S. Hwang*

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Designing a slippery/superaerophobic hierarchical open channel for reliable and versatile underwater gas delivery

Xinsheng Wang, Haoyu Bai, Zhe Li, Yaru Tian, Tianhong Zhao and Moyuan Cao*

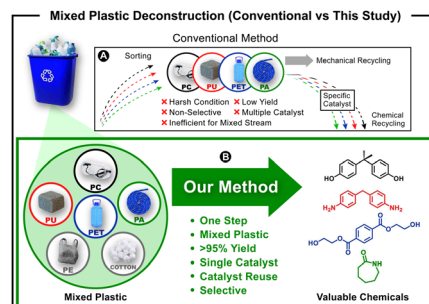


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Selective deconstruction of mixed plastics by a tailored organocatalyst

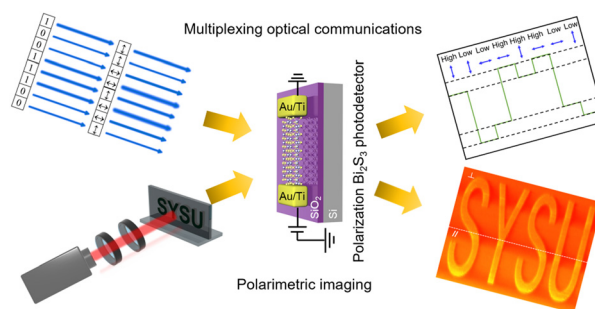
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Quantum tailoring for polarization-discriminating Bi_2S_3 nanowire photodetectors and their multiplexing optical communication and imaging applications

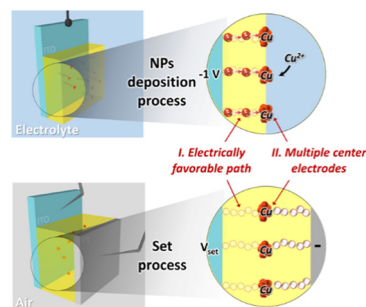
Huaxin Yi, Churong Ma, Wan Wang, Huanrong Liang, Rui Cui, Weiwei Cao, Hailin Yang, Yuhang Ma, Wenjing Huang, Zhaoqiang Zheng, Yichao Zou, Zexiang Deng,* Jiandong Yao* and Guowei Yang



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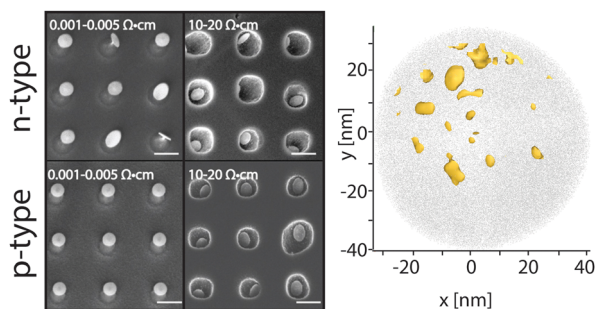
Dong Su Kim, Hee Won Suh, Sung Woon Cho, Shin Young Oh, Hak Hyeon Lee, Kun Woong Lee, Ji Hoon Choi and Hyung Koun Cho*



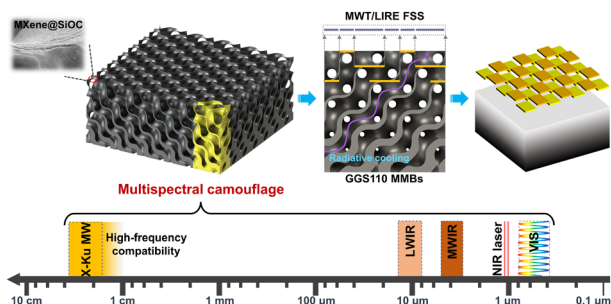
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Doping density, not valency, influences catalytic metal-assisted plasma etching of silicon

Julia B Sun, Namphung Peimyoo, James O Douglas and Benjamin D Almquist*



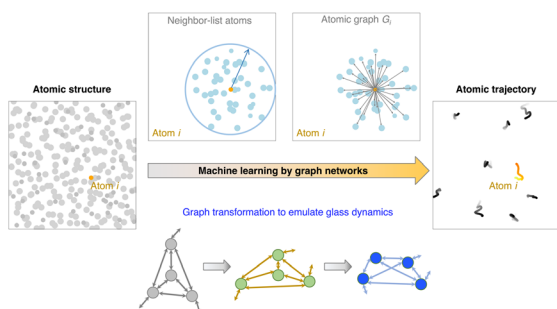
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Wide-temperature-range multispectral camouflage enabled by orientation-gradient co-optimized microwave blackbody metastructure coupled with conformal MXene coating

Li Yao, Longkai Pan, Shixiang Zhou, Hongxia Liu, Hui Mei,* Yang Li, Konstantinos G. Dassios, Paolo Colombo, Laifei Cheng and Litong Zhang

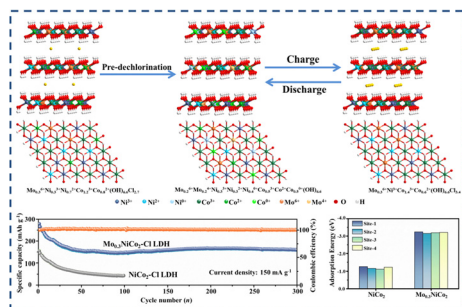
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Learning molecular dynamics: predicting the dynamics of glasses by a machine learning simulator

Han Liu,* Zijie Huang, Samuel S. Schoenholz, Ekin D. Cubuk, Morten M. Smedskjaer, Yizhou Sun, Wei Wang and Mathieu Bauchy*

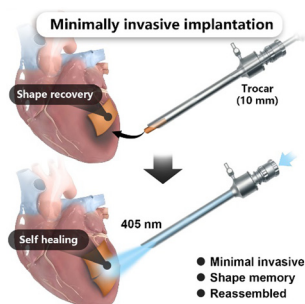
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Introducing high-valence molybdenum to stimulate lattice oxygen in a NiCo LDH cathode for chloride ion batteries

Shuhan Yang, Qing Yin,* Zhihao Song, Fan Xu, Zelin Xie, Yunjia Wu, Shilin Xu, Yong-Zhi Li, Danyang Zhao, Bin Xiao, Xiaolan Xue, Jiqiu Qi, Yanwei Sui* and Jingbin Han

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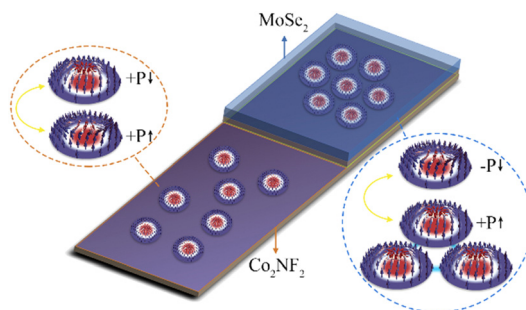
In vivo self-assembled shape-memory polyurethane for minimally invasive delivery and therapy

Shifen Li, Hua Zhang, Jieqi Xie, Zhaoyi Wang, Kai Wang, Zhihe Zhai, Jie Ding, Shuqin Wang, Liyin Shen, Jun Wen, Yi-Da Tang, Huanan Wang, Yang Zhu* and Changyou Gao*

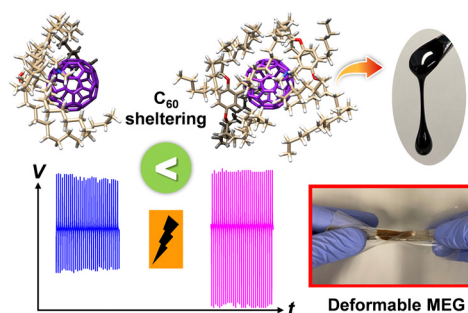


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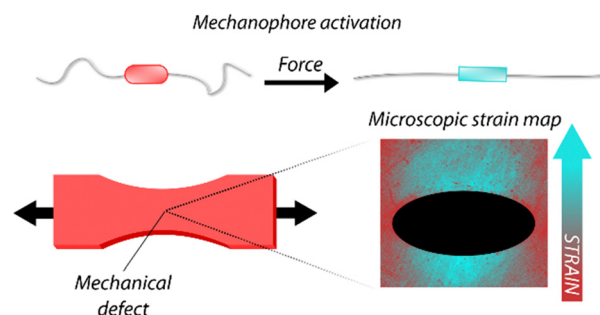
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Ferroelectrically tunable magnetic skyrmions in two-dimensional multiferroicsZhonglin He, Wenhui Du, Kaiying Dou, Ying Dai,*
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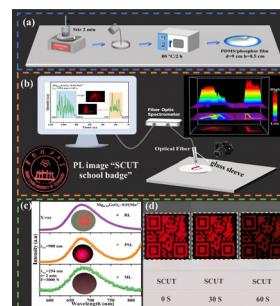
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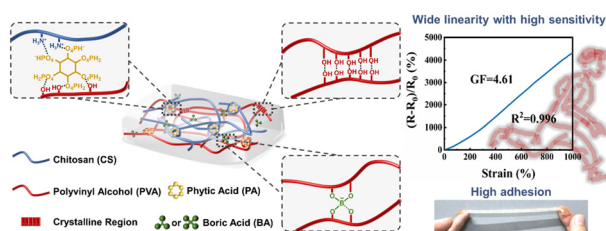
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Microscopic strain mapping in polymers equipped with non-covalent mechanochromic motifsHanna Traeger, Derek Kiebal, Céline Calvino,
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Na Yan, Zhiduo Wang, Qianyi Chen, Peishan Shao,
Mikhail G. Brik, Shi Ye, Dongdan Chen* and
Zhongmin Yang

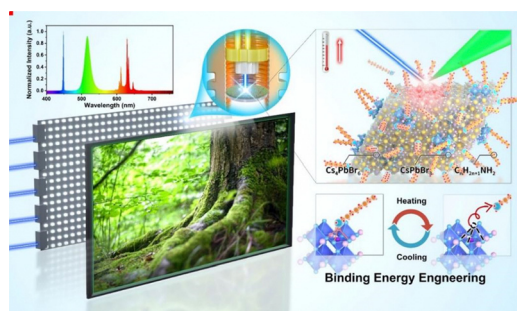
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Highly adhesive chitosan/poly(vinyl alcohol) hydrogels *via* the synergy of phytic acid and boric acid and their application as highly sensitive and widely linear strain sensors

Cuiwen Liu, Ru Zhang, Yao Wang, Chengmeng Wei, Feng Li, Ning Qing and Liuyan Tang*

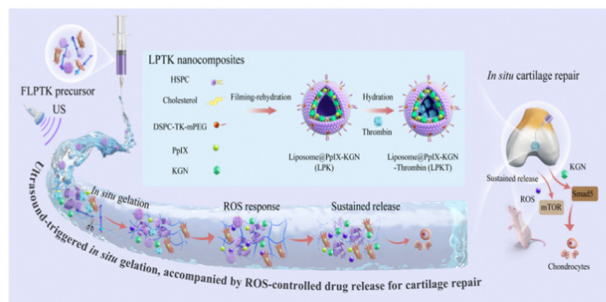
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A high-performance metal halide perovskite-based laser-driven display

Shaoan Zhang, Zhenzhang Li, Zaijin Fang, Bao Qiu, Janak L. Pathak, Kaniyarakkal Sharafudeen, S. Saravanakumar, Zhanjun Li, Gang Han* and Yang Li*

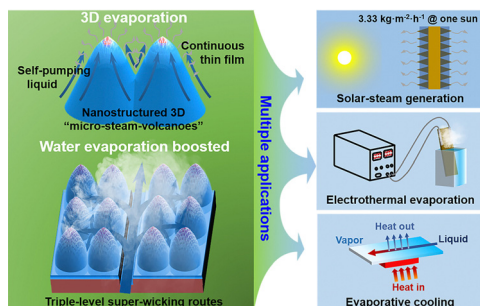
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Ultrasound-triggered *in situ* gelation with ROS-controlled drug release for cartilage repair

Shunli Wu, Hao Zhang, Sicheng Wang, Jinru Sun, Yan Hu, Han Liu, Jinlong Liu, Xiao Chen, Fengjin Zhou,* Long Bai,* Xiuhui Wang* and Jiacan Su*

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Boosting water evaporation *via* continuous formation of a 3D thin film through triple-level super-wicking routes

Guochen Jiang, Lizhong Wang, Ze Tian, Changhao Chen, Xinyu Hu, Rui Peng, Daizhou Li, Hongjun Zhang, Peixun Fan* and Minlin Zhong*

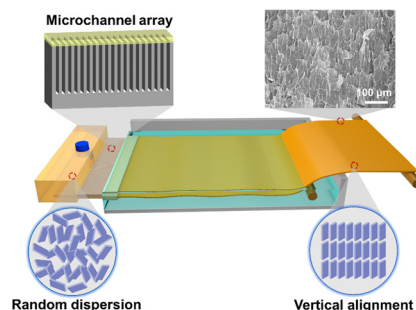


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Scalable microfluidic fabrication of vertically aligned two-dimensional nanosheets for superior thermal management

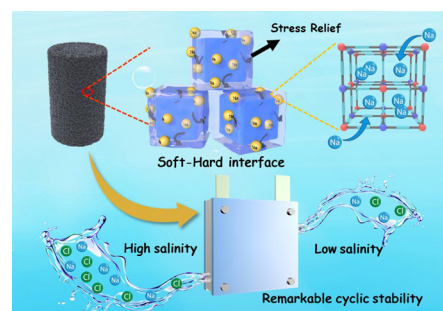
Kai Yang, Xiaoran Yang, Zexin Liu, Rong Zhang, Yue Yue, Fanfan Wang, Kangyong Li, Xiaojie Shi, Jun Yuan, Ningyu Liu, Zhiqiang Wang,* Gongkai Wang* and Guoqing Xin*



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Soft–hard interface design in super-elastic conductive polymer hydrogel containing Prussian blue analogues to enable highly efficient electrochemical deionization

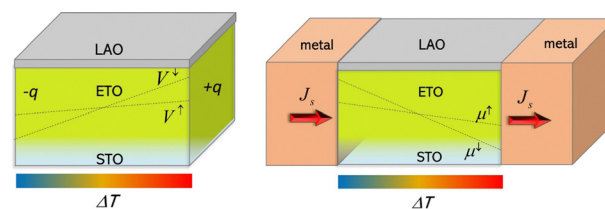
Yifan Ren, Fei Yu, Xin-Gui Li, Brian Yuliarto, Xingtao Xu,* Yusuke Yamauchi* and Jie Ma*



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Ultra-thin magnetic film with giant phonon-drag for heat to spin current conversion

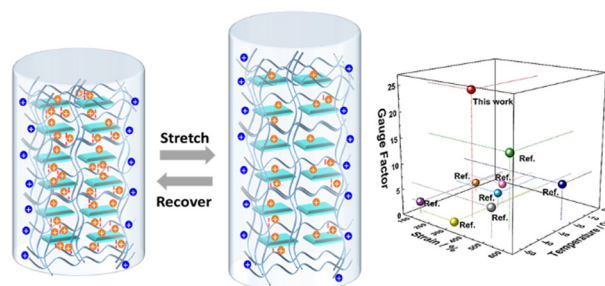
Payal Wadhwa, Andrea Bosin and Alessio Filippetti*



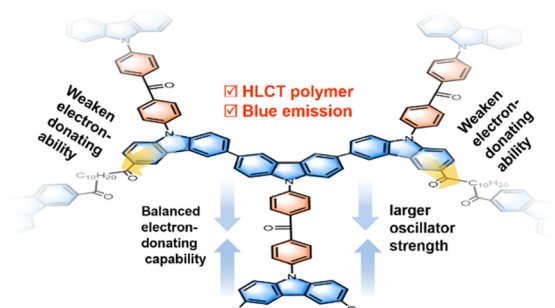
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Competitive proton-trapping strategy enhanced anti-freezing organohydrogel fibers for high-strain-sensitivity wearable sensors

Zhujun Chen, He Liu, Xinyiming Lin, Xianming Mei, Wei Lyu* and Yaozu Liao*



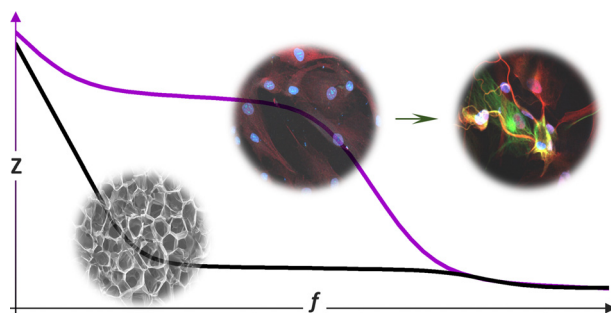
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Pioneering research on blue “hot exciton” polymers and their application in solution-processed organic light-emitting diodes

Jiasen Zhang, Wei Li,* Lingling Lyu, Qiang Wei,* Yuanyuan Meng, Deli Li, Zhichuan Wang, Ming Luo, Songyu Du, Xu Xu, Xiaoli Zhang, Guohua Xie* and Ziyi Ge*

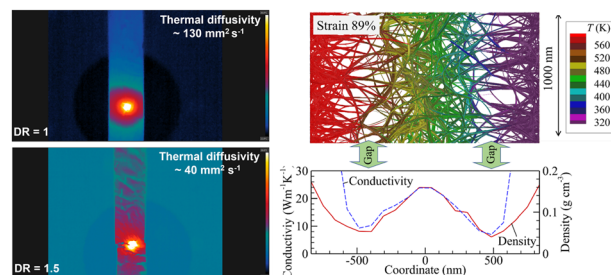
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3D organic bioelectronics for electrical monitoring of human adult stem cells

Achilleas Savva,* Janire Saez, Aimee Withers, Chiara Barberio, Verena Stoeger, Shani Elias-Kirma, Zixuan Lu, Chrysanthi-Maria Moysidou, Konstantinos Kallitsis, Charalampos Pitsalidis and Róisín M. Owens*

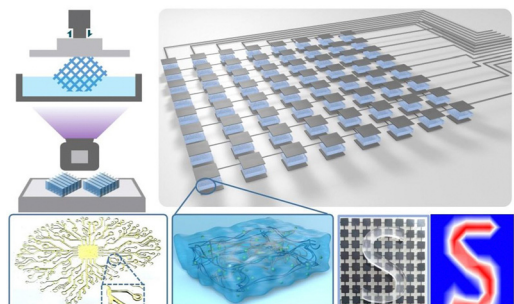
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Optimization of thermoelectric properties of carbon nanotube veils by defect engineering

Chongyang Zeng, Pietro Stenier, Kan Chen, Kening Wan, Ming Dong, Suwei Li, Coskun Kocabas, Michael J. Reece, Dimitrios G. Papageorgiou, Alexey N. Volkov, Han Zhang and Emiliano Bilotti*

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A liquid-free conducting ionoelastomer for 3D printable multifunctional self-healing electronic skin with tactile sensing capabilities

Qirui Wu, Yidan Xu, Songjiu Han, Jundong Zhu, Anbang Chen, Jiayu Zhang, Yujia Chen, Xiaoxiang Yang, Jianren Huang* and Lunhui Guan*

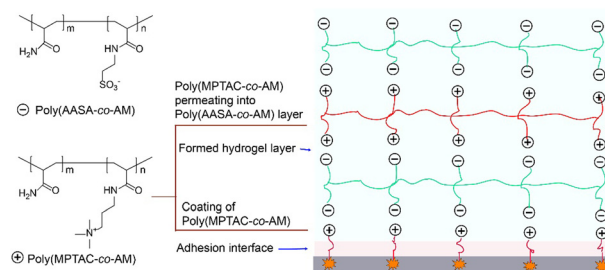


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3622

***In situ* molecular permeation of liquid cationic polymers into solid anionic polymer films enabling self-adaptive adhesion of hydrogel biosensors**

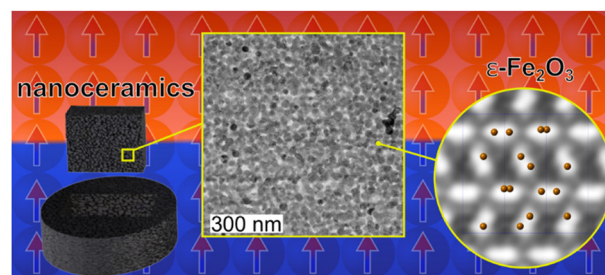
Danqing Zhou, Jiahui Yu,* Qiuhua Zhao* and Lidong Zhang*



3631

Nanoceramics of metastable ϵ -Fe₂O₃: effect of sintering on the magnetic properties and sub-terahertz electron resonance

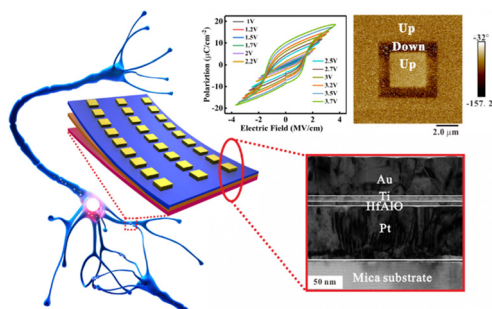
Evgeny A. Gorbachev,* Liudmila N. Alyabyeva, Miroslav V. Soshnikov, Vasily A. Lebedev, Anatolii V. Morozov, Ekaterina S. Kozlyakova, Asmaa Ahmed, Artem A. Eliseev and Lev A. Trusov*



3643

Flexible aluminum-doped hafnium oxide ferroelectric synapse devices for neuromorphic computing

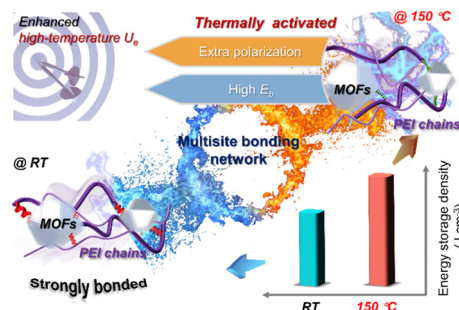
Zhenhai Li, Tianyu Wang,* Jialin Meng, Hao Zhu, Qingqing Sun, David Wei Zhang and Lin Chen*



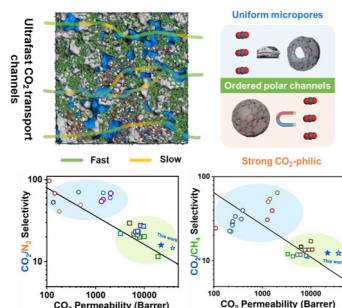
3651

Thermally activated dynamic bonding network for enhancing high-temperature energy storage performance of PEI-based dielectrics

Jialong Li, Xiaoxu Liu,* Bingshun Huang, Dongyang Chen, Zhaoru Chen, Yanpeng Li, Yu Feng, Jinghua Yin, Haozhe Yi and Taoqi Li



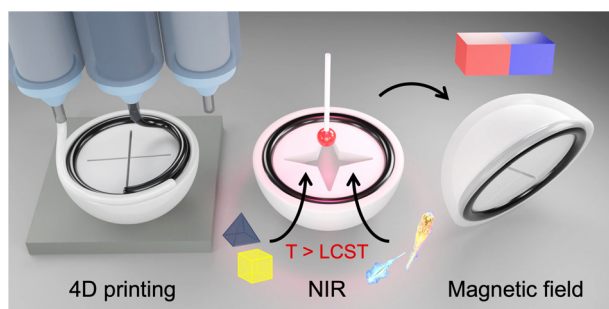
3660



Heteroatom-doped noble carbon-tailored mixed matrix membranes with ultrapermeability for efficient CO₂ separation

Zhihong Tian, Dongyang Li, Weigang Zheng, Qishuo Chang, Yudong Sang, Feili Lai, Jing Wang,* Yatao Zhang,* Tianxi Liu and Markus Antonietti

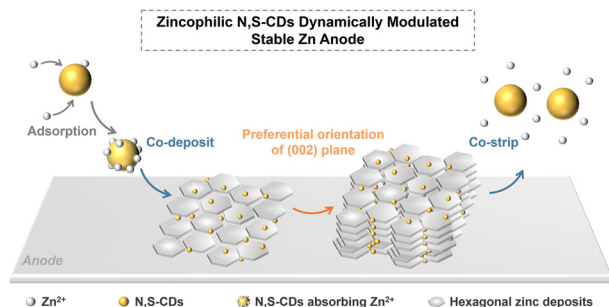
3668



A dual stimuli-responsive smart soft carrier using multi-material 4D printing

Inyoung Choi, Saeun Jang, Seunggyeom Jung, Seohyun Woo, Jinyoung Kim, Cheol Bak, Yongmin Lee and Sukho Park*

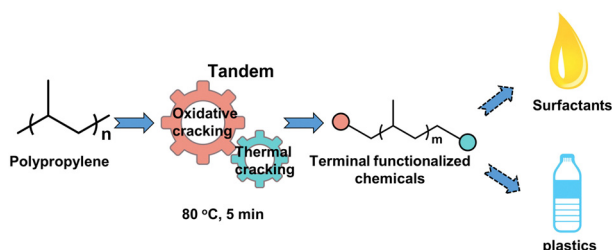
3680



Durable modulation of Zn(002) plane deposition via reproducible zincophilic carbon quantum dots towards low N/P ratio zinc-ion batteries

Zhu Xu, Heng Li,* Yupeng Liu, Kexuan Wang, Huibo Wang, Mingzheng Ge, Junpeng Xie, Jielei Li, Zhaorui Wen, Hui Pan, Songnan Qu, Jilei Liu, Yanyan Zhang, Yuxin Tang* and Shi Chen*

3694



Tandem oxidative and thermal cracking of polypropylene at low temperatures

Xiangyue Wei, Qiang Zhang, Chengfeng Shen, Xu Zhao, Fan Zhang, Xuehui Liu, Gang Wu, Shimei Xu* and Yu-Zhong Wang*

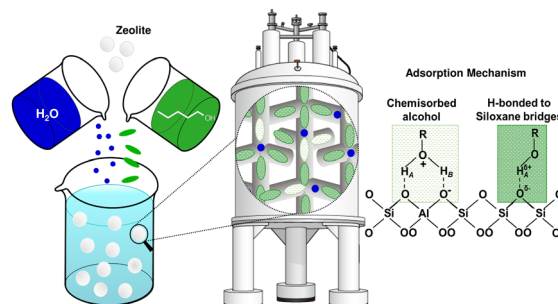


COMMUNICATIONS

3702

Hydrogen bonding to oxygen in siloxane bonds drives liquid phase adsorption of primary alcohols in high-silica zeolites

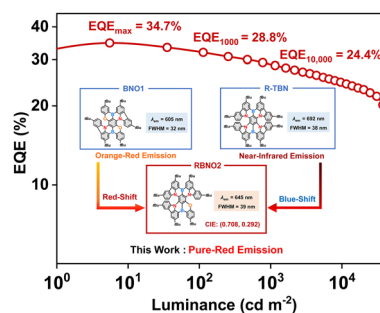
Sambhu Radhakrishnan, Charlotte Lejaegere, Karel Duerinckx, Wei-Shang Lo, Alysson F. Morais, Dirk Dom, C. Vinod Chandran, Ive Hermans, Johan A. Martens and Eric Breynaert*



3712

Precisely regulating the double-boron-based multi-resonance framework towards pure-red emitters: high-performance OLEDs with CIE coordinates fully satisfying the BT. 2020 standard

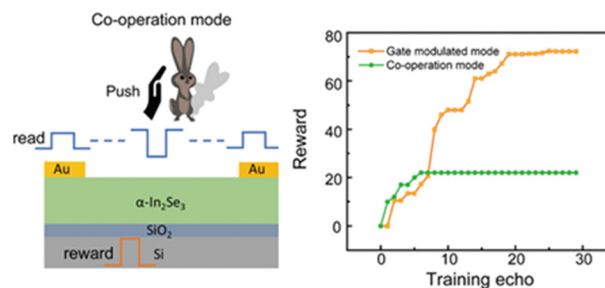
Yang Zou,* Jiawei He, Nengquan Li, Yuxuan Hu, Sai Luo, Xiaosong Cao and Chuluo Yang*



3719

Achieving reinforcement learning in a three-active-terminal neuromorphic device based on a 2D vdW ferroelectric material

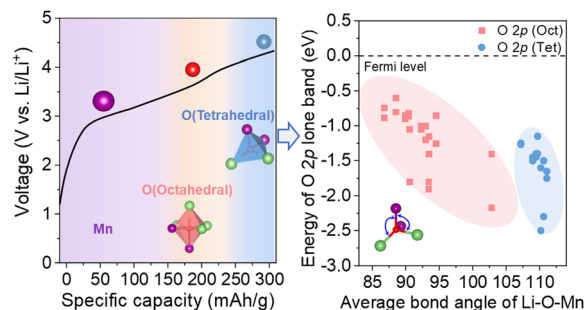
Feng Guo, Weng Fu Io, Zhaoying Dang, Ran Ding, Sin-Yi Pang, Yuqian Zhao and Jianhua Hao*



3729

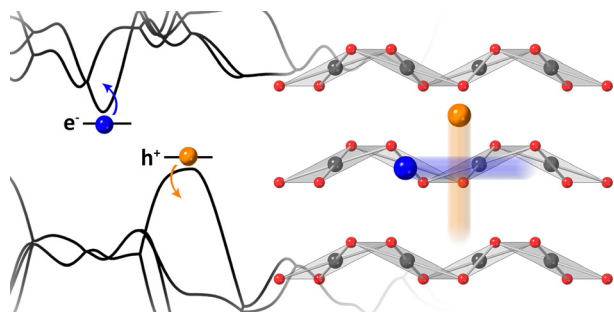
Enhancing anionic redox stability via oxygen coordination configurations

Haixin Li, Yining Li, Xiaolin Zhao, Yang Gan, Wujie Qiu* and Jianjun Liu*



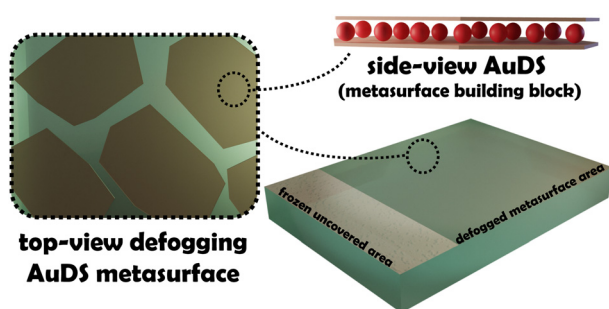
COMMUNICATIONS

3740

Axis dependent conduction polarity in the air-stable semiconductor, PdSe₂

Ryan A. Nelson, Ziling Deng, Andrew M. Ochs, Karl G. Koster, Cullen T. Irvine, Joseph P. Heremans, Wolfgang Windl and Joshua E. Goldberger*

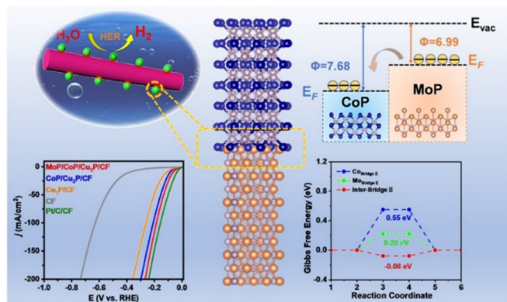
3749



Fabricating defogging metasurfaces via a water-based colloidal route

Olena Khoruzhenko, Volodymyr Dudko, Sabine Rosenfeldt and Josef Breu*

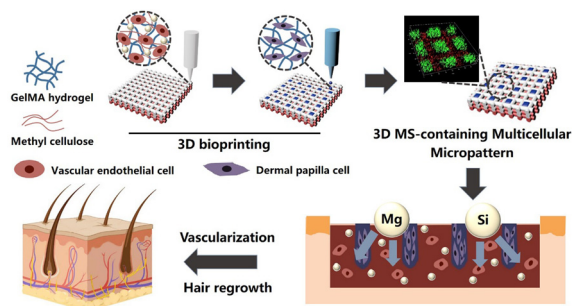
3761



Constructing abundant interfaces by decorating MoP quantum dots on CoP nanowires to induce electronic structure modulation for enhanced hydrogen evolution reaction

Yuanyuan Chen, Tingting Sui, Chaojie Lyu, Kaili Wu, Jiwen Wu, Meifang Huang, Ju Hao, Woon-Ming Lau, Chubin Wan,* Dawei Pang* and Jinlong Zheng*

3773



3D multicellular micropatterning biomaterials for hair regeneration and vascularization

Jingge Ma, Chen Qin, Jinfu Wu, Hui Zhuang, Lin Du, Jinfu Xu and Chengtie Wu*

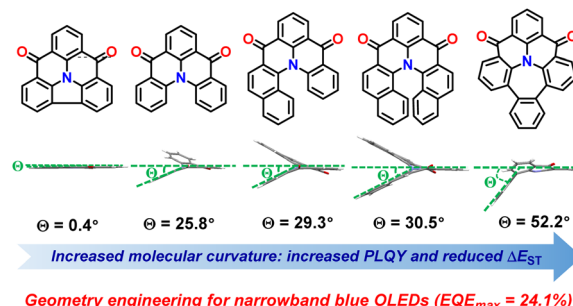


COMMUNICATIONS

3785

Geometry engineering of a multiple resonance core via a phenyl-embedded strategy toward highly efficient narrowband blue OLEDs

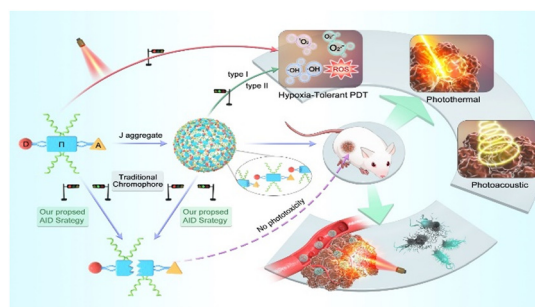
Yimin Wu, Xiaoyu Liu, Junjie Liu, Ge Yang, Songyan Han, Dezhi Yang, Xiaosong Cao, Dongge Ma, Zhengyang Bin* and Jingsong You*



3791

Aggregation-induced type I&II photosensitivity and photodegradability-based molecular backbones for synergistic antibacterial and cancer phototherapy via photodynamic and photothermal therapies

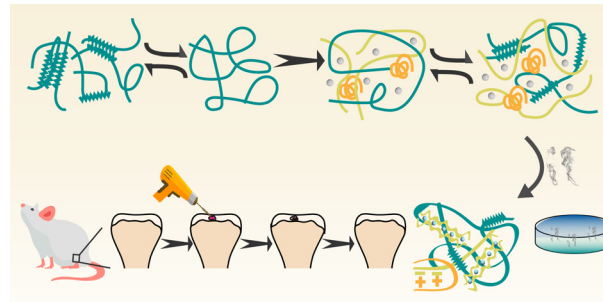
Jun Liu,* Hongyu Chen, Yongsheng Yang, Qihui Wang, Shilu Zhang, Bo Zhao, Zhonghui Li, Guoqiang Yang* and Guowei Deng*



3797

A natural polymer-based hydrogel with shape controllability and high toughness and its application to efficient osteochondral regeneration

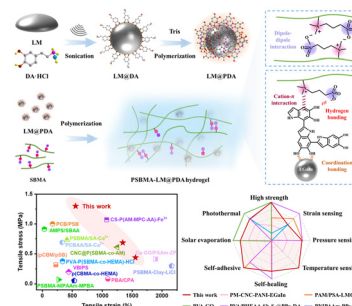
Jueying Yang, Hui Wang, Weiting Huang, Kelin Peng, Rui Shi, Wei Tian, Lizhi Lin, Jingjing Yuan, Weishang Yao, Xilan Ma and Yu Chen*



3807

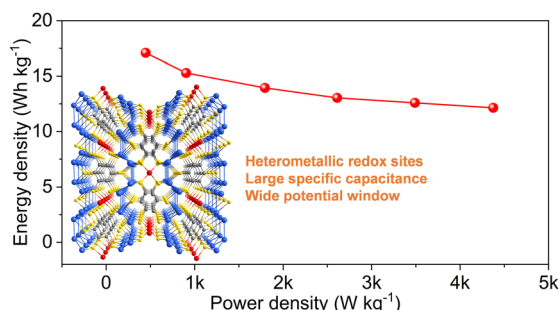
Ultra-robust, high-adhesive, self-healing, and photothermal zwitterionic hydrogels for multi-sensory applications and solar-driven evaporation

Youyou Chen, Chen Zhang,* Rui Yin, Minghan Yu, Yijie Liu, Yaming Liu, Haoran Wang, Feihua Liu, Feng Cao, Guoqing Chen* and Weiwei Zhao*



COMMUNICATIONS

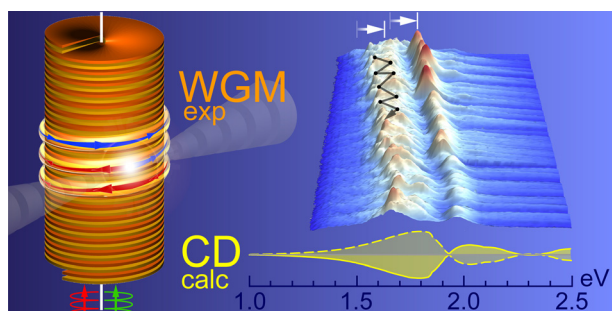
3821



Nonporous, conducting bimetallic coordination polymers with an advantageous electronic structure for boosted faradaic capacitance

Yigang Jin, Sha Wu, Yong Sun, Zixin Chang, Ze Li, Yimeng Sun and Wei Xu*

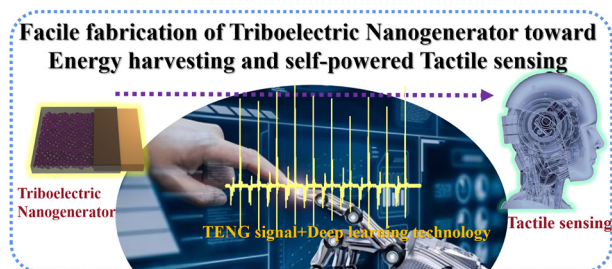
3830



Chirality and dislocation effects in single nanostructures probed by whispering gallery modes

Peter Sutter,* Larousse Khosravi-Khorashad, Cristian V. Ciobanu and Eli Sutter*

3840



Fabrication of a textile-based triboelectric nanogenerator toward high-efficiency energy harvesting and material recognition

Junjun Huang, Sanlong Wang, Xingke Zhao, Wenqing Zhang, Zhenming Chen, Rui Liu, Peng Li,* Honglin Li* and Chengmei Gui*

CORRECTION

3854

Correction: Anomalous abrupt switching of wurtzite-structured ferroelectrics: simultaneous non-linear nucleation and growth model

Keisuke Yazawa,* John Hayden, Jon-Paul Maria, Wanlin Zhu, Susan Trolier-McKinstry, Andriy Zakutayev and Geoff L. Brennecke*

