

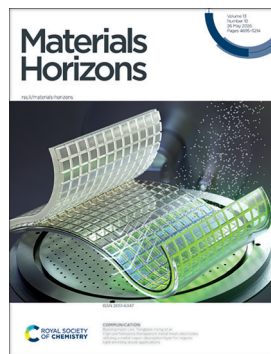
Materials Horizons

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See Byeongmoon Lee, Yongtaek Hong *et al.*, pp. 4863–4874. Image reproduced by permission of Yongtaek Hong from *Mater. Horiz.*, 2026, 13, 4863.



Inside cover

See J. T. Xiong, T. Yang *et al.*, pp. 4875–4890. Image reproduced by permission of Tao Yang from *Mater. Horiz.*, 2026, 13, 4875.

EDITORIAL

4708

Introduction to the themed collection on nanocatalysis

Huabin Zhang,* Jennifer Strunk, Marcella Lusardi,* Tianyi Ma, Vivek Polshettiwar* and Wee-Jun Ong*

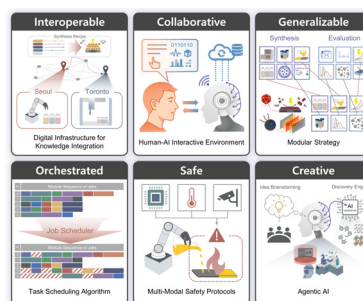


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Toward self-driving laboratory 2.0 for chemistry and materials discovery

Heeseung Lee, Hyuk Jun Yoo, Hye Su Jang, Byeongho Park, Yang Jeong Park* and Sang Soo Han*



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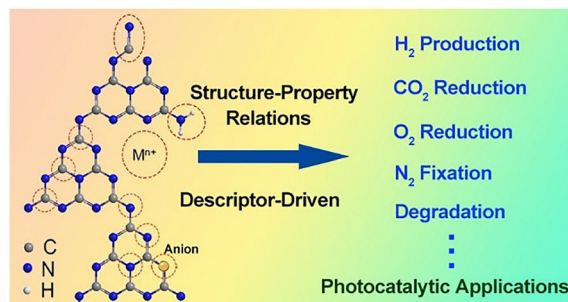


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Revolutionizing carbon nitride-based photocatalysts: design strategies for energy conversion and environmental applications

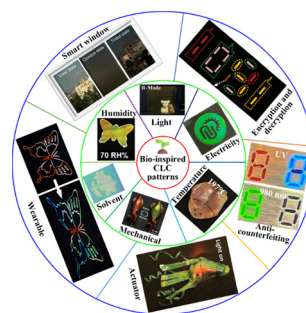
Xuying Li, Aiping Zheng, Haoxin Mai,* Dehong Chen* and Rachel A. Caruso*



4773

Recent advances in patterned bio-inspired cholesteric liquid crystals: fabrication, stimuli-responsive mechanisms, and smart optical applications

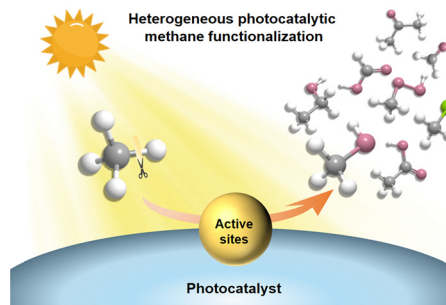
Yuanyuan Shang, Tao Long, Junchao Liu, Pingping Wu, Xiaodong Yang and Jingxia Wang*



4803

Methane functionalization in heterogeneous photocatalysis

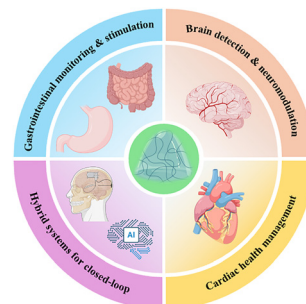
Yin-Feng Wang, Ming-Yu Qi, Chang-Long Tan,* Zi-Rong Tang* and Yi-Jun Xu*



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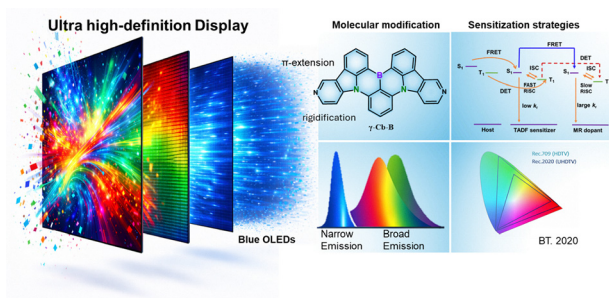
Hydrogel-integrated multimodal physiological and modulation systems

Mengmeng Yao, Ju-Chun Hsieh and HuiLiang Wang*



REVIEWS

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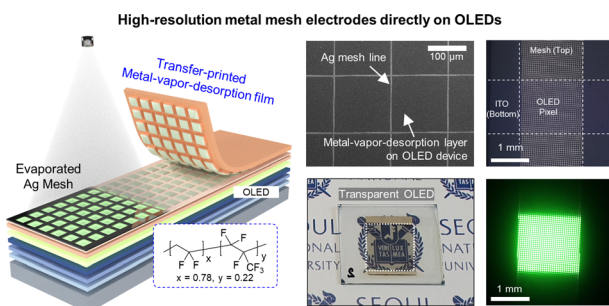


Next-generation blue OLED emitters: efficiency, color purity, and the road to BT.2020

Tejas Dhanalaxmi Raju, Meghana Tirupati, Nahyun Kim, Subramanian Muruganatham, Pavan Kumar Odugu, Arul Varman Kesavan, Jang Hyuk Kwon* and Tae Geun Kim*

COMMUNICATIONS

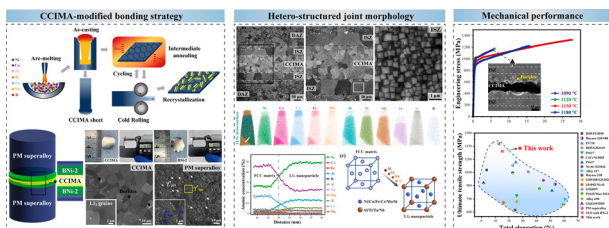
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High-performance transparent metal mesh electrodes utilizing a metal-vapor-desorption layer for organic light-emitting diode applications

Dahyun Kim, Sujin Jeong, Dong Keon Lee, Wonjune Yi, Hyungsoo Yoon, Joohee Jeon, Hayun Kim, Byeongmoon Lee* and Yongtaek Hong*

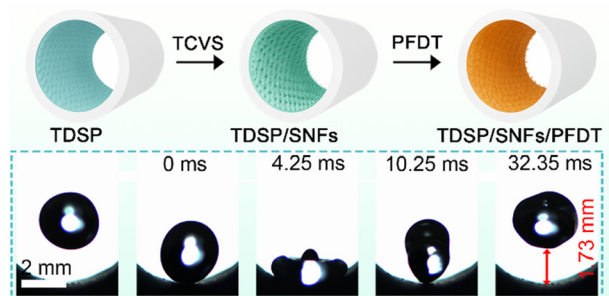
4875



Hierarchical strengthening and toughening design of superalloy joints via a chemically complex intermetallic alloy-modified diffusion bonding strategy

L. Yuan, F. Y. Jiang, Y. J. Du, Y. Z. Yang, J. Gan, P. K. Liu, D. Hao, J. Y. Zhang, J. H. Luan, H. Zhang, J. L. Li, J. T. Xiong* and T. Yang*

4891



Robust superamphiphobic coatings in confined and chemically inert tubular geometries enabled by a dynamic circulation coating strategy

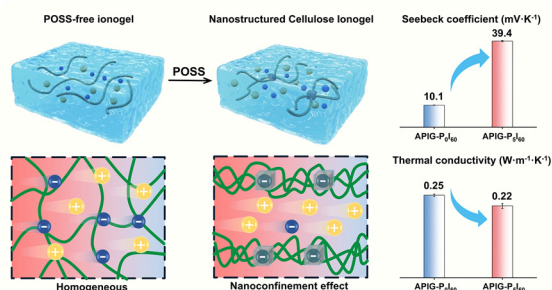
Bucheng Li, Jiaren Zhang and Junping Zhang*



4903

Nanostructured cellulose ionogels with selective anion confinement for high-efficiency thermoelectric harvesting

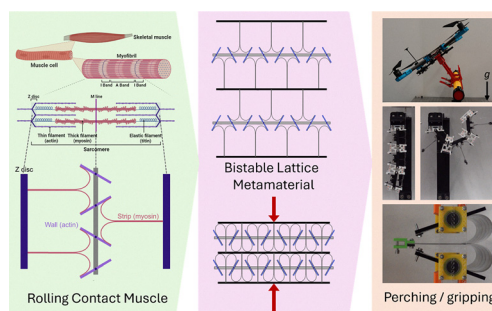
Legeng Li, Jiawang Zang, Bingjie Yang, Yonghen Cui, Ji Pan,* Yingjie Zhou* and Feng Yan*



4914

Rolling contact bistable passive and active metamaterials

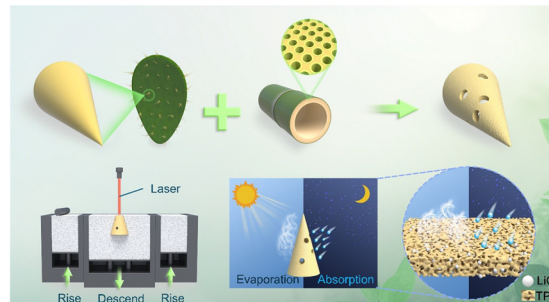
Mohammad Naghavi Zadeh,* Fabrizio Scarpa and Jonathan Rossiter*



4930

Bio-inspired 3D-printed TPU/LiCl hierarchical porous cones for high-performance atmospheric water harvesting

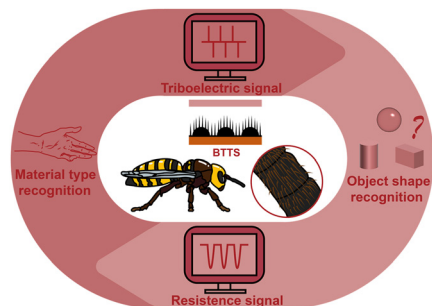
Pengyu Zhang, Shanfei Zhang, Xiaojun Chen, Peng Chen, Manhui Chen, Chang Zhai, Wenxiang Du, Congcan Shi* and Bin Su*



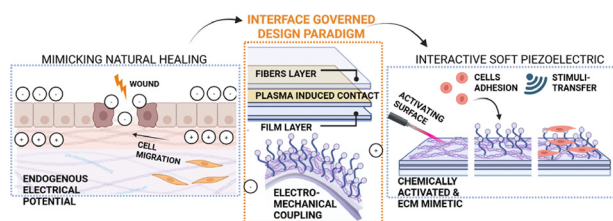
4938

A bioinspired dual-modal laser-induced graphene tactile sensor for high-precision multimodal object recognition

Gongmo Xiang, Guozhen Zhang, Guoning Yin, Zhenya Ge, Weijie Wang, Lingyun Xu and Xiangyu Jiang*



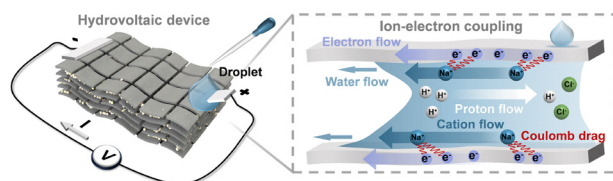
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Interface-governed electromechanical coupling in bioinspired hierarchical piezoelectric poly(L-lactide) architectures

Martina Žabčič, Lea Gazvoda, Masoumeh Sepideh Salehidashbayaz, Ita Junkar, Selestina Gorgieva, Andraž Rešetič, Matjaž Spreitzer and Marija Vukomanović*

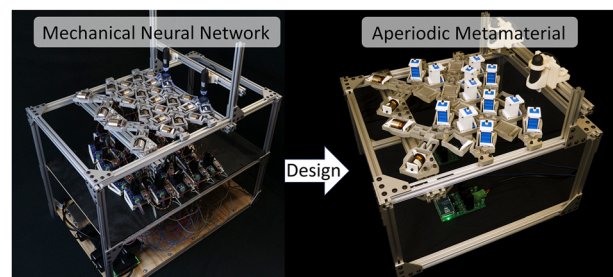
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Ion-electron coupling in a MXene/silk nanofluidic hydrovoltaic device for enhanced electricity generation

Yulei Dong, Zhixiao Si,* Wenchao Liu, Zijia Huang, Tingting Mei, Ying Liao, Wei Zhang, Wenbo Chang, Hongjie Zhang, Xiangyu Zhang, Junjun Liu,* Fengxiang Chen* and Kai Xiao*

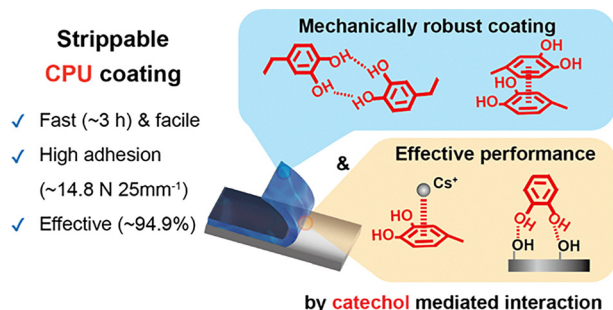
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Designing aperiodic metamaterials using mechanical neural networks

Pietro Sainaghi, Zhidi Yang and Jonathan B. Hopkins*

4982



A strippable catechol-terminated polyurethane coating for large-area radioactive cesium decontamination

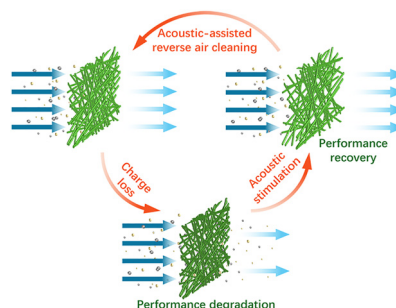
Jae Seung Lee, Ye-won Jeong, Donghyun Kim, Hyung-Ju Kim, Sung-Wook Kim, Hee-Man Yang,* Myung-Jin Baek* and Dong Woog Lee*



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Acoustic “re-charging” of nanofiber air filters

Le Xu, Zhenyu Zhu, Baojun Qiu, Shipeng Hou, Linyi Cui, Hongyuan Wei, Hongxia Wang* and Tong Lin*



5004

Oppositely-charged coordination cages form a type I porous ionic liquid with two pore sizes

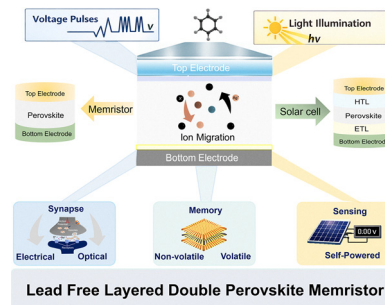
Simone Adorinni, Hugh P. Ryan, Lillian Ma, Tanya K. Ronson, Sudhakar Gaikwad, Barbara Rossi, Lucia Nasi, Jonathan R. Nitschke* and Silvia Marchesan*



5010

Lead-free layered halide double perovskites with aromatic organic cations for resistive switching memories and artificial synapses

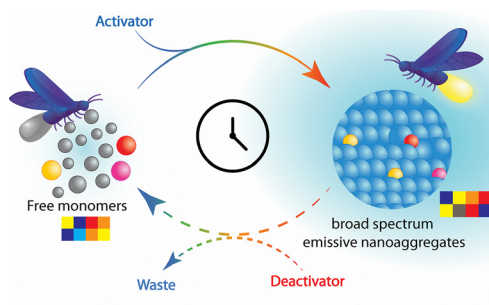
Mubashir Mushtaq Ganaie, Mahdi Mohammadi, Michalis Loizos, Konstantinos Rogdakis, Rashid M. Ansari, Gianluca Bravetti, Maryam Ghasemi, Mohammad Reza Golobostanfard, Kishan Kumar, Shahab Ahmad, Satyajit Sahu, Emmanuel Kymakis, Wolfgang Tress, Jovana V. Milić* and Mahesh Kumar*



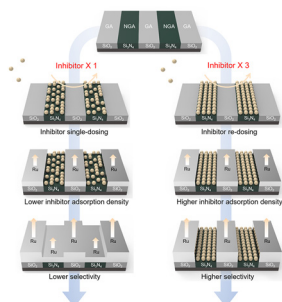
5022

Bioinspired chemoenzymatically controlled artificial light-harvesting nanoaggregates with multicolour transient emissions for time-gated information encryption

Priyam Das,* Sampurna Routray, Ritvika Kushwaha, Malay Kumar Baroi and Debapratim Das*



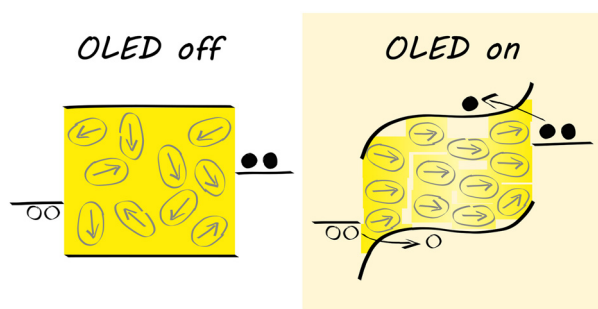
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Tuning surface reactivity pathways through molecular inhibitor redosing for precision nanopatterning

Byungchan Lee, Chi Thang Nguyen, Minhyeok Lee, Ngoc Le Trinh, Kyeongmin Min, Youngho Kang, Eun-Hyoung Cho and Han-Bo-Ram Lee*

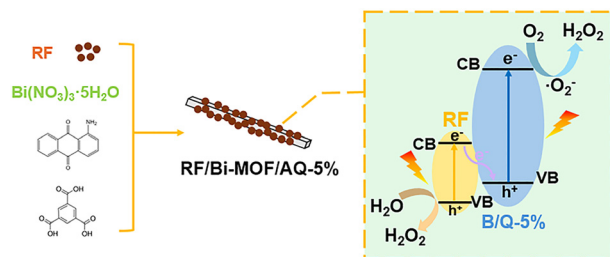
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In-operando dipole orientation for bipolar injection from air-stable electrodes into organic semiconductors

Anton Kirch,* Joan Ràfols-Ribé, Yuntao Qiu, Thushar Salkod Mahabaleshwar, William Strömberg, Ajay Kumar Poonia, Preetam Dacha, Kumar Saumya, Sri Harish Kumar Paleti, Christian Larsen, Nicolò Maccaferri and Ludvig Edman

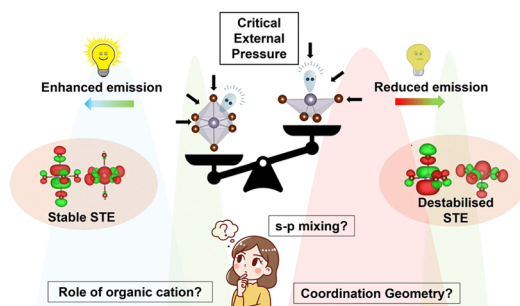
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Band-gap engineering of Bi-MOFs via anthraquinone integration for boosting photocatalytic H₂O₂ production over a donor–acceptor–acceptor junction

Yunyun Gong,* Baihui Wang, Junqing Hao, Jianting Wang, Meiyu Xu, Mingyang Meng, Meichao Gao* and Yuanyuan Feng*

5070



Origin of inverse emission behaviour in strain-engineered zero-dimensional tin halides: all-inorganic vs. hybrid

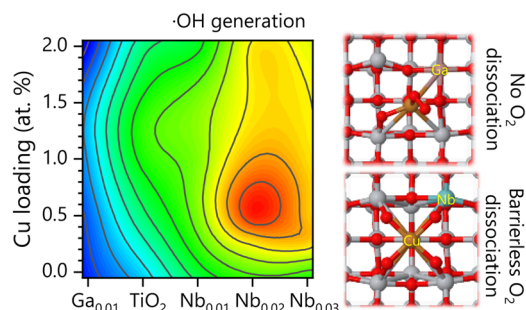
Dhritismita Sarma, Palak Chugh, Anshid Kuttasseri and Arup Mahata*



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Controlling the oxidation and chemistry of photodeposited CuO_x species via charge density modulation

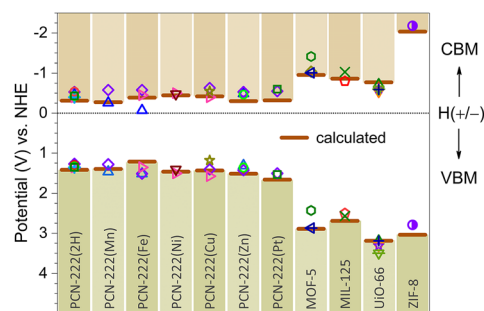
Szymon Dudziak,* Marta Kowalkińska, José D. Gouveia, Adam Ostrowski, Miguel Gomez-Mendoza, Marcin Łapiński, Aleksandra Szkudlarek, José R. B. Gomes, Víctor A. de la Peña O'Shea and Anna Zielińska-Jurek



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Hydrogen defects as probes of band alignment in metal–organic frameworks

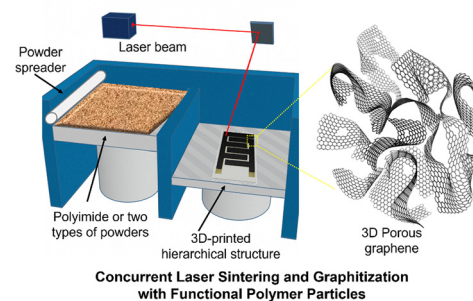
Khang Hoang



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Concurrent selective laser sintering and graphitization of polyimide microparticles into functional and flexible 3D structures for energy storage and sensing

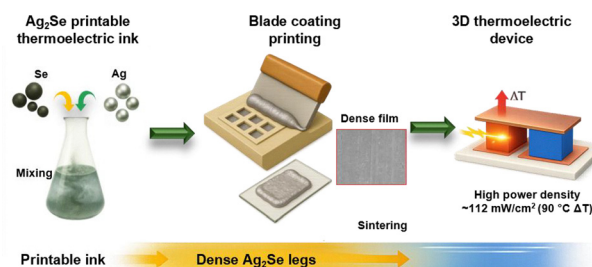
Muxuan Yang, Jinyu Bu, Pushkar N. Dalal, Leyi Deng, Mingcheng Liu, Laura Brady and Weinan Xu*



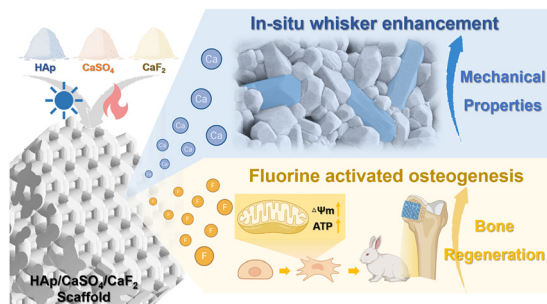
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Scalable, low-cost ink-based processing of high-performance silver selenide thermoelectrics

Md. Omarsany Bappy, Guoyue Xu, Kaidong Song, Qiang Jiang, Paribesh Acharyya, Berardo Matalucci, Allen Gray, Mercouri Kanatzidis, Tengfei Luo and Yanliang Zhang*



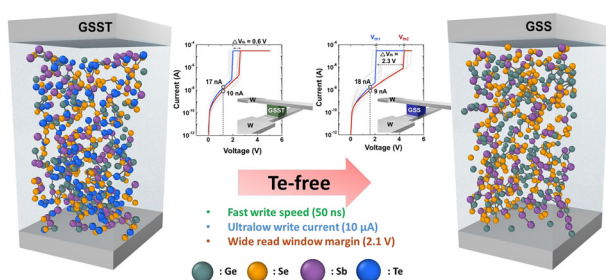
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***In situ* whisker reinforced multiphase bioceramic scaffolds with fluorine-activated osteogenesis**

Ruiqi Mao, Yu Yang, Ziqi Zhao, Qi Chen, Yawen Huang, Dongxuan Li, Boqing Zhang, Changchun Zhou, Qing Jiang,* Yujiang Fan, Kefeng Wang* and Xingdong Zhang

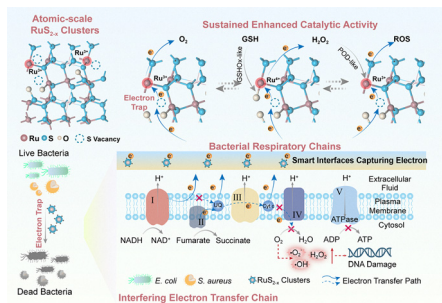
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A tellurium-free GeSbSe thin film for reliable selector-only memory operation

Inchan Oh, Won Hee Jeong, Jaeho Jung, Min Kyu Yang* and Gun Hwan Kim*

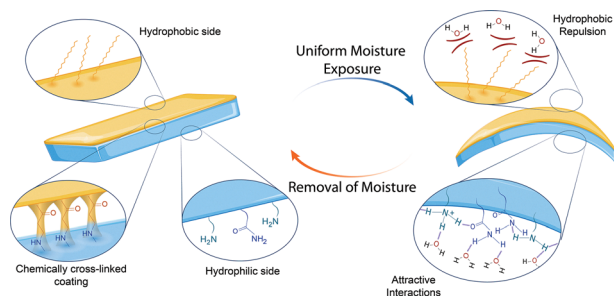
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Atomic-scale RuS_{2-x} clusters with rich defects for efficient electron trapping of bacterial respiratory chains

Qingshan Liu, Zhen Wan, Ruoli Zhao, Hao Zhang, Yadong Zhe, Jiarong Li, Xiaoyu Mu* and Xiao-Dong Zhang*

5173



A bioinspired monolayer gel with efficient omnidirectional moisture-driven actuation for humidity sensing

Sampurna Routray, Malay Kumar Baroi, Ritvika Kushwaha, Priyam Das and Debapatim Das*

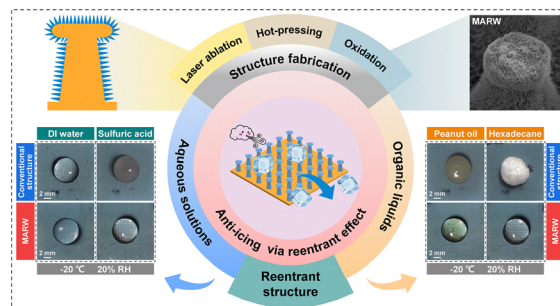


COMMUNICATIONS

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Rationally designed metallic reentrant superomniphobic structures toward anti-icing for low-surface-tension liquids

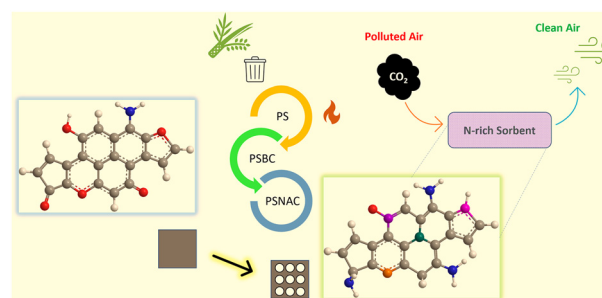
Daizhou Li, Rui Peng, Ziyang Song, Zhao Liu, Zhixuan Chang, Hongjun Zhang, Peixun Fan* and Minlin Zhong*



5201

Porosity and basicity tuned biomass-derived activated carbon enhancing CO₂ capture

Sujit Kumar Guchhait, Bitan Ray, Diku Raj Deka, Anu Pulparambil, Devender Goud, Harishankar Kopperi and Sebastian C. Peter*



CORRECTION

5212

Correction: Decoupling thermoelectric parameters in novel ionic layered materials: a charged monolayer stabilization strategy for enhanced anisotropy

Yaobo Li, Meng Pei, Ziyang Zuo, Dangdang Xu, Zhenzhen Feng, David B. Hayrapetyan, Christos S. Garoufalidis, Sotirios Baskoutas, Yuli Yan* and Zaiping Zeng*

