

Journal of Materials Chemistry A

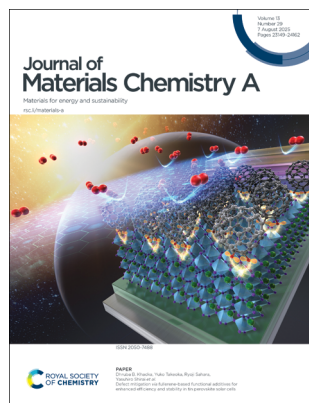
Materials for energy and sustainability

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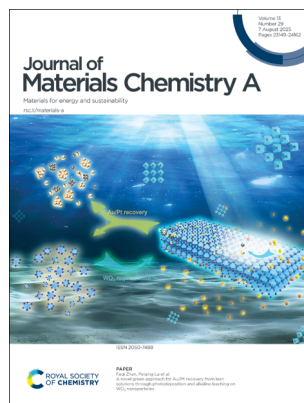
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ISSN 2050-7488 CODEN JMCAET 13(29) 23149–24162 (2025)



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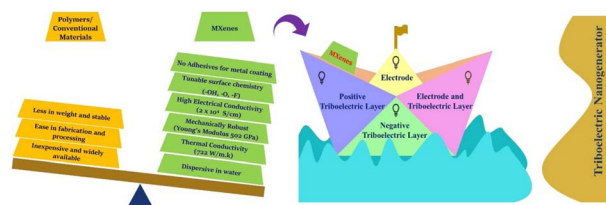
See Faqi Zhan, Peiqing La *et al.*, pp. 23499–23516. Image reproduced by permission of Faqi Zhan from *J. Mater. Chem. A*, 2025, 13, 23499.

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From energy to intelligence: MXenes transforming triboelectric nanogenerators

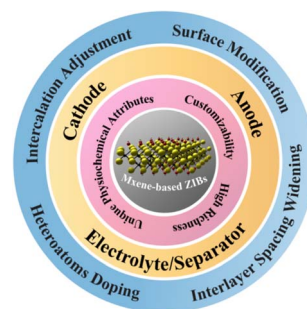
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MXene-based zinc-ion batteries: synthesis, applications, and strategies for performance optimization

Xuehan Ye, Le Pang, Shiyi Tan, Guozhen Zhang, He Liu, Cong Guo, Weizhai Bao, Jingfa Li, Pin Jern Ker, Hongxia Wang and Feng Yu*



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Progress on polymer-based materials and composites for humidity sensor applications: from materials aspects to sensor performances

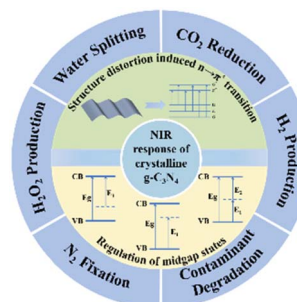
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An in-depth understanding of highly crystalline carbon nitride for near-infrared photocatalysis: from $n \rightarrow \pi^*$ transition to midgap state engineering

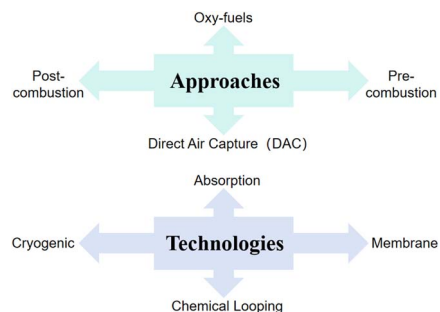
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Recent advancements in carbon capture materials research: innovative optimization of materials synthesis and engineering applications

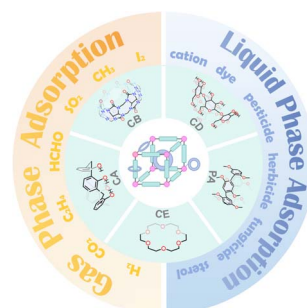
Yifan Wang, Fengyu Gao,* Yaxin Niu, Jiyue Zhang, Kai Chen, Yuansong Zhou, Xiaolong Tang, Shunzheng Zhao and Honghong Yi*



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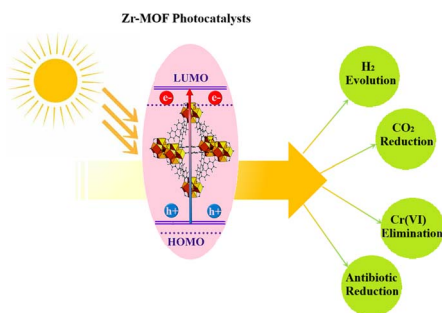
Macrocycle-containing metal–organic frameworks in adsorption and related applications

Huiqing Zhao, Yue Li,* Chunju Li* and Dong-Sheng Guo*



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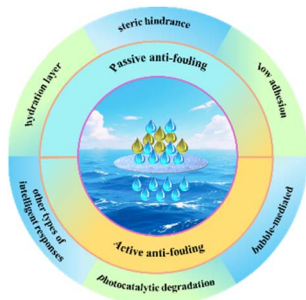
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Zirconium-based MOFs for light-driven reactions: a critical assessment of recent progress

Anita Abedi, Fataneh Norouzi and Vahid Amani*

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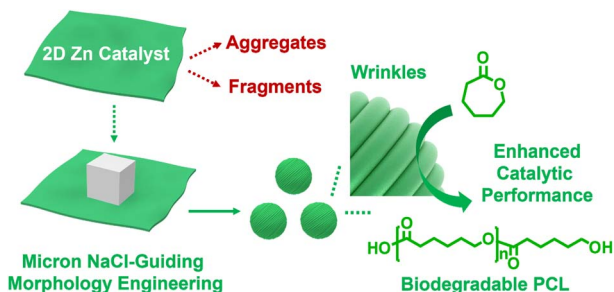


Recent advances in anti-fouling oil–water separation membranes: a review focusing on active and passive anti-fouling strategies

Zhaoyang Li, Ruirui Jin, Jingling Gong, Weimin Liu* and Jian Li*

COMMUNICATIONS

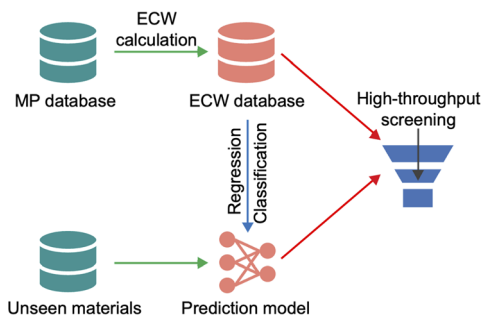
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Morphology engineering of 2D Zn-catalysts to wrinkled particles using NaCl microcrystals: enhanced recyclability for the synthesis of poly(ϵ -caprolactone)s

Seram Kim, Jong Doo Lee and Seung Uk Son*

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Machine-learning-aided screening of inorganic lithium solid-state electrolytes with a wide electrochemical window

Jiajing Chen, Lu Jiang, Shendong Tan, Jun Yang, Zihui Li, Chen Bai, Xiang Zhang, Rongao Li, Yaoshu Xie, Ming Liu, Yan-Bing He and Tingzheng Hou*

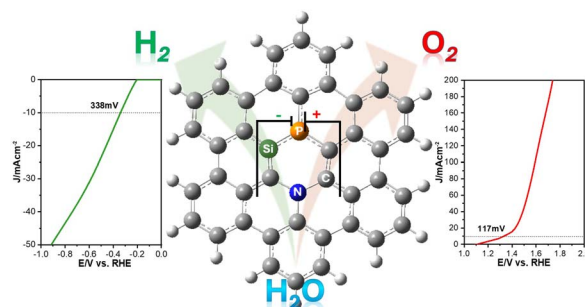


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Modulating carbon quantum dots using multi-heteroatom doping as a bifunctional electrocatalyst for efficient oxygen and hydrogen evolution reactions in alkaline electrolytes

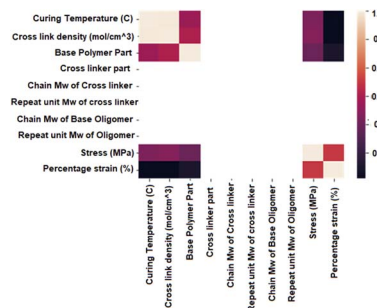
Nermeen S. Hafez, El-Zeiny M. Ebeid,* Aya Khalifa, Saleh A. Azim, Abdelhamid El-Shaer, Mahmoud A. S. Sakr and Mohamed Barakat Zakaria Hegazy*



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Machine learning computes the elastic response of cross-linked polymers

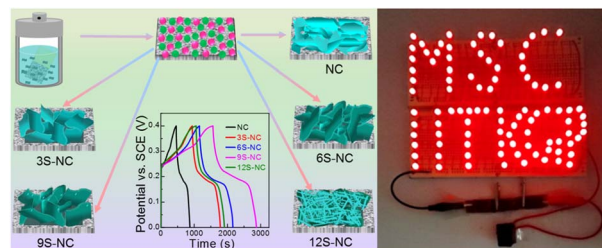
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In situ growth of sulfur-incorporating NiCo-LDH for a high-performance hybrid all-solid-state supercapacitor

Sudhir Kumar and Debabrata Pradhan*

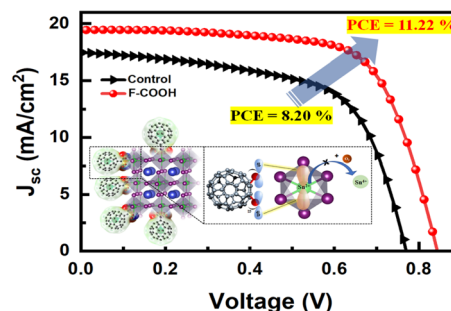


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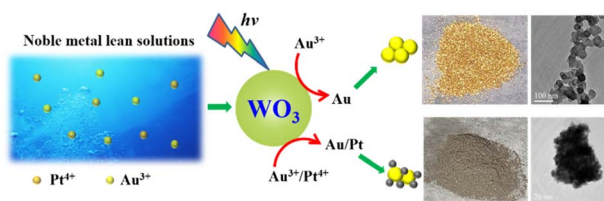
Defect mitigation via fullerene-based functional additives for enhanced efficiency and stability in tin perovskite solar cells

Aman Shukla, Dhruba B. Khadka,* Chunqing Li, Masahiro Rikukawa, Yuko Takeoka,* Ryoji Sahara,* Masatoshi Yanagida and Yasuhiro Shirai*



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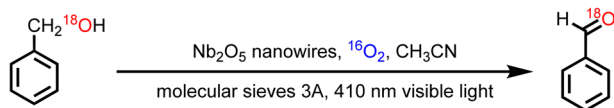
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A novel green approach for Au/Pt recovery from lean solutions through photodeposition and alkaline leaching on WO₃ nanoparticles

Faqi Zhan,^{*} Ruixin Li, Haiyan Zhao, Dalin Chen, Yisi Liu, Min Zhu, Yuehong Zheng, Peiqing La^{*} and Jie Li

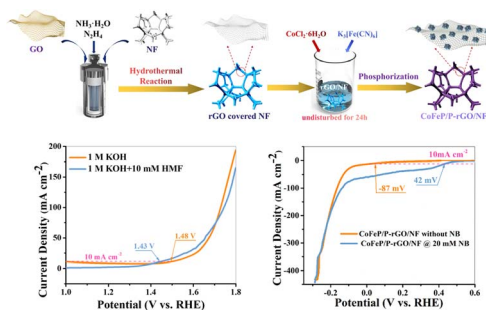
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Visible light-initiated selective aerobic oxidation of alcohols over niobium oxide nanowires: an oxygen isotope labeling study

Xiaoming Ma, Yuexin Wang, Fulin Zhang, Guoqing Zhu, Shuolin Zhou^{*} and Xianjun Lang^{*}

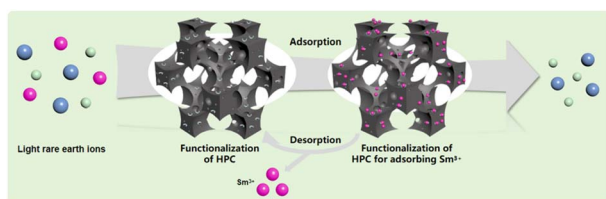
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Electrooxidation of 5-hydroxymethylfurfural and electroreduction of nitrobenzene by hollow CoFeP cubes/rGO/Ni foam

Xinheng Li,^{*} Lei Qi, Wanfei Li, Mei Wang, Jianbin Xue, Muzi Chen and Guixin Wang

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Functionalization of hierarchical porous carbon materials for adsorption of light rare earth ions

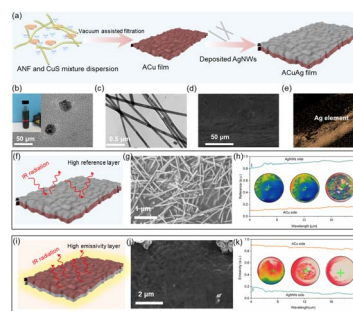
Yu Zhu, Liying Guo, Ruiyue Zhang, Qianqian Tian, Hongzhang Cao,^{*} Li Wang, Yu Tang^{*} and Liangliang Liu^{*}



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Unlocking a dual-mode thermal regulation and electromagnetic protection strategy under extreme conditions via bidirectional Janus design

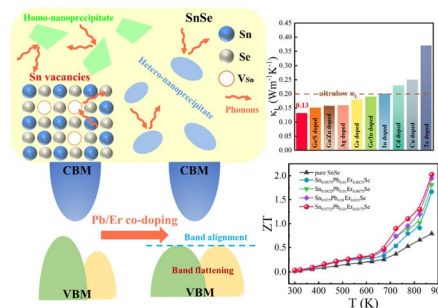
Fuhao Yu, Pengfei Jia, Bibo Wang,* Lei Song and Yuan Hu



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High thermoelectric performance of Pb and Er co-doped polycrystalline SnSe via endogenous hetero-/homo-nanostructures and band alignment

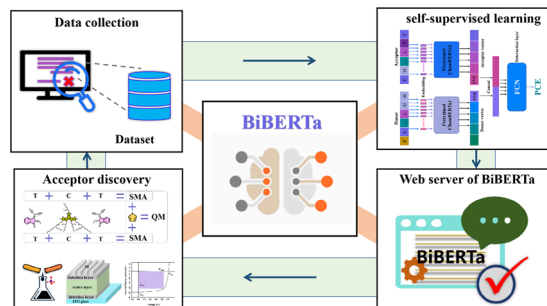
Pubao Peng, Yaru Gong,* Wei Dou, Jiajun Nan, Yanan Li, Song Li, Yang Geng, Congmin Liang, Jiaqi Fan, Di Li, Dewei Zhang, Pan Ying, Yang Cao* and Guodong Tang*



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BiBERTa: a self-supervised framework for accelerating the discovery of stable organic photovoltaic materials

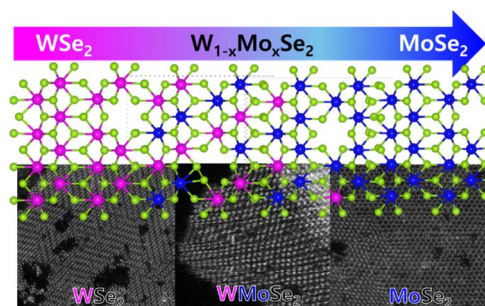
Jinyu Sun, Dongxu Li, Jie Zou, Xiaoxiao Tan, Yue Wang, Hailiang Zhang, Yingping Zou, Zhimin Zhang* and Hongmei Lu*



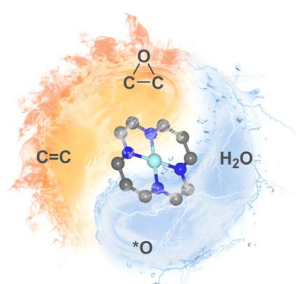
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2M phase stability of WSe₂–MoSe₂ alloy nanosheets via a colloidal reaction and their Se-rich model calculations

Ju Yeon Kim, Jun Hyuk Choi, Youn Jun Choi, Junaid Ihsan, Irtiqa Mishal, Seo Yun Jeong, Ha Eun Lee, Jung Eun Ahn, Seung Jo Yoo, Sang Gil Lee, In Hye Kwak,* Ik Seon Kwon,* Jeunghye Park* and Hong Seok Kang*



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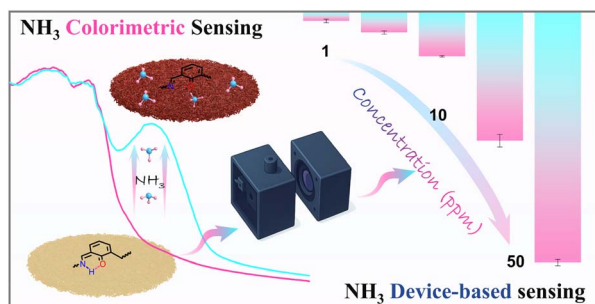


Electro-epoxidation

Electro-epoxidation of ethylene and propylene using atomic active oxygen derived from water electrolysis on IrN₄ site in graphene at a lower applied potential and over a wide potential range

Yun-Jie Chu, Jing Gao, Chun-Guang Liu,^{*} Yun Geng, Zhong-Min Su and Min Zhang^{*}

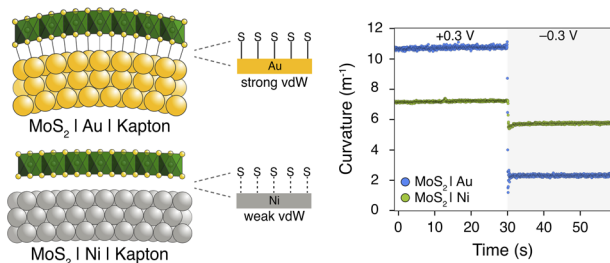
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A colorimetric ammonia sensor based on interfacially assembled porous polymer membrane: coupled hydrogen-bonding and electronic structure modulation

Zebiao Qiu, Qianchi Xiong, Heng Zhang, Yue Xiao, Ling Zhang, Ruijuan Wen, Liping Ding,^{*} Haonan Peng^{*} and Yu Fang

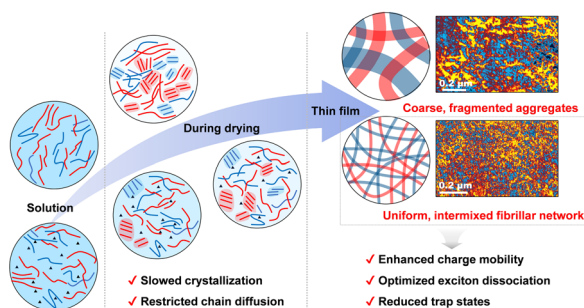
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Interactions at heterointerfaces influence actuation in wet cast 1T-MoS₂ and V₂O₅·0.5H₂O thin films

Jacob M. Baker, Katelyn P. Murphy and Michael L. Aubrey^{*}

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Unraveling the role of crystallization kinetics for fibrillar morphology optimization in all-polymer solar cells

Zhiyuan Yang, Lei Yu, Qiaoyu Guo, Fei Xie, Xuechen Jiao, Lei Ying, Wenkai Zhong^{*} and Fei Huang^{*}

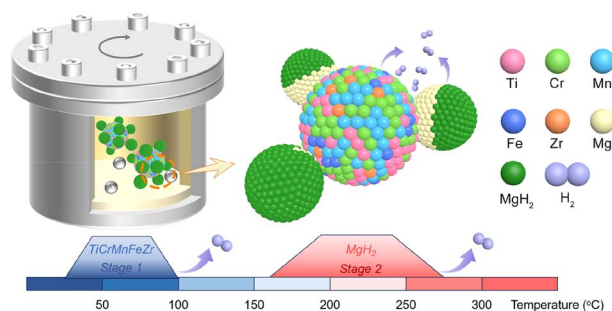


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Study on mechanisms of two-step hydrogen sorption in a MgH_2 – TiCrMnFeZr high-entropy alloy composite

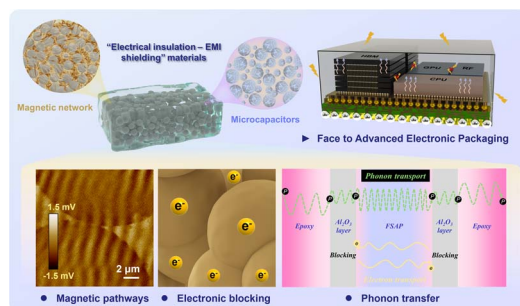
Yinghui Li, Yingyan Zhao, Shusheng Cao, Zi Li, Yueqing Shen, Yasemen Kuddusi, Chong Lu, Xi Lin, Andreas Züttel, Chongnan Ye* and Jianxin Zou*



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Towards electrical insulation electromagnetic interference shielding materials: a magnetic network–microcapacitor framework for advanced electronic packaging

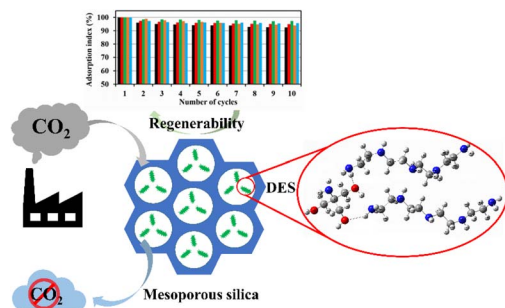
Zeyu Zheng, Xinyin Gu, Yang Liu, Ting Xin, Jianhui Zeng, Jialin Wen, Hebin Zhang, Weijing Wu, Yan-Jun Wan,* Pengli Zhu* and Rong Sun*



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Enhanced CO_2 capture performance of mesoporous silica materials with TEPA amine-based deep eutectic solvent: kinetics and mechanism

Hosein Ghaedi, Jiawen Fu, Payam Kalhor, Salman Masoudi Soltani and Ming Zhao*

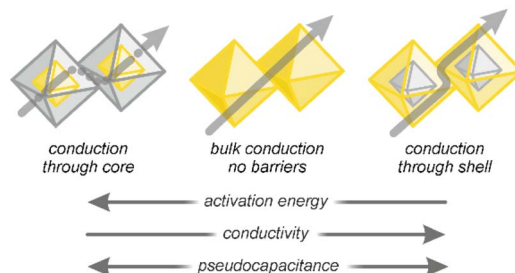


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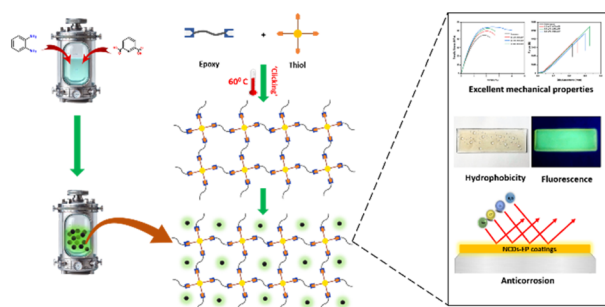
Tracing proton conduction pathways in polycrystalline MOF-based core–shell systems

Damian Jędrzejowski, Marzena Pander, Emilian Stachura, Krzysztof Matlak, Wojciech Bury* and Dariusz Matoga*

PROTON CONDUCTION IN CORE-SHELL MOFs



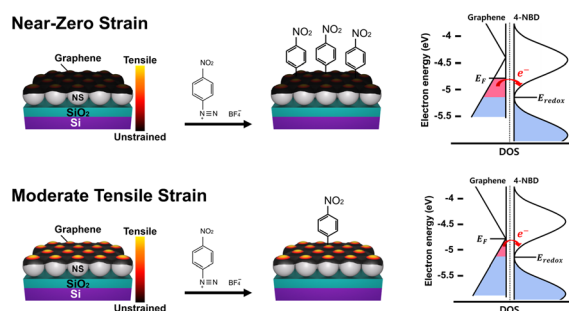
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Corrosion-resistant and fluorescent thiol–epoxy 'click' coatings reinforced with hydrophobic N-doped carbon dots

Albin Davies, Sobhi Daniel, Vishnu Murali, Rahul Ramkumar, Archana N. M., Chozhidakath Damodharan Sunesh and Youngson Choe*

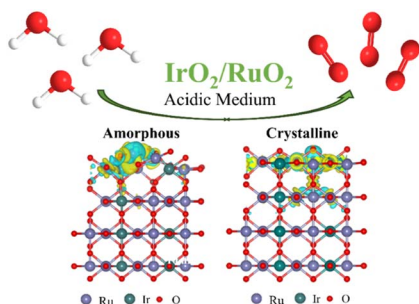
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Electrochemical reactivity of graphene under mechanical strain

Hyo Jin Lee, Jinhyun Hwang, Hyo Chan Hong, Young Wook Hwang, Jiyeon Lee, Gaeun Cho, Dalsu Choi, Kilwon Cho* and Hyo Chan Lee*

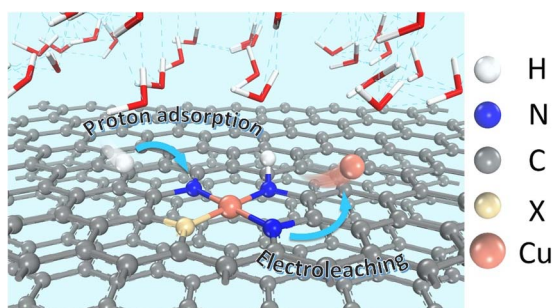
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Surface amorphization advances activity and stability for acidic oxygen evolution

Muhammad Bilal Hussain, Munir Ahmad, Shabab Hussain, Rida Javed, Zulakha Zafar, Dinghua Zhou, Arunpandian Surulinathan, Renfei Feng, Xian-Zhu Fu, Shao-Qing Liu* and Jing-Li Luo*

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Tuning the electrochemical stability of carbon based single-atom structures via doping: trade-off between electrosorption/leaching behavior

Xu Zhang, Lin Tao,* Davoud Dastan, Hongwei Zhang and Baochang Gao*

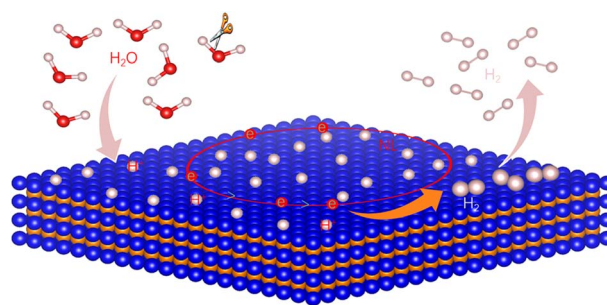


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High-performance hydrogen evolution reaction catalysts based on three-dimensional single nodal loop semimetals ScX (X = Cd/Ag/Cu/Rh)

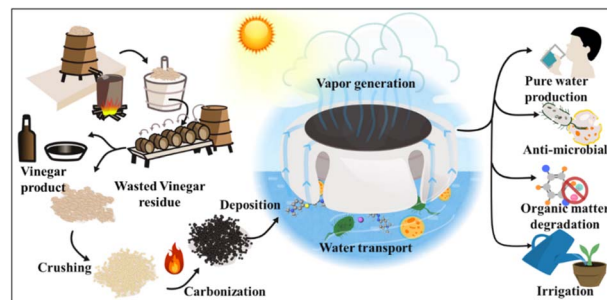
Zihan Li, Zhizuo Liu, Ying Liu,* Xuefang Dai, Xiaoming Zhang and Guodong Liu*



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A multifunctional waste biomass-derived solar evaporator for efficient and sustainable solar-driven clean water evaporation

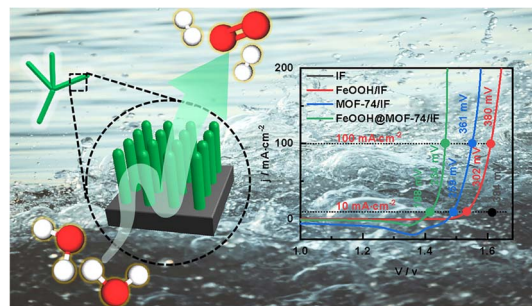
Hongbin Cao, Haiyan Wang, Xiu He, Yuxin Yang,* Tongyan Ren, Lvhuo Liu, Yanyan Zheng, Jingjing Fu* and Huang Zhou*



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In situ assembly of the FeOOH@MOF-74 heterostructure on IF as efficient electrocatalysts for water splitting

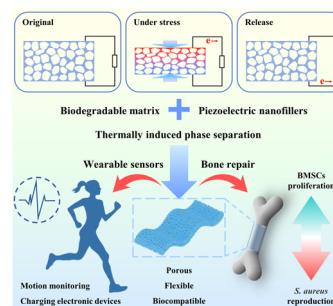
Xiaolong Liang, Guobin Qin, Min Fang, Jing Liang, Xu Ge, Ke Xu, Huanyue Zhang, Tianming Lv, Junyu Shen* and Jinxuan Liu*



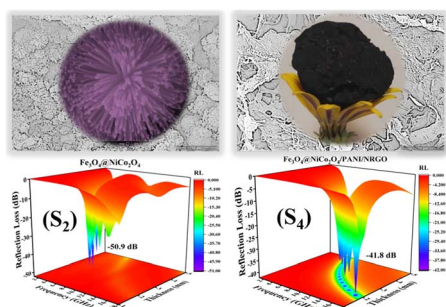
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Multi-functional piezoelectric energy harvesters based on porous PLLA/BaTi₂O₅ piezocomposite films

Yuanbiao Gong, Weijia Wang,* Jiahao Cao, Xiaohu Ren, Yuxin Jia, Yidi Duan, Bodong Wang, Qinghua Guo, Yafei Feng* and Huiqing Fan*



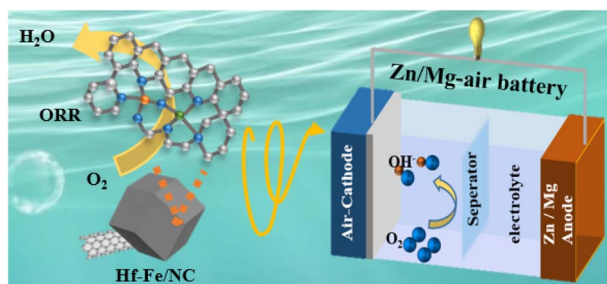
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Ultra-broadband microwave absorption performance of multi-scale designed $\text{Fe}_3\text{O}_4@\text{NiCo}_2\text{O}_4/\text{PANI}/\text{NRGO}$ aerogels

Yousef Mehdizadeh, Jamileh Seyed-Yazdi,^{*} Farnaz Jamadi, Fatemeh Ebrahimi-Tazangi, Seyyed Jalal Seyyed Yazdi, Seyed Mohammad Hosseiny and José Teixeira

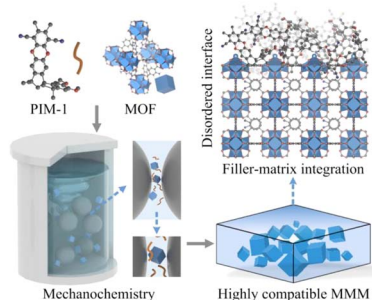
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Doping hafnium with a high ligand field to modulate the electronic structure of Fe/NC for achieving remarkable ORR activity in Zn-air and Mg-air batteries

Jili Ren, Min Wang, Feng Fu, Zhenjiang Lu,^{*} Jing Xie, Jindou Hu and Yali Cao^{*}

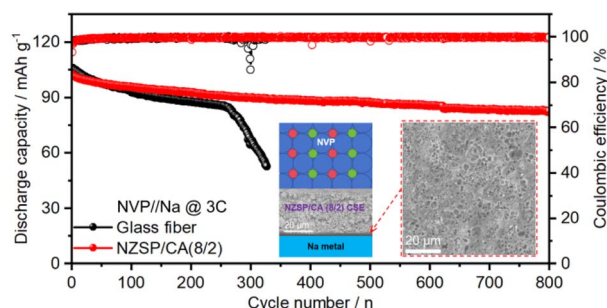
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Mechanochemical processing of interface-integrated mixed-matrix membranes for efficient gas separation

Kunxiang Lei, Xinxi Huang, Yihao Xiao, Kun Niu, He Huang, Zhiwei Qiao^{*} and Wanbin Li^{*}

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$\text{Na}_3\text{Zr}_2\text{Si}_2\text{PO}_{12}/\text{cellulose acetate}$ composite solid electrolyte unlocking high ionic conductivity and long cycle life in solid-state sodium batteries

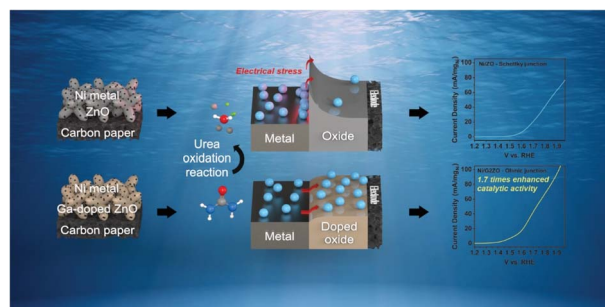
Xiangyu Shi, Chenkang Zheng, Xiangfei Li, Zhuoyuan Zheng,^{*} Zewan Shu, Jie Zhou and Yusong Zhu^{*}



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Enhancement of catalytic performance by controlling the type of junctions in metal/oxide catalysts for the urea oxidation reaction

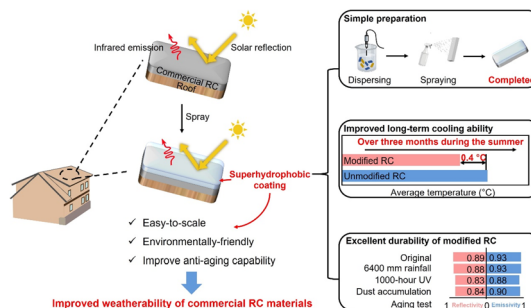
Yoo Lim Cha, Shuai Wu, Md Sabbir Hossen Bijoy, Seyed Morteza Taghavi Kouzehkhanan, Wonhyeong Kim, Pengyu Chen, Tae-Sik Oh, Fariborz Kargar, Sun Hee Kim* and Dong-Joo Kim*



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Improving the long-term weatherability of commercial radiative cooling materials by applying a fluorine-free superhydrophobic coating

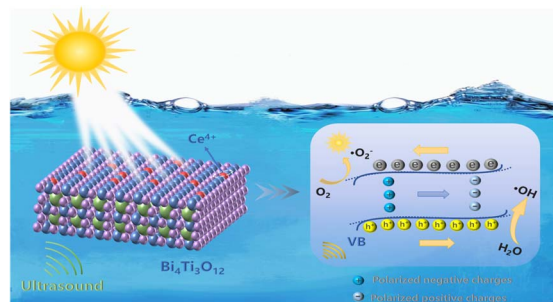
Ze-Ye Wang, Xian Wu, Ming-Liang Qu, Zi-Rui Li, Guang-Yan Zhou, Yi-Chao Wang, Hui Liu, Jiang Lu, Zi-Tao Yu and Li-Wu Fan*



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Reinforcing piezo-photocatalytic properties and enhancing RhB degradation efficiency of Ce-doped Bi₄Ti₃O₁₂: mechanistic insights

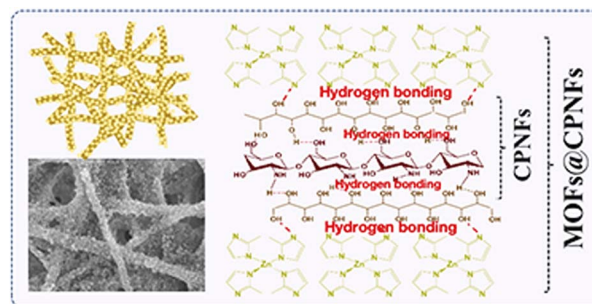
Shiyu Geng, Xinnyu Sui, Yitong Li, Hailong Wang, Xuesong Zhao, Limin Chang and Xiaoyue Duan*



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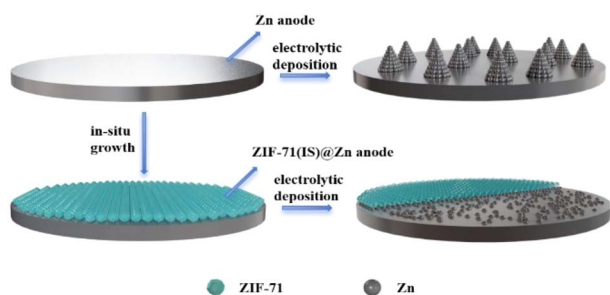
A facile method to construct proton exchange membranes based on metal organic frameworks decorating binary polymer nanofibers

Shu Hu, Xinna Gao, Niuniu Zhang, Chunyu Li, Wenwen Ding, Wantong Zheng and Quantong Che*



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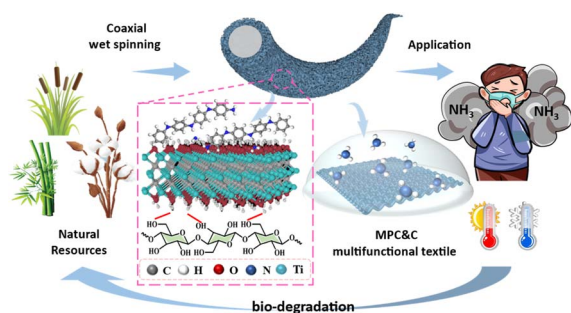
23869



In situ grown superhydrophobic ZIF-71 layer enabling ultra-stable zinc anodes for long-cycle AZBs

Tianxu Ji, Zinan Wang, Peng Wang,* Xiaoyu Yang, Jihao Ye, Xuze Tang, Chunyan Li and Yunpeng Liu

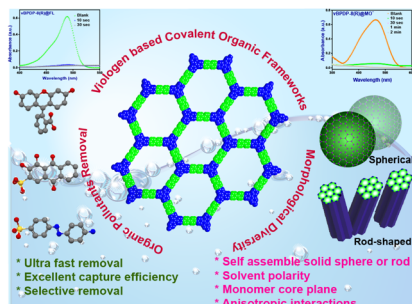
23882



Cellulose hierarchical sponge-aerogel fibers *via* ionic liquid-assisted coaxial wet spinning: lightweight architectures for gas detection and adaptive thermal management

Jin Zhu Huang, Hanguang Wu* and Zhiqiang Su*

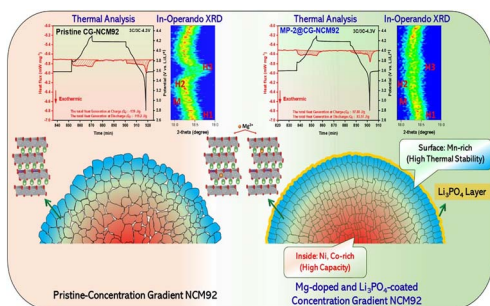
23893



Morphology tuned viologen-based covalent organic frameworks: a fast and targeted approach to eliminate toxic organic pollutants from water

Pampa Jhariat, Arjun Warriar, Mebin Varghese and Tamas Panda*

23902



Unlocking the synergistic effects of gradient engineering, Mg doping, and *in situ* Li conductive coating for high-performance Ni-rich LiNi_{0.92}Co_{0.04}Mn_{0.04}O₂ cathode materials

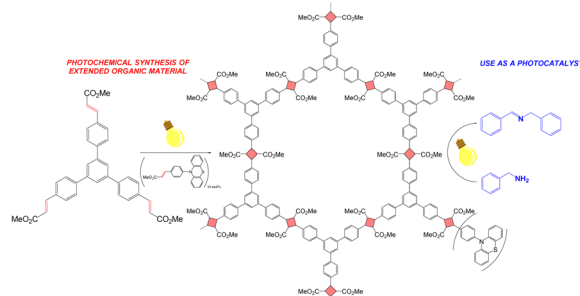
Yola Bertilsya Hendri, Yi-Shiuan Wu, She-Huang Wu, Liang-Yin Kuo, Jeng-Kuei Chang, Amun Amri, Rajan Jose* and Chun-Chen Yang*



23928

[2 + 2] light-driven cycloaddition synthesis of an organic polymer and photocatalytic activity enhancement *via* monomer truncation

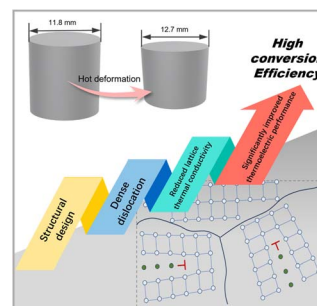
Giacomo De Crescenzo, Beatriz de Santos, M. José Capitán, Jesús Álvarez, Silvia Cabrera, Alberto Fraile,* Matías Blanco* and José Alemán*



23939

Direct hot deformation of as-grown n-type Bi₂Te₃ ingots: a simple thermoelectric optimization strategy

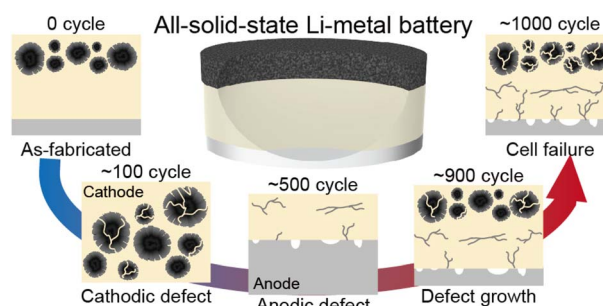
Chuangdong Zhou, Jianfeng Cai, Qiang Zhang, Guoqiang Liu, Xiaojian Tan,* Jiaze Zhu, Guodong Zhang, Jiehua Wu, Bo Liang* and Jun Jiang*



23946

Degradation analysis during fast lifetime cycling of sulfide-based all-solid-state Li-metal batteries using *in situ* electrochemical impedance spectroscopy

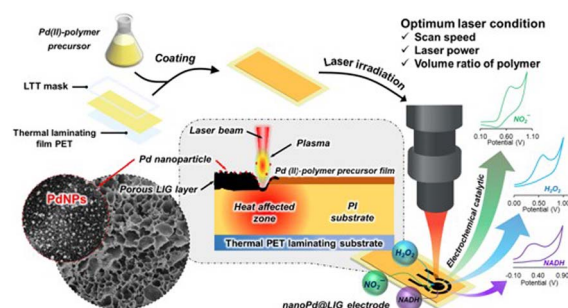
Young Jung Kim, Hyeseong Jeong, Sahn Nam, Dongwook Shin, Jong-Ho Lee* and Hyoungchul Kim*



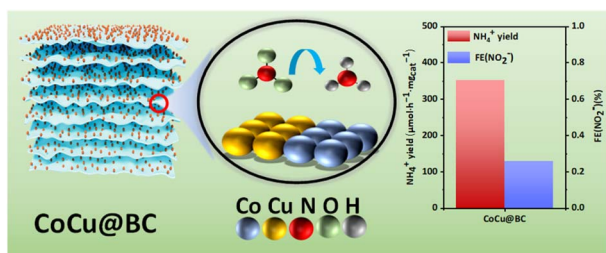
23957

Enhanced electrochemical catalysis and sensing applications: fabrication process optimization and electrocatalytic characterization of polymeric matrix composite for one-step synthesis of Pd nanoparticle-decorated laser-induced graphene electrodes

Asamee Soleh, Kasrin Saisahas, Kiattisak Promsuwan, Jenjira Saichanapan, Panote Thavarungkul, Proespichaya Kanatharana, Lingyin Meng, Wing Cheung Mak* and Warakorn Limbut*



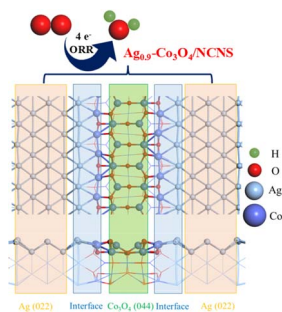
23971



Construction of bimetallic CoCu@BC for sustainable ammonia synthesis with minimal nitrite accumulation

Xiaofeng Xu, Ziyu Wang, Zhongyan Zhang, Pengfei Guo, Di Shen, Tianyi Wei, Meiqin Shi,^{*} Bingbao Mei,^{*} Dongshuang Wu and Fanfei Sun^{*}

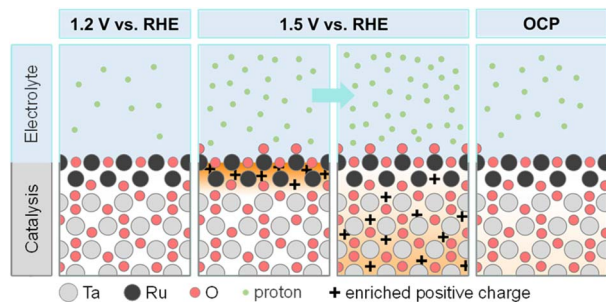
23981



Exploring the heterointerface of silver nanoparticles and cobalt oxide nanorings toward the oxygen reduction reaction

Fatima Nasim, Hira Malik, Guobao Xu, Huilong Dong^{*} and Muhammad Arif Nadeem^{*}

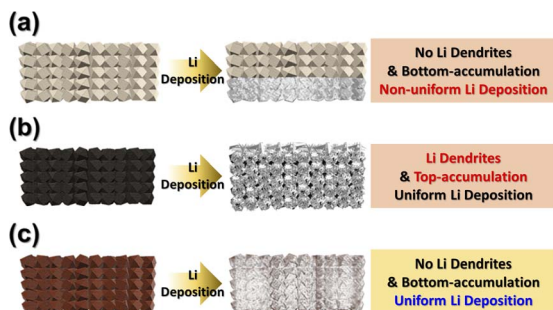
23998



Constructing abundant 5d electron buffering interfaces for enhancing acidic water oxidation

Jingqiu Shang, Xiuxiu Zhang,^{*} Youcai Che, Xupeng Qin, Yuhao Zhang, Jing Zhang, Baojie Li, Chenyu Yang, Yaling Jiang, Xiangang Lin^{*} and Qinghua Liu^{*}

24005



MOF-derived 3D host nanostructures combining the advantages of microporous MOFs and carbon for stable Li deposition

Ju Young Kim, Jae Hun Choi, Jung-Kul Lee^{*} and Yun Chan Kang^{*}

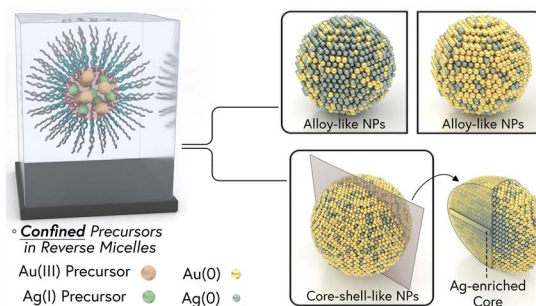


PAPERS

24014

Bimetallic Ag–Au nanoparticles from nanoconfinement: adjusting properties by electrochemical synthesis

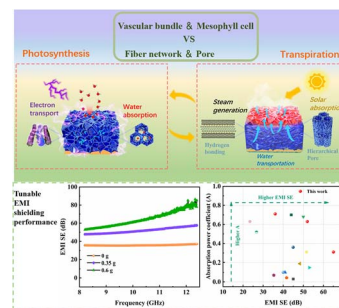
Thais Schroeder Rossi, Athanasios A. Papaderakis, Maximilian Jaugstetter, Zaher Jlalati, Miriam Knoke, Pouya Hosseini, Paolo Cignoni, Fengli Yang, Maximilian Gerwin, Oliver Trost, Marius Spallek, Eduardo Ortega, Beatriz Roldan Cuenya, Debbie C. Crans, Nancy E. Levinger and Kristina Tschulik*



24028

Leaf-inspired nanofibrous mat-based composites for liquid–gas phase change-driven dynamically adaptive electromagnetic interference shielding

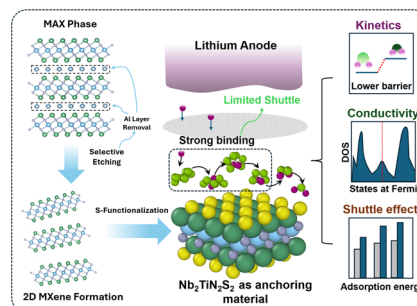
Junqing Shi, Jialong Tian, Yimei Xu, Fenglin Huang, Qufu Wei and Yibing Cai*



24038

Computational discovery of a novel double transition metal nitride MXene and its applications as an anchoring and catalytic material in Li–Se batteries

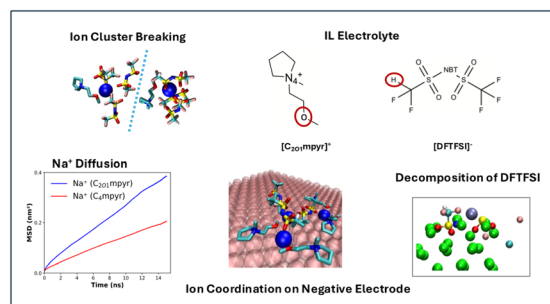
Rafiuzzaman Pritom, Indrajit Nandi, Md Shahriar Nahian, Rahul Jayan, Satyajit Mojumder and Md Mahbulul Islam*



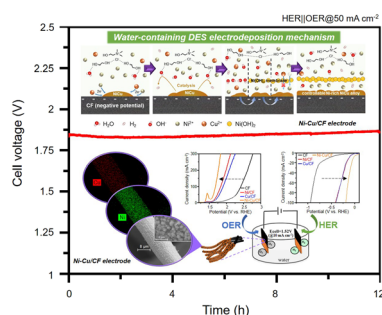
24051

Molecular insights into an ether-functionalised ionic liquid electrolyte with hydrogen-modified anions at electrode interfaces

Sreehari Batni Ravindranath, Jhonatan Soto Puelles, Agilio Padua, Luke A. O'Dell, Michel Armand, Patrick Howlett, Maria Forsyth and Fangfang Chen*



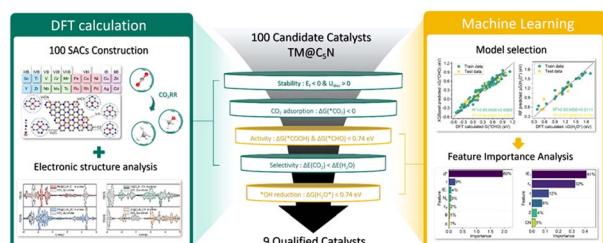
24062



Boosting the HER/OER bifunctional electrocatalytic activity of Ni–Cu alloy via water-containing deep eutectic solvent system

Yi-Hung Liu,^{*} Fen-Yan Zeng, Yen-Shen Kuo, Yu Chen and Cheng-Liang Hsu^{*}

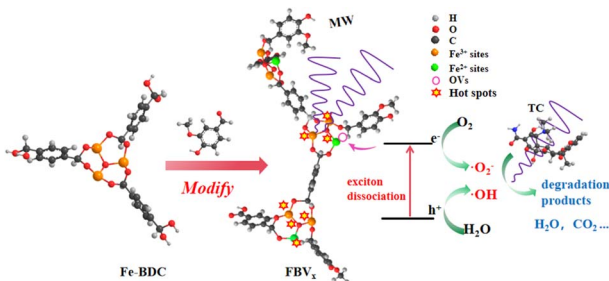
24073



Screening of single-atom catalysts for CO₂ electroreduction to CH₄ using DFT calculations and machine learning

Jingzhou Zhou, Zhengyu Gu, Xiaobing Wang, Xiuyun Zhang, Yixin Ouyang^{*} and Li Shi^{*}

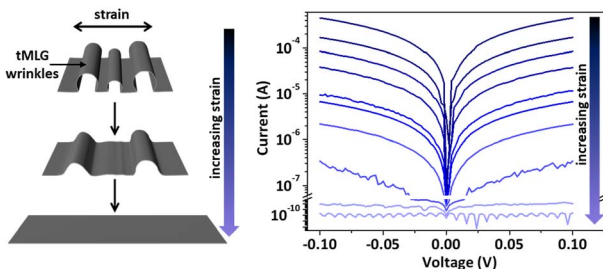
24084



Microwave catalytic degradation of tetracycline using Van modified Fe-MOF: regulation of defect engineering and its performance under microwave irradiation

Jingjing Wu,^{*} Zhiyu Yan, Jingying Shi, Lu Lu, Bing Sun and Ying Yu

24102



Highly sensitive and stretchable strain sensor based on wrinkles of a twisted multilayer graphene

Nikita Gupta, Ankit Kumar, Umesha Mogera, Umesh V. Waghmare and Giridhar U. Kulkarni^{*}

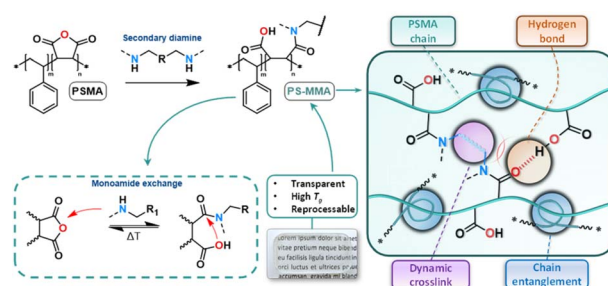


PAPERS

24111

Poly(styrene-co-maleamic acid)-based monoamide covalent adaptable networks

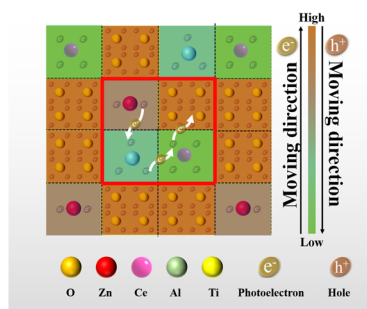
Aitor Hernández, Susanne M. Fischer, Johan M. Winne and Filip E. Du Prez*



24126

Research on the enhanced photocatalytic hydrogen production performance of anatase synergistically co-doped with aluminum, zinc and cerium

Zhongming Hao, Yansen Zhang, Shuya Cui, Xinghong Duo,* Leichao Meng and Shenghua Ma



24151

Stable and efficient organic solar cells featuring an ultra-thin and transparent solution-deposited MoO_3 hole extraction layer

Wisnu Tanyo Hadmojo,* Hendrik Faber, Julien Gorenflot, Ryanda Enggar Anugrah Ardhi, Zhaoheng Ling, Qiao He, Sarah Fearn, Ayman Rezk, Muntaser Almansoori, Ammar Nayfeh, Martin Heeney, Frédéric Laquai and Thomas D. Anthopoulos*

