

Journal of Materials Chemistry A

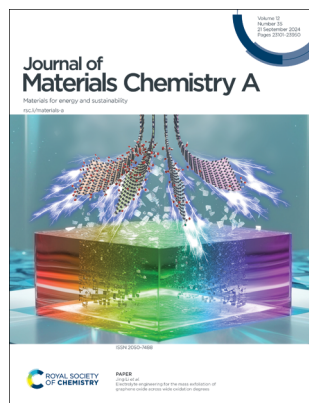
Materials for energy and sustainability

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IN THIS ISSUE

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Cover

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Inside cover

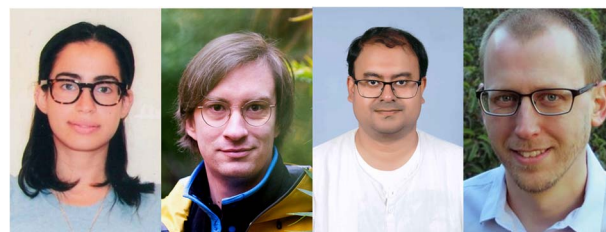
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EDITORIAL

23122

Advancing energy materials through high throughput experiments and computation

Helge S. Stein,^{*} Arghya Bhowmik^{*} and John M. Gregoire^{*}

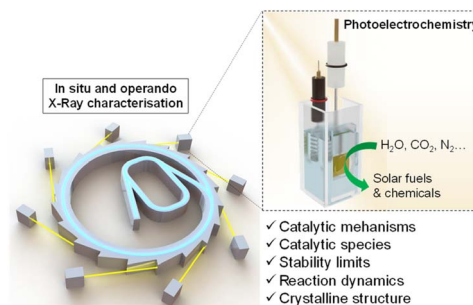


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Latest advances in *in situ* and *operando* X-ray-based techniques for the characterisation of photoelectrocatalytic systems

Mariam Barawi, Camilo A. Mesa, Laura Collado, Ignacio J. Villar-García, Freddy Oropeza, Víctor A. de la Peña O'Shea^{*} and Miguel García-Tecedor^{*}



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Fundamental questions
Elemental answers

REVIEWS

23147

Enhancing electrochemical performance and corrosion resistance of nickel-based catalysts in seawater electrolysis: focusing on OER and HER

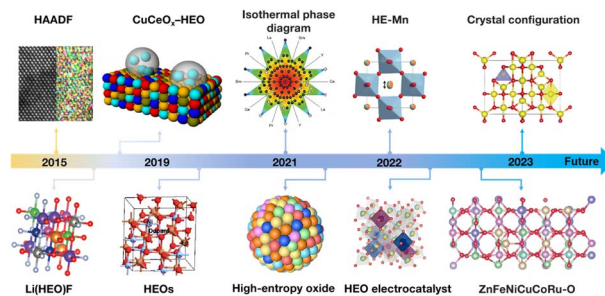
Yuemin Xin, Qianqian Hua, Chengjie Li,* Haiding Zhu, Liguo Gao, Xuefeng Ren,* Peixia Yang* and Anmin Liu*



23179

High-entropy oxides for energy storage and conversion

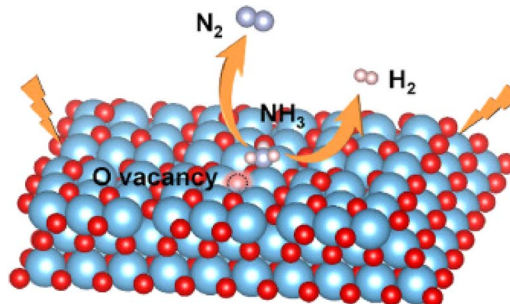
Weizhai Bao,* Hao Shen, Yangyang Zhang, Chengfei Qian, Guozhao Zeng, Kai Jing, Dingyu Cui, Jingjie Xia, He Liu, Cong Guo, Feng Yu, Kaiwen Sun* and Jingfa Li*



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Recent progress on electrocatalysts in ammonia electrooxidation reaction for clean hydrogen production

N. S. Hassan, A. A. Jalil,* R. Saravanan, N. M. Izzuddin, M. B. Bahari, D. Prasetyoko and R. E. Nugraha



23218

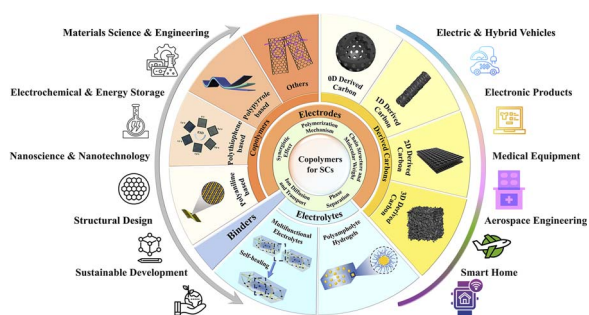
Exploring the dual phases of cadmium sulfide: synthesis, properties, and applications of hexagonal wurtzite and cubic zinc blende crystal structures

Jianbin Mao, Weiming Xu* and Soonmin Seo*



REVIEWS

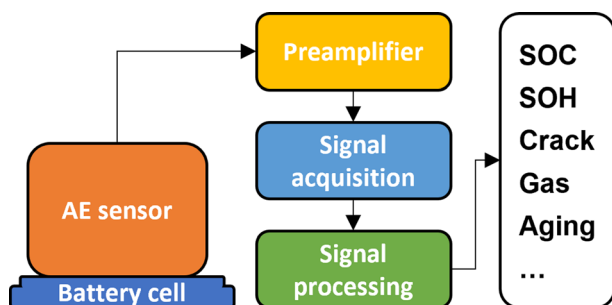
23243



The role of copolymers towards key materials in electrochemical supercapacitors: a review

Song Yin, Xiaojie Bai, Di Jiang, Libing Liao* and Hao Liu*

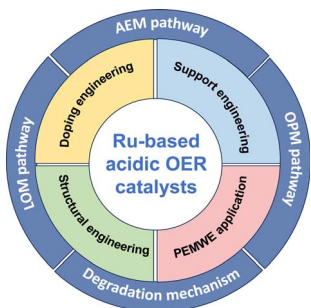
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Online acoustic emission sensing of rechargeable batteries: technology, status, and prospects

Inti Espinoza Ramos,* Amina Coric, Boyang Su, Qi Zhao, Lars Eriksson, Mattias Krysander, Annika Ahlberg Tidblad and Leiting Zhang*

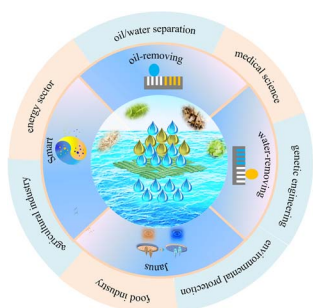
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Recent advances of ruthenium-based materials for acidic oxygen evolution reaction: from catalyst design to proton exchange membrane water electrolyzers

Lin-Lin Wang, Zi-You Yu* and Tong-Bu Lu

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Biomass materials with special wettability: a sustainable solution for efficient oil–water separation

Ruirui Jin, Jingling Gong, Bin Xiang and Jian Li*

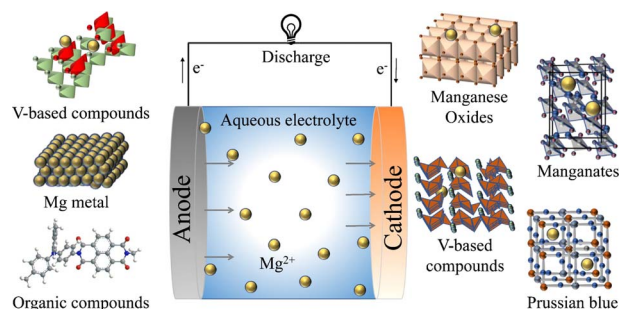


REVIEWS

23337

Recent advances in rechargeable aqueous magnesium-ion batteries

Xiaoman Ye, Xuemei Xiao, Zhijing Wu, Yi Zhan,* Xin Wu* and Sheng Liu*

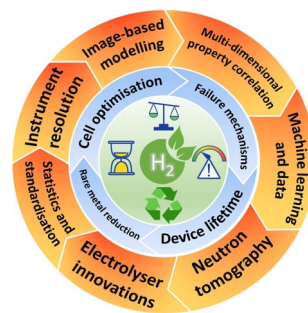


PERSPECTIVE

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Complementary X-ray and neutron imaging of water electrolyzers for green hydrogen production

Sebastian J. Altus, Beverley J. Inkson and Jennifer Hack*

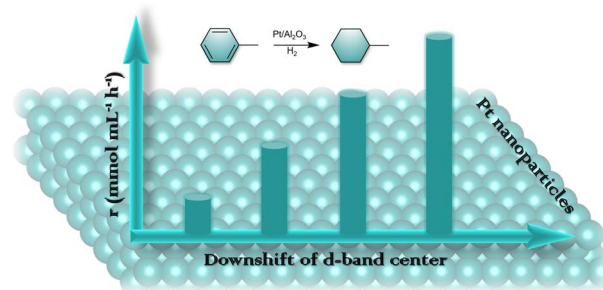


COMMUNICATIONS

23392

Regulating the d-band center of Pt for highly effective H₂ storage through toluene hydrogenation at low temperatures

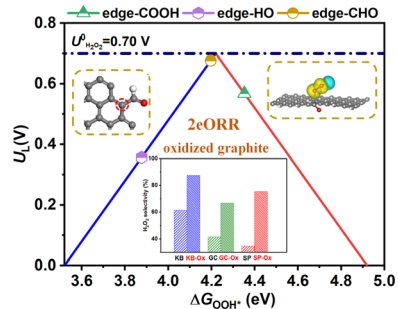
Xingyu Zhang, Ke Xu, Qiankang Liao, Yu Sun and Sai Zhang*



23398

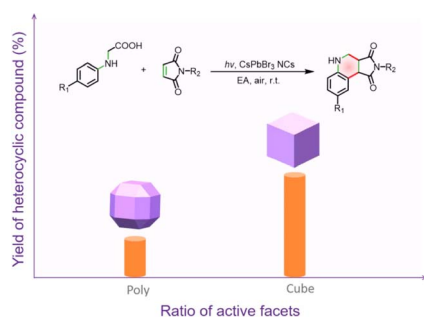
Electronic regulation of carbon sites by oxygenated groups for electrochemical oxygen reduction to H₂O₂

Yin Wang,* Tingting Zhang, Dongyong Li, Peihe Li, Quanli Hu, Quan Zhuang,* Limei Duan and Jinghai Liu*



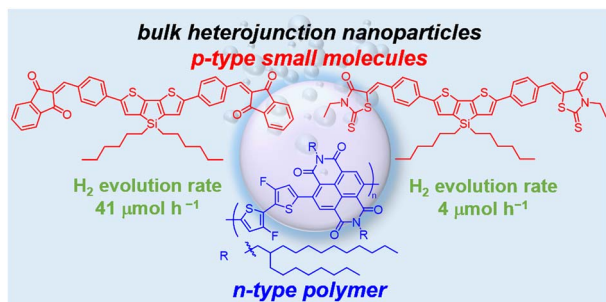
COMMUNICATIONS

23406

**Facets in metal halide perovskite nanocrystals for the photoinduced electron transfer annulation reaction**

Qing Guo,* Jun-Lin Lu, Bin Qin, Qi-Chao Shan, Le Liu, Jin-Dan Zhang, Xi Liu,* Xin-Hua Duan and Li-Na Guo*

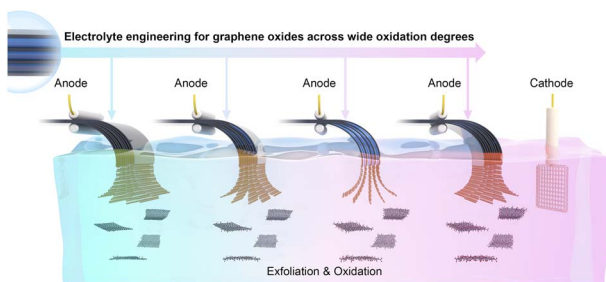
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**Non-conventional bulk heterojunction nanoparticle photocatalysts for sacrificial hydrogen evolution from water**

Jai-Ram Mistry, Ewan McQueen, Fabio Nudelman, Reiner Sebastian Sprick* and Iain A. Wright*

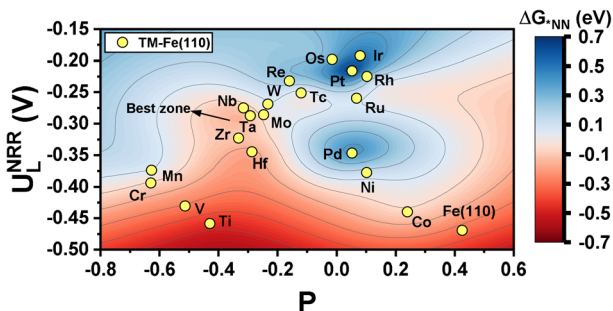
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**Electrolyte engineering for the mass exfoliation of graphene oxide across wide oxidation degrees**

Huili Ren, Xiaopei Xia, Yingzhi Sun, Yi Zhai, Zongzheng Zhang, Jiahao Wu, Jing Li* and Mingjie Liu

23425

**Promoting electrocatalytic nitrogen reduction by introducing low-spin sites in ferromagnetic single-atom alloys**

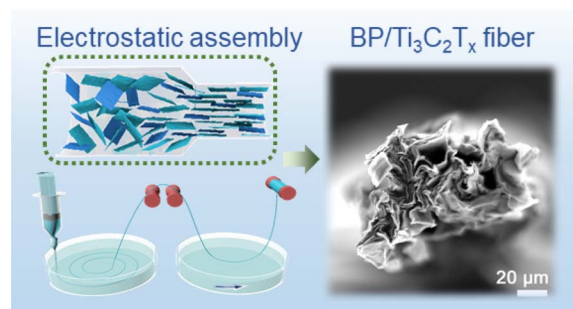
Yiming Ren, Peiyao Bai, Hongguang Wang, Shilin Wei and Lang Xu*



23436

Structurally oriented black phosphorus/MXene heterostructured fibers for flexible supercapacitors with enhanced ion transport and capacitive charge storage

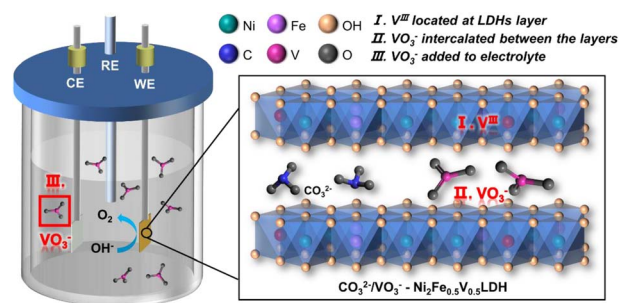
Kunhua Quan, Yubing Li, Panji Xu, Jiayong Wu and Shuaikai Xu*



23447

Location effects of vanadium in NiFe layered double hydroxides for oxygen evolution reaction

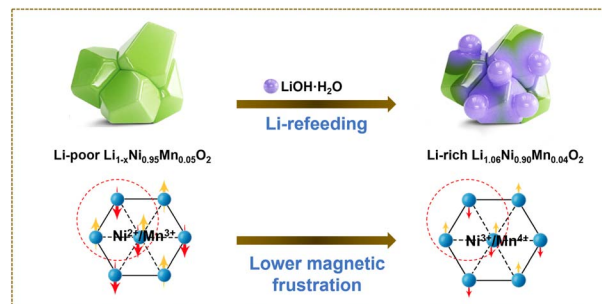
Mengze Ma, Yechi Zhang, Xiaoqian Ding, Jianlei Jing, Linbo Jin, Wei Liu, Daojin Zhou* and Xiaoming Sun*



23454

Mitigating magnetic frustration to improve single-crystalline nonstoichiometric $\text{Li}_{1.06}\text{Ni}_{0.90}\text{Mn}_{0.04}\text{O}_2$ for lithium-ion batteries

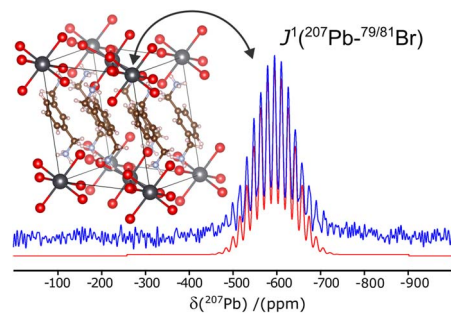
Guoyu Ding, Shizhou Wang, Xinhui Huang, Qiancheng Zhao, Yiyang Peng, Zhonghan Wu, Na Jiang, Kuiming Liu, Yudong Zhang, Zhichen Hou, Wutong Yang, Meng Yu, Fangming Liu* and Fangyi Cheng*



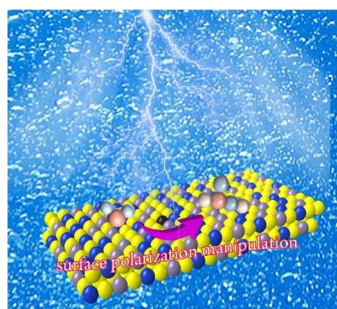
23461

Multinuclear solid-state NMR investigation of structurally diverse low-dimensional hybrid metal halide perovskites

Thomas J. N. Hooper,* Benny Febriansyah, Thirumal Krishnamoorthy, Walter P. D. Wong, Kai Xue, Joel W. Ager and Nripan Mathews



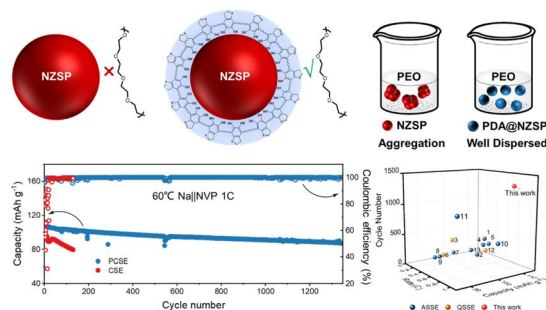
23475



Surface defect induced polarization manipulation in Cu_2SnS_3 for boosting electrochemical CO_2 reduction

Haihua Wang, Ning Wen, Yupeng Li, Xiuling Jiao, Yuguo Xia* and Dairong Chen*

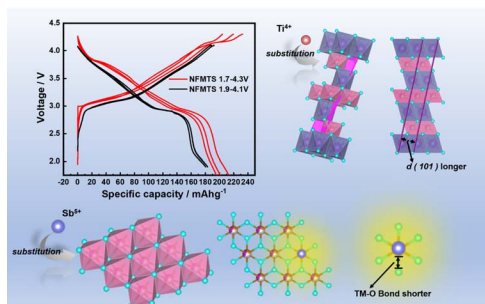
23485



An amphiphilic interface for constructing a uniform composite solid-state electrolyte towards long-life all-solid-state sodium metal batteries

Chengyuan Peng, Shizhi Huang, Xuyang Shen, Jingyi Ding, Junrong Luo, Junhao Du, Zongpu Xia, Xinxiang Zhang and Jitao Chen*

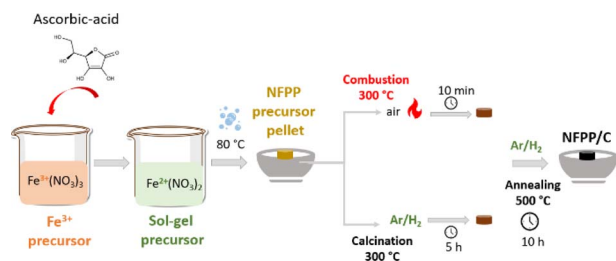
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High-entropy configuration of O3-type layered transition-metal oxide cathode with high-voltage stability for sodium-ion batteries

Lei Liu, Yuhang Xin, Yingshuai Wang, Xiangyu Ding, Qingbo Zhou, Ziye Wang, Weiqing Huang* and Hongcai Gao*

23506



Synthesis and characterization of a crystalline $\text{Na}_4\text{Fe}_3(\text{PO}_4)_2(\text{P}_2\text{O}_7)$ cathode material for sodium-ion batteries

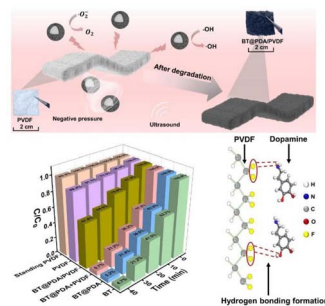
Yaprak Subaşı*, Laura Altenschmidt, Fredrik Lindgren, Tore Ericsson, Lennart Häggström, Cheuk-Wai Tai, Haidong Liu* and Reza Younesi



23518

Tailoring of PVDF for retrieval of piezoelectric powders to optimize piezo-catalytic water treatment

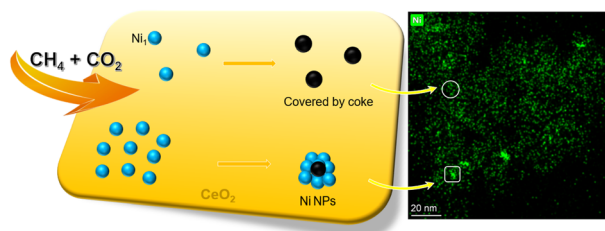
Kaiyu Feng, Yan Zhang,* Xuefan Zhou, Yan Zhao, Hanyu Gong, Xiang Zhou, Hang Luo, Dou Zhang and Chris Bowen



23530

The *in situ* growth of atomically dispersed Ni species on CeO₂ during low-temperature CH₄/CO₂ reforming

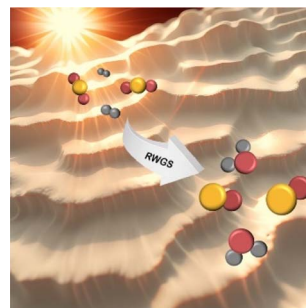
Hui Wang,* Yansu Hu, Alexander Adogwa, Ming Yang* and Tong-Bu Lu*



23541

Alkali-promoted indium oxide as a highly active and selective catalyst for photo-thermal CO₂ hydrogenation

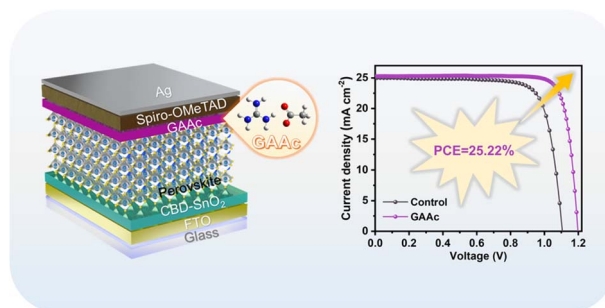
Xinhuilan Wang, Alejandra Rendón-Patiño, Jean Marcel R. Gallo, Diego Mateo* and Jorge Gascon*



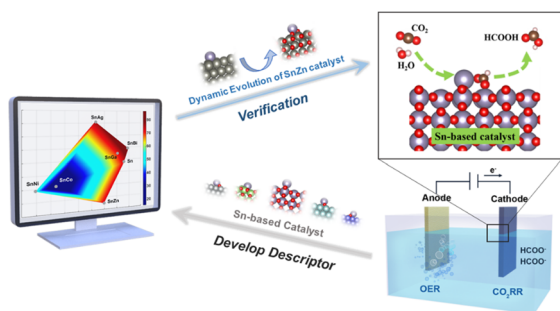
23551

Synergistic surface modulation with isotropic 2D GA₂PbI₄ and Lewis base enhances efficiency and stability of perovskite solar cells

Peiquan Song, Lina Shen, Lingfang Zheng, Enlong Hou, Peng Xu, Jinxin Yang, Chengbo Tian, Zhanhua Wei,* Xianguang Zhang* and Liqiang Xie*



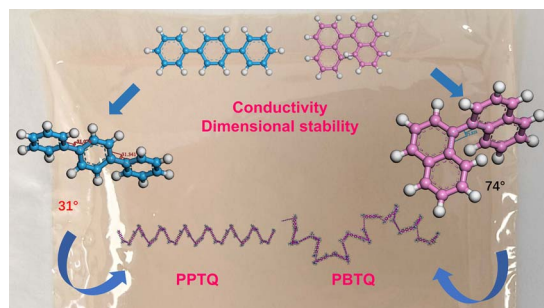
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Experimental trends and theoretical descriptors for electrochemical reduction of carbon dioxide to formate over Sn-based bimetallic catalysts

Xue Han, Binhong Wu, Yan Wang, Nathaniel N. Nichols, Yongjun Kwon, Yong Yuan, Zhenhua Xie, Sinwoo Kang, Byeongjun Gil, Caiqi Wang, Tianyou Mou, Hongfei Lin, Yao Nian* and Qiaowan Chang*

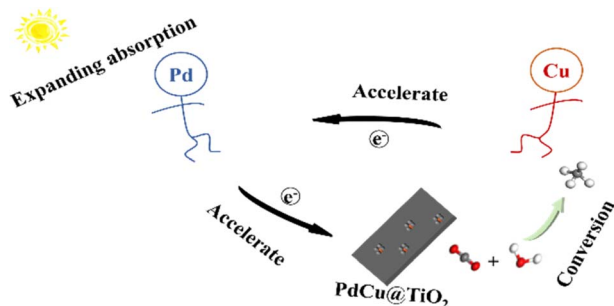
23570



A poly(binaphthyl-co-terphenyl quinuclidinium) anion exchange membrane with excellent alkaline stability and anion conductivity

Hongbo Zhang, Xianying He, Hanhua Feng, Cheng Li and Ming Li*

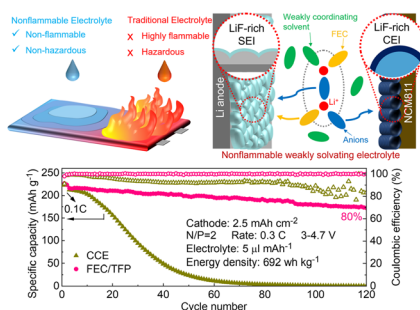
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Synergistic integration of PdCu alloy on TiO₂ for efficient photocatalytic CO₂ reduction to CH₄ with H₂O

Yang Liu, Shujuan Sun, Meng Ma, Xinyu Zhong, Fengyu Gao,* Guangtong Hai* and Xiubing Huang*

23590



Achieving safe high-voltage lithium-metal batteries by tailoring electrolyte systems

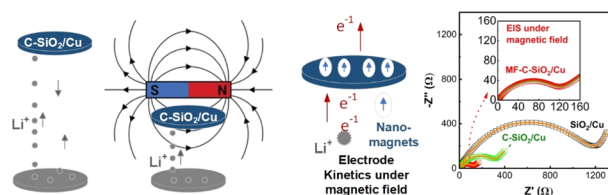
Kai Lan, Jancong Cheng, XinXin Yang, Jingmin Fan, Mingseng Zheng, Ruming Yuan* and Quanfeng Dong*



23601

Magnetic field-governed kinetics in a silicon dioxide-based anode towards high performing lithium-ion magneto-batteries

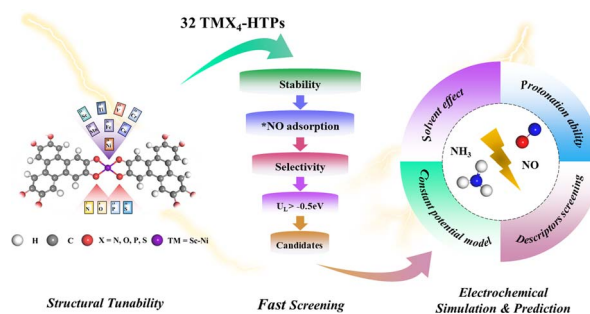
Rizwan Ur Rehman Sagar, Srikanth Mateti, Nasir Mahmood, Muhammad Waqas Khan, Ying (Ian) Chen* and Md Mokhlesur Rahman*



23612

2D conductive metal–organic frameworks for NO electrochemical reduction: a first-principles study

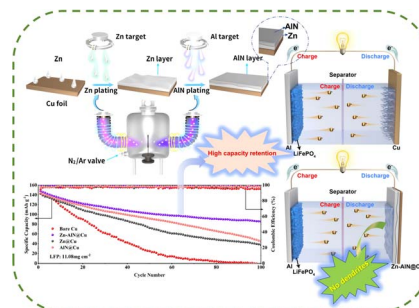
Xing Chen, Xiangyu Zhu, Zhiyuan Xia, Shiting Qian, Yanan Zhou,* Qiquan Luo* and Jinlong Yang*



23622

Fabrication of a synergistic dual-functional layer-modified Cu current collector using a Co-FCVA apparatus for high-performance anode-free lithium metal batteries

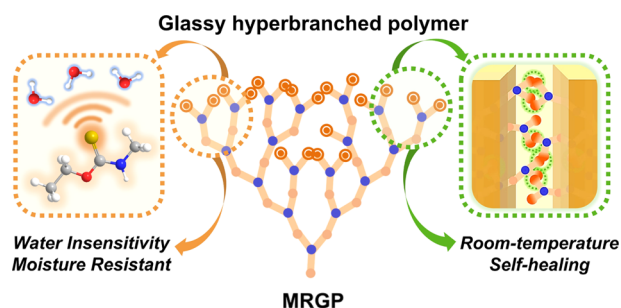
Yaohui Zhu, Shengqi Dai, Shengjie Du, Bo Zhang, Lin Chen* and Bin Liao*



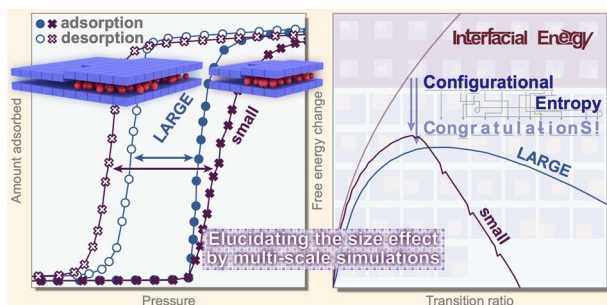
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Moisture-resistant and room-temperature self-healing glassy plastic with thiocarbonyl and hyperbranched structure

Weihang Li, Minjie Cai, Yihang Yao, Yue Huang, Haitao Wu, Wenqiang Wu, Jie Wen and Jinrong Wu*



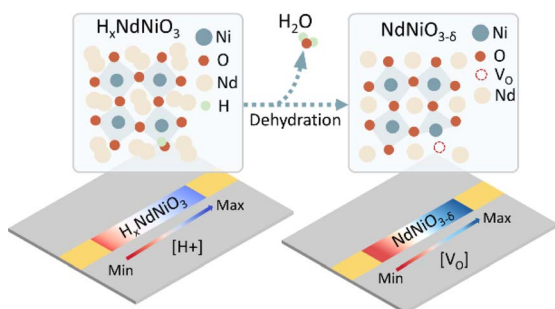
23647



Elucidating the particle size-dependent guest-induced structural transition of flexible metal-organic frameworks by exploring cooperative nature

Homare Arima, Shotaro Hiraide* and Satoshi Watanabe*

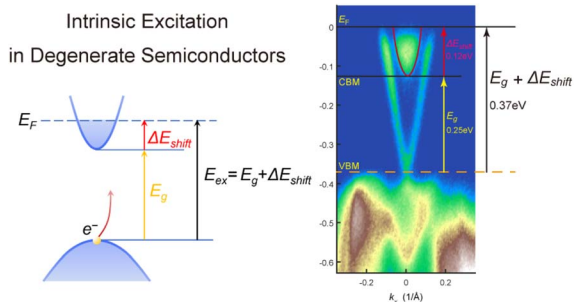
23658



Manipulating protons and oxygen vacancies in nickelate oxides via thermochemical dehydration

Haowen Chen, Zihan Xu, Luhan Wei, Mingdong Dong, Yang Hu, Ying Lu, Nian Zhang, Jie Wu and Qiyang Lu*

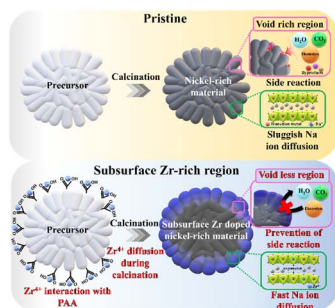
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Burstein-moss effect leads to an unusual suppression of bipolar conduction with shrinking bandgap

Chenxi Zhao, Shengtao Cui, Yuanlong Li, Yunbo Wu, Tongrui Li, Kai Li, Liang Sun, Zhe Sun, Chong Xiao* and Yi Xie

23676



Design of a stable and voidless surface region by intensive subsurface zirconium doping for a high performance nickel-rich cathode in sodium-ion batteries

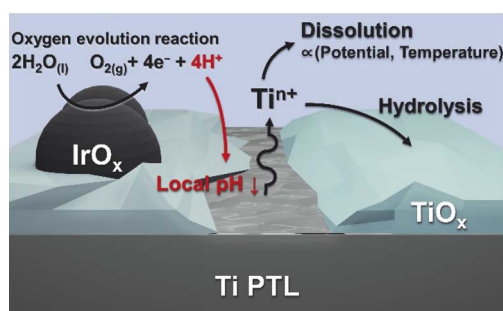
Sunwoo Lee, Donguk Kim and Wonchang Choi*



23688

Dissolution of the Ti porous transport layer in proton exchange membrane water electrolyzers

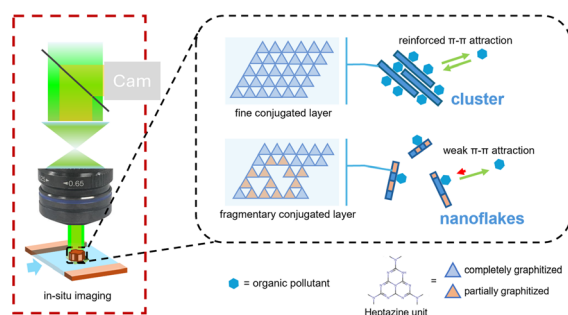
Junsic Cho, Dong Hyun Kim, Min Wook Noh, Haesol Kim, Hong-Gyun Oh, Pilyoung Lee, Soobin Yoon, Wangyun Won, Young-June Park,* Ung Lee* and Chang Hyuck Choi*



23697

Quantitative nanoscopic imaging of adsorbent-aggregation-state dependent molecular binding cooperativity

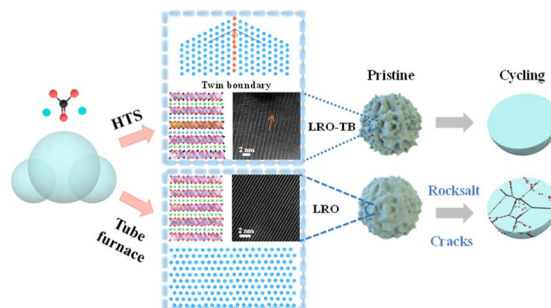
Jin Xie, Kanglu Li, Nafil Zuhair B Nizzar, Haotian Meng and Xianwen Mao*



23712

Twin boundaries induced by high-temperature shock boost the structural stability of Li-rich layered-oxide

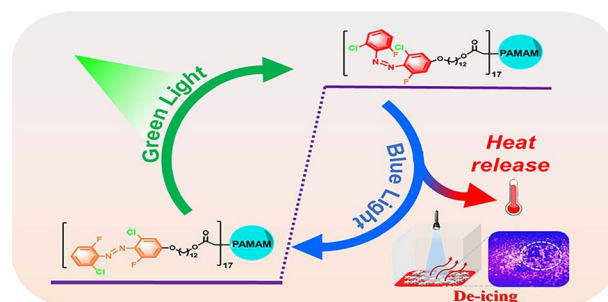
Zhedong Liu, Cuihua Zeng, Jingchao Zhang, Jiawei Luo, Zhaoxin Guo, Zekun Li, Rui Liu, Wei-Di Liu, Jia Ding, Yanan Chen* and Wenbin Hu*



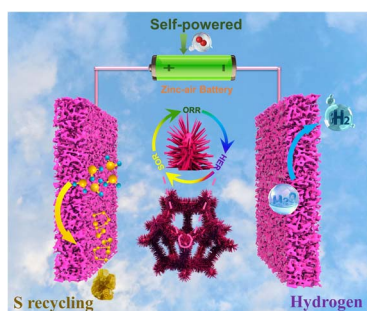
23723

Visible light activated dendrimers for solar thermal energy storage and release below 0 °C

Xingtang Xu, Chonghua Li, Wenjing Chen, Jie Feng, Wen-Ying Li,* Guojie Wang* and Haifeng Yu*



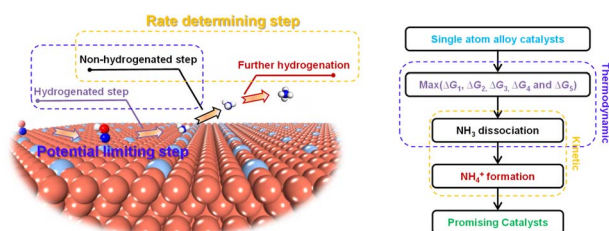
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A multifunctional MoS₂/Ni₉S₈/NF catalyst for synchronous desulfurization and hydrogen evolution by a self-driven system

Xiaoqiong Hao, Keqi Jiang, Guangfeng Liu, Shiyuan Zhou, Danfeng Wang, Ye Zhang, Tingyu Zhang,* Yingjie Liu* and Peiyang Gu*

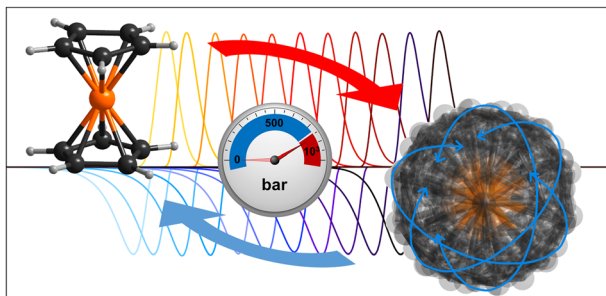
23743



Identifying non-proton-coupled electron transfer as a potential limiting step for the electro-synthesis of ammonia

Lei Yang, Jiake Fan and Weihua Zhu*

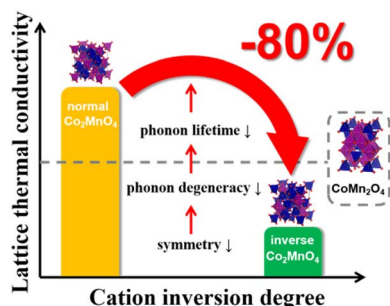
23751



Unveiling barocaloric potential in organometallic-sandwich compounds [Cp₂M][PF₆] (M: Fe³⁺, Co³⁺)

Javier García-Ben, Ignacio Delgado-Ferreiro, Richard J. C. Dixey, Socorro Castro-García, Jorge López-Beceiro, Ramon Artiaga, Manuel Sánchez-Andújar, Anthony E. Phillips, Juan Manuel Bermúdez-García* and María Antonia Señaris-Rodríguez*

23761



Abnormally low thermal conductivity of Co₂MnO₄ spinel induced by cation inversion

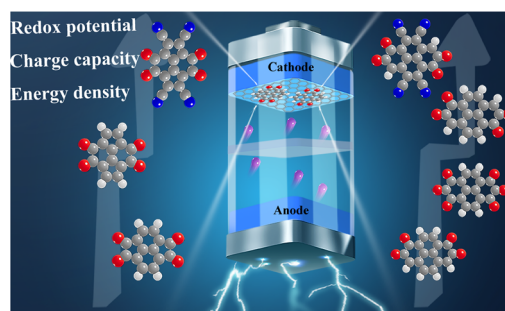
Qi Ye, Shengyang Wang, Huilan Ma, Wen Yin, Zhongbo Hu and Can Li*



23769

Designing strategies for high-redox-potential conjugated carbonyl organic cathodes in lithium- and sodium-ion batteries

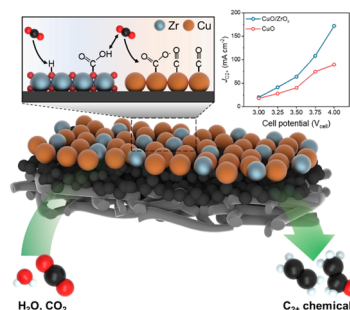
Zhaoli Liu, Xiangyu Meng, Fengchao Cui* and Guangshan Zhu*



23780

Enhanced C–C coupling of Cu-based catalysts via zirconia-driven carbonate interaction for electrochemical CO₂ reduction reaction

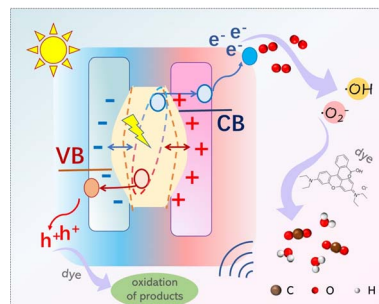
Dayeon Kim, Hyewon Yun, Jiseon Kim, Chan Woo Lee and Yun Jeong Hwang*



23789

High photopiezocatalytic energy conversion via effective charge separation and deformability in the asymmetric ternary heterojunction Bi₄Ti₃O₁₂/PPy/TiO₂

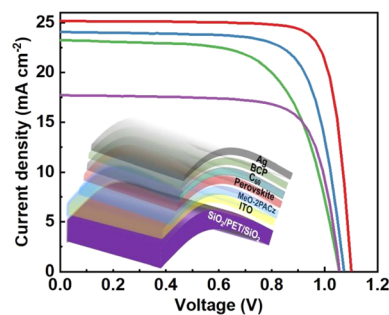
Jialin Zhuang, Lingchao Wang, Yingmo Hu,* Yechen Wang, Liping Lin, Jiaying Xiao, Yunfan Chen, Xiaowei Li, Huiqiang Liu, Qian Zhang* and Qi An*



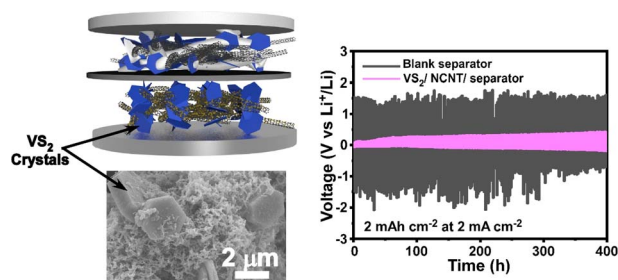
23801

22.43%-Efficiency flexible modification-free perovskite solar cells with a uniform and anti-reflective ITO/SiO₂/PET/SiO₂ substrate

Jiwen Chen, Xi Fan,* Jia Li, Jinzhao Wang, Jixi Zeng, Wenqing Zhu* and Weijie Song*



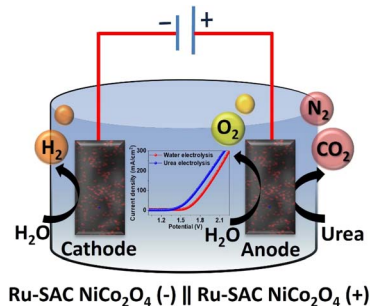
23810



High lithiophilicity and Li diffusion rate on 1T phase transition metal dichalcogenides as effective Li regulating materials for dendrite-free metal anodes

Hoilun Wong, Md Delowar Hossain, Mengyang Xu, Yuting Cai, Mohsen Tamtaji, Kenan Zhang and Zhengtang Luo*

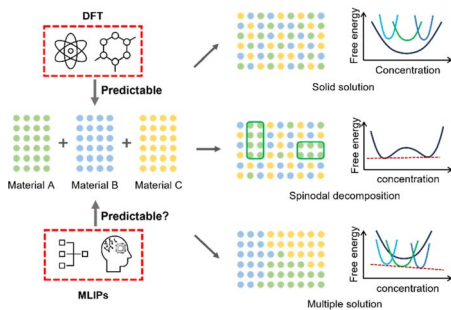
23819



Stabilizing a Ru single atom catalyst through electronic metal–support interaction with a NiCo₂O₄ support for overall water splitting and urea electrolysis

Astha Gupta, Swarup Ghosh, Dinesh Bhalothia, Sadhasivam Thangarasu, Biplab Ghosh, Rajashri Urkude, Joydeep Chowdhury and Surojit Pande*

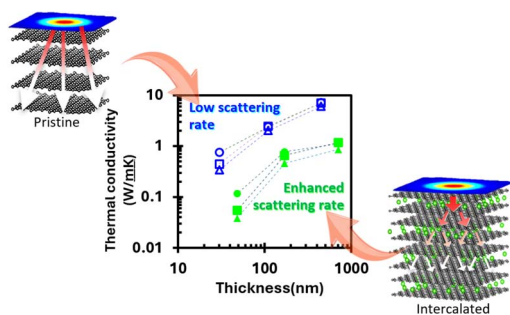
23837



Machine learning interatomic potentials in engineering perspective for developing cathode materials

Dohyeong Kwon and Duho Kim*

23848



Modulating the cross-plane thermal conductivity of graphite by MnCl₂ and FeCl₃ co-intercalation

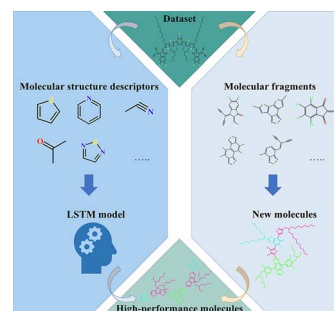
Harsh Chandra, Shun Sasano, Bin Xu, Ryo Ishikawa, Suguru Noda, Naoya Shibata and Junichiro Shiomi*



23859

Design and virtual screening of donor and non-fullerene acceptor for organic solar cells using long short-term memory model

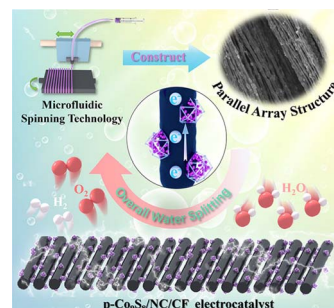
Long-Fei Lv, Cai-Rong Zhang,* Rui Cao, Xiao-Meng Liu, Mei-Ling Zhang, Ji-Jun Gong, Zi-Jiang Liu, You-Zhi Wu and Hong-Shan Chen



23872

A parallel array structured cobalt sulfide/nitrogen doped carbon nanocage/carbon fiber composite based on microfluidic spinning technology: a novel design to boost overall water splitting

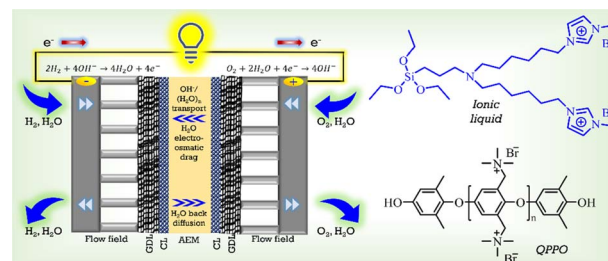
Yige Zhao,* Ting Li, Qing Wang, Yinyin Ai, Ruohan Hou, Aneela Habib, Guosheng Shao, Feng Wang* and Peng Zhang*



23880

Synthesis and characterization of ionic liquid incorporated quaternized poly(2,6-dimethyl-1,4-phenylene oxide) and NiO/IrO2 electrocatalyst for anion exchange membrane fuel cell applications

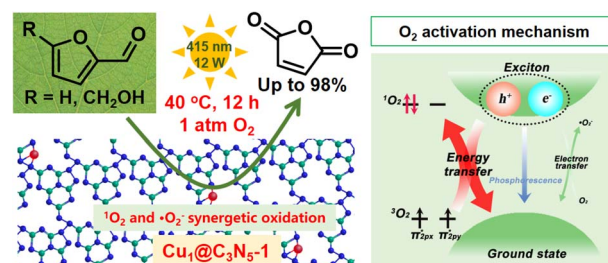
Ramasamy Gokulapriyan, S. C. Karthikeyan and Dong Jin Yoo*



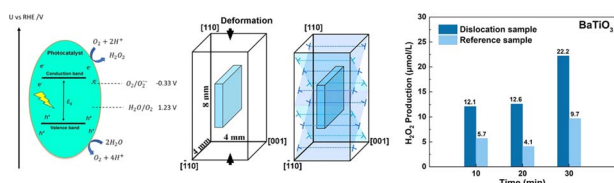
23897

Single atom Cu anchored graphitic-C3N5 for photocatalytic selective oxidation of biomass-derived furfurals to maleic anhydride

Kaihua Li, Weihao Zhou, Xincheng Cao, Xuran Xu, Yamei Lin, Kui Wang,* Jianchun Jiang and Guo-Ping Lu*



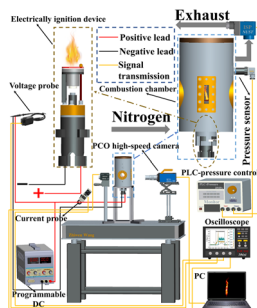
23910



Enhancing the photoelectric performance of metal oxide semiconductors by introduction of dislocations

Haoyu Zhang, Shuang Gao, Hongyang Wang, Fangping Zhuo, Qaisar K. Muhammad, Xufei Fang, Jürgen Rödel, Till Frömling* and Qi Li*

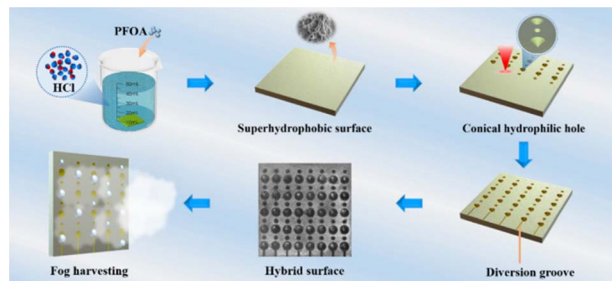
23920



A combination strategy targeting the combustion enhancement of electrically controlled rocket fuels exerts synergistic elimination against zirconium's electrostatic hazards

Zhiwen Wang, Feng Li, Qianyi Zhang, Keer Ouyang, Ruiqi Shen, Yinghua Ye, Luigi T. DeLuca and Wei Zhang*

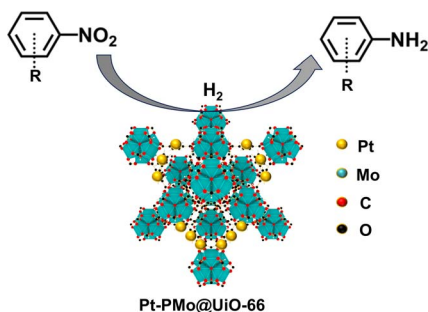
23930



Efficient water-collection hybrid surface optimized through combination-hole arrangement and diversion groove structure design

Jing Zhao,* Chuang Liu, Zijin Cheng, Ruoyu Sun, Yixian Hu and Jiliang Mo

23940



Highly dispersed platinum and phosphomolybdic acid (PMo) on the UiO-66 metal-organic framework (MOF) for highly efficient and selective hydrogenation of nitroaromatics

Kai Chen, Qingqing Liu, Zhiying Qiu, Huan Zhang, Ning Gong and Lihua Zhu*



CORRECTION

23948

Correction: Influence of microstructure evolution on the discharge properties of the Al–Mg–Sn–Ga–In anode for Al–air batteries

Xuehong Xu, Jin Zhang, Wei Jiang and Yunlai Deng*

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