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Journal of Materials Chemistry A

Materials for energy and sustainability

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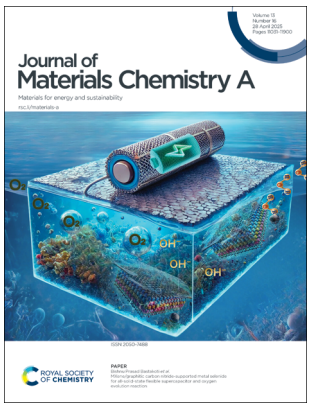

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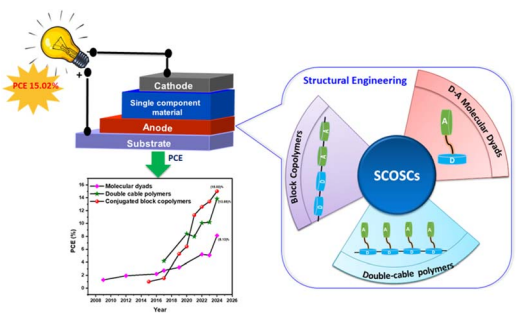
Shaik Nizamuddin, Syed Nousheen, Muthulakshmi Navadharsana, Bommaramoni Yadagiri, Kamatham Narayanaswamy,* Surya Prakash Singh* and Ganesh D. Sharma*



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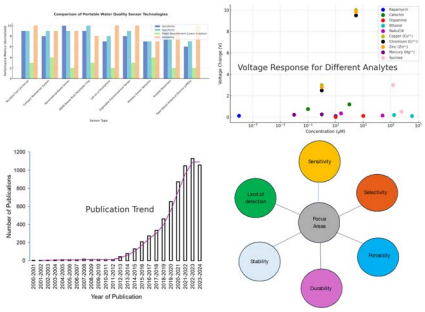
REVIEWS

11134

Advances in real-time water quality monitoring using triboelectric nanosensors

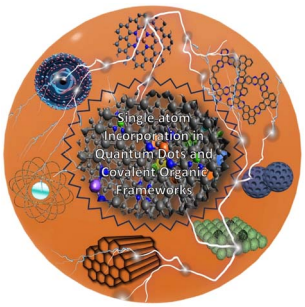
Salini Krishnan and Adewale Giwa*



11159

Single-metal-atom-incorporated quantum dots and covalent organic frameworks: a comparison of quantum effects and electronics

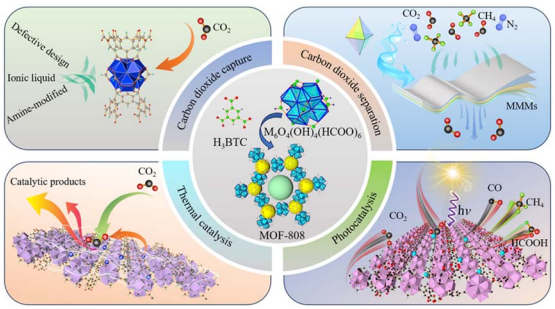
Anubha Yadav and Saikat Dutta*



11185

Application of MOF-808 and its derivatives in carbon capture and CO_2 catalytic conversion

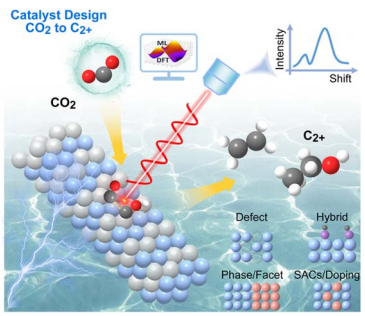
Junya Wang, Zhengdong Jiang, Shikun Wen, Yaling Wei, Ping Ning and Yu Zhang*



11210

Advancing C–C coupling of the electrocatalytic CO_2 reduction reaction for C_{2+} products

Guangyuan Liang, Sheng Yang, Chao Wu, Yang Liu, Yi Zhao, Liang Huang, Shaowei Zhang, Shixue Dou, Hongfang Du,* Dandan Cui* and Liangxu Lin*



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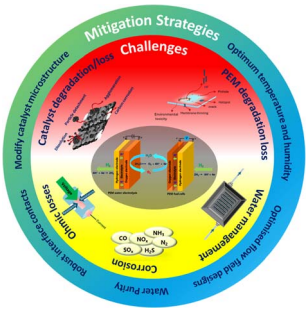
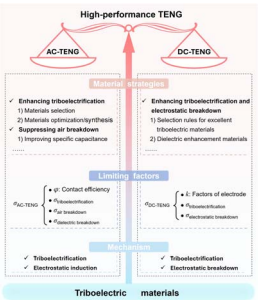
11236



Challenges and mitigation strategies for general failure and degradation in polymer electrolyte membrane-based fuel cells and electrolysers

Malavika Arun, Sarbjit Giddey, Paul Joseph* and Dattatray S. Dhawale*

11264

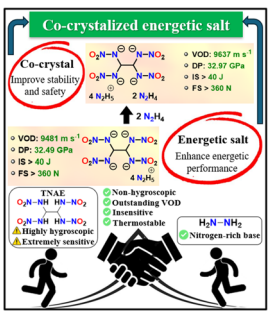


Empowering high-performance triboelectric nanogenerators: advanced materials strategies

Xiaoru Liu, Zhihao Zhao* and Jie Wang*

COMMUNICATIONS

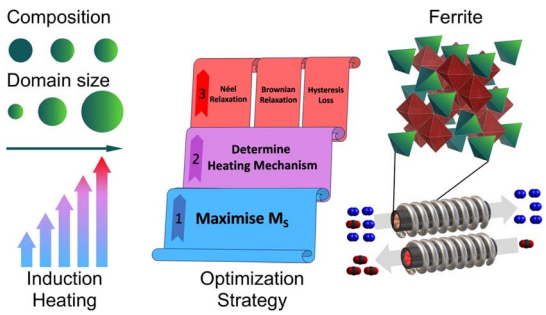
11286



Synergizing hydrazine co-crystals with hydrazine salt of TNAE: a novel strategy for developing highly insensitive explosives

Shreyasi Banik, Vikas D. Ghule and Srinivas Dharavath*

11293



Tuning ferrite nanoparticles for optimal inductive heating in thermal swing adsorption processes

Maxim De Belder, Alysson F. Morais, Julie Heyens, Rikkie Joris, Sergey Basov, Margriet J. Van Bael, Dmitry Chernyshov, Vadim Diadkin, Joeri F. M. Denayer, Johan A. Martens and Eric Breynaert*

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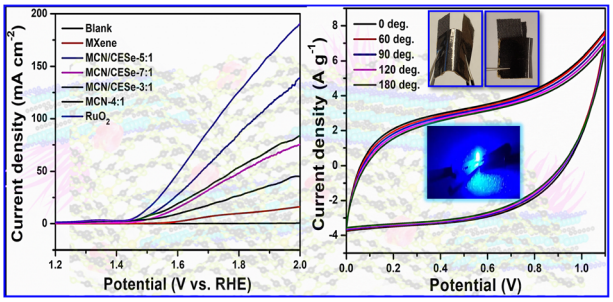
11300

MXene/graphitic carbon nitride-supported metal selenide for all-solid-state flexible supercapacitor and oxygen evolution reaction

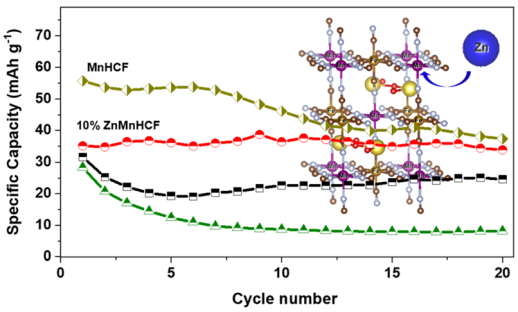
Shrabani De, Jose Florentino, Gayani Pathiraja, Bhoj Raj Gautam and Bishnu Prasad Bastakoti*



11314

Excess of Zn to relieve the structural distortion of manganese hexacyanoferrate in aqueous Zn-ion battery

Min Li, Mariam Maisuradze, Zulkarnaen Paputungan, Reinhard Denecke, Jasper Rikkert Plaisier, Giuliana Aquilanti, Giovanni Agostini and Marco Giorgetti*



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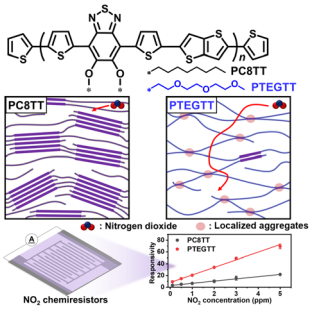
Enhancing NO_2 sensing performance and stability: low-crystallinity conjugated polymers with localized aggregates *via* ethylene glycol pendants

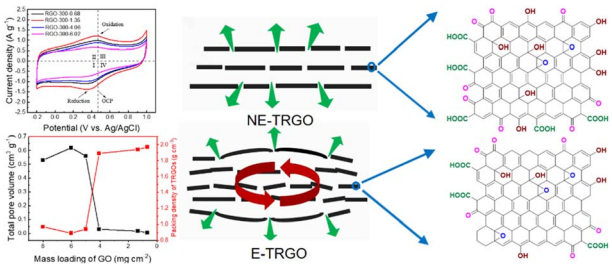
Jung-Won An, Ho Won Jang, Ji-Soo Jang* and Junwoo Lee*



11330

Reduced graphene oxides prepared *via* mass loading-controlled non-explosive thermal reduction for high volumetric capacitance supercapacitors

Jianing Tan, Zhaoyuan Liu,* Wei Wu, Gang Li and Wei Guo*



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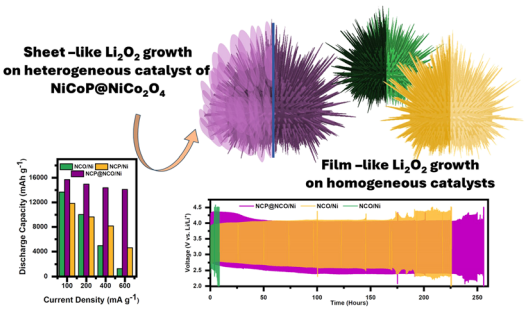
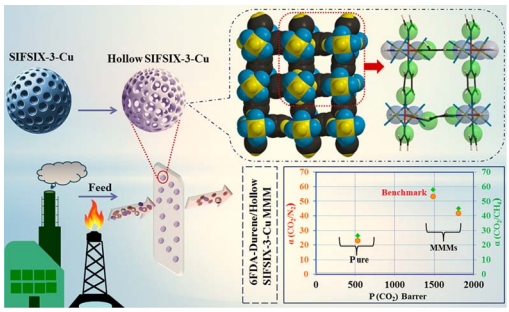
11344



Optimizing discharge product morphology with hetero-nanostructured NiCoP/$NiCo_2O_4$ for enhanced sustainability in Li–O_2 battery performance

Shadeepa Karunarathne,* Gabriel E. Pérez, W. P. S. L. Wijesinghe, François Orange, Yasun Y. Kannangara, Chirag R. Ratwani, Chanaka Sandaruwan, Alice Mija, Ali Reza Kamali* and Amr M. Abdelkader*

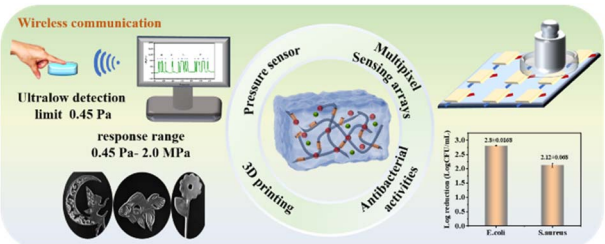
11358



A fine-tuned hollow porous metal–organic framework in mixed-matrix membranes for benchmark CO_2 separation performance

Reyhane Ahmadi, Abtin Ebadi Amooghin* and Hamidreza Sanaeepur

11371



3D printable, super compressible, antibacterial and environmentally stable dual networked ionogels as wearable pressure sensors for wireless early warning of precise health

Xiaoya Liu, Zhenzhou Wang, Haoyu Wang, Yuqi Liu, Zhice Xu, Shaorui Chen* and Xudong Yu*

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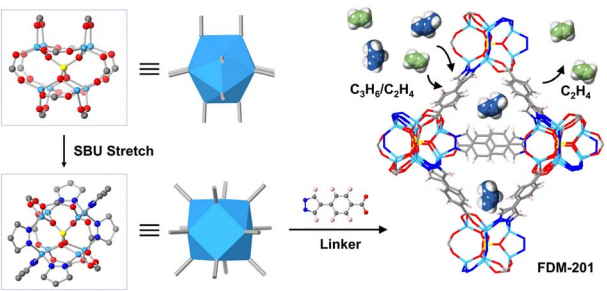

A highly connected metal–organic framework with stretched inorganic units for propylene/ethylene separation

Yin Rao, Xinhao Li, Haozhi Xi, Zhongwen Jiang, Wangzhi Li, Han Zhou, Yanping Zhang, Chuixiong Wu, Yue-Biao Zhang and Qiaowei Li*

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PAPERS

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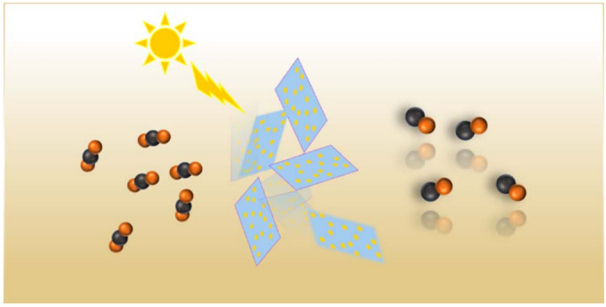
***In situ* fabrication of TiO_2 nanoparticles/2D porphyrin metal–organic frameworks for enhancing the photoreduction of CO_2 to CO**

Xiaoqian Xu, Abdelkader Labidi, Tian Luo, Ting Gao, Nurxat Nuraje, Irina Zvereva and Chuanyi Wang*



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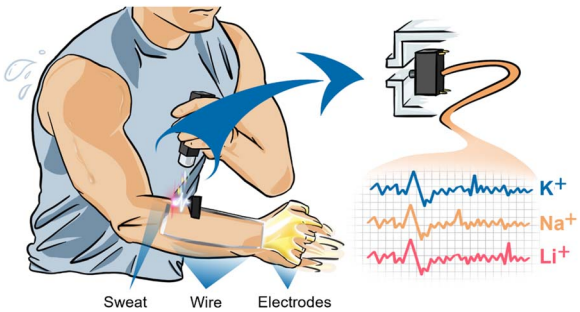
Solution ion luminescence induced by the triboelectric-discharge effect for rapid and intuitive detection of sweat ions

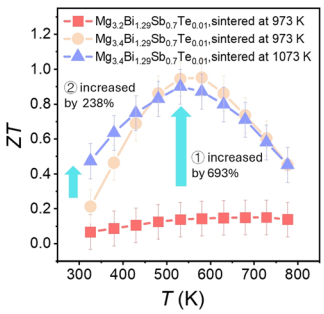
Haoyu Wang, Jingjing Fu, Xian Song, Tingting Hou, Xin Xia, Guoqiang Xu, Binbin Zhang, Keshuai Yang, Ru Guo, Chaojie Chen, Zuowei Sun, Guangyao Zhao, Zijian Zheng, Xinge Yu* and Yunlong Zi*



11406

A two-step strategy improves the wide-temperature-range thermoelectric performance of $Mg_{3+x}Bi_{1.29}Sb_{0.7}Te_{0.01}$

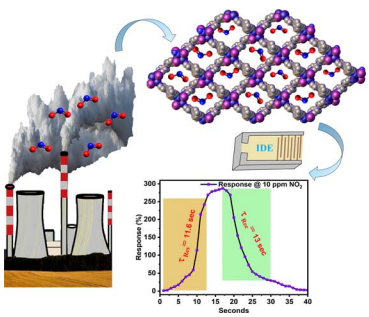
Yushuo Ma, Xiao-Lei Shi, Li Zhang,* Han Gao, Meng Li, Liang-Cao Yin, Wei-Di Liu, Qingfeng Liu, Yan-Ling Yang and Zhi-Gang Chen*



11416

Two-dimensional Cu(I)-MOF with mesoporous architecture towards chemiresistive NO_2 sensing

Dilip Pandey, Trivedi Samarth, Vikash Kumar Verma, Chandrabhan Patel, L. Ponvijayakanthan, Neeraj K. Jaiswal,* Shaibal Mukherjee* and Abhinav Raghuvanshi*



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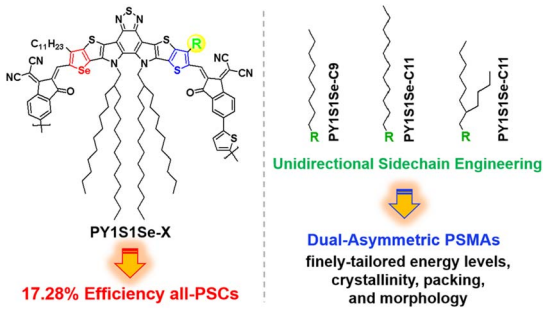
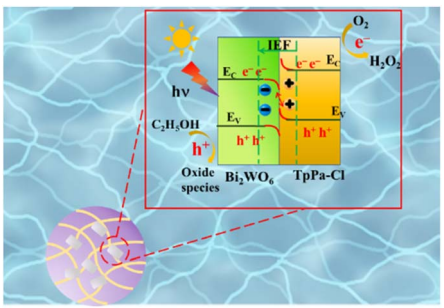


Dual-asymmetric backbone constructed polymerized small molecule acceptors for efficient all-polymer solar cells

Wenyan Su, Tao Sun, Guangyu Qi, Tengfei Li, Haoyu Su, Hairui Bai, Hongmei Qin, Xuming Zhou, Shuaishuai Chen, Yingfan Du, Jing Guo, Yuxiang Li, Weiguo Zhu and Qunping Fan*

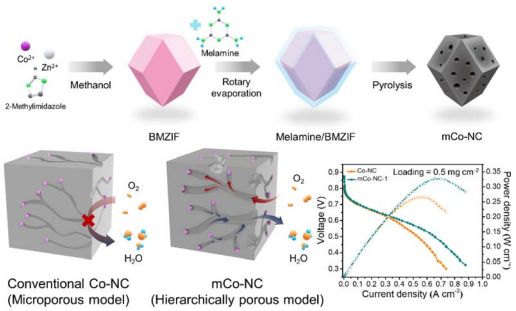
11433



Bi_2WO_6/COF S-scheme heterostructure photocatalyst for H_2O_2 production

Han Liu, Jun Zhang, Quanlong Xu, Hong Tao, Tingmin Di,* Quanrong Deng* and Shenggao Wang*

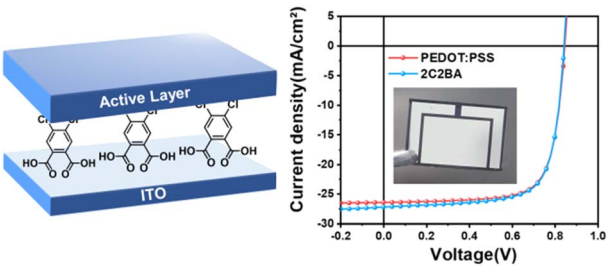
11445



Hierarchically porous Co–N–C electrocatalysts with enhanced mass transport and cobalt utilization efficiency for oxygen reduction reaction in high-performance PEMFCs

Jinhyuk Baek, Hyeonwook Son, Eungjun Lee, Sung Jong Yoo, Moonsu Kim* and Gibaek Lee*

11458



Blade-coated organic photovoltaics with a dichlorophthalic acid self-assembled monolayer

Yingcong Zheng, Cenqi Yan,* Hongxiang Li, Wei He, Jiayuan Zhu, Yingyue Hu, Jiayu Wang, Yufei Gong, Lei Meng, Yongfang Li and Pei Cheng*

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PAPERS

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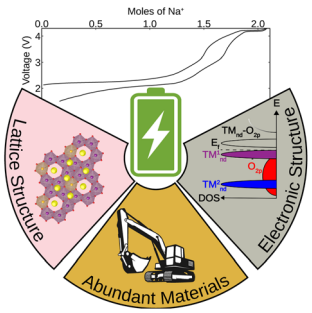
Elucidating the effect of Fe substitution on structural and redox stability of $Na_2Mn_3O_7$

Hugh B. Smith, Gi-Hyeok Lee, Bachu Sravan Kumar, Aubrey N. Penn, Victor Venturi, Yifan Gao, Ryan C. Davis, Kevin Hunter Stone, Adrian Hunt, Iradwikanari Waluyo, Eli Stavitski, Wanli Yang and Iwnetim I. Abate*



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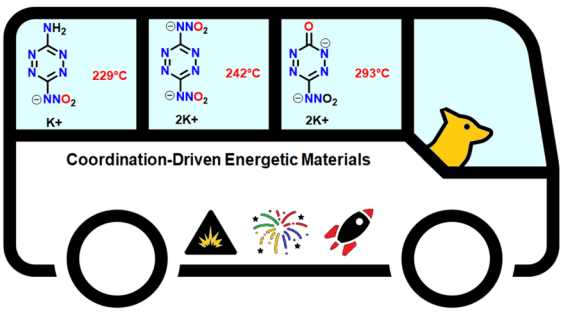
Coordination-driven safer and sustainable energetic materials

Jatinder Singh, Richard J. Staples and Jean'ne M. Shreeve*



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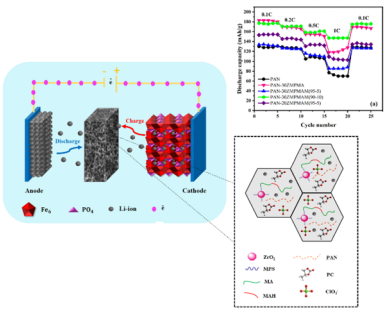
The effect of ZrO_2-*g*-poly(methyl acrylate-*co*-maleic anhydride) on the performance of polyacrylonitrile gel polymer electrolyte in lithium ion batteries

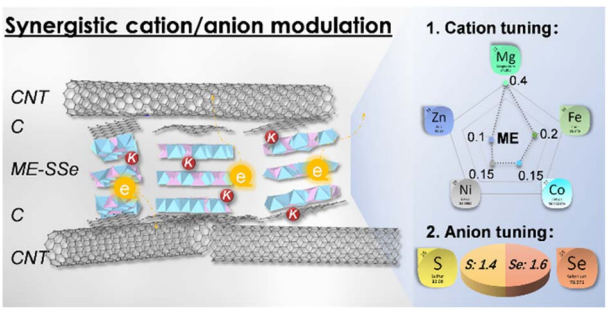
Shirin Hosseini, Maral Ghahramani* and Hamid Bakhshi*



11505

Synergistic cation/anion modulation of metal phosphorus trichalcogenides for enhanced potassium-ion storage performance

Xiao-Hui Wu,* Li-Bing Yang, Ming-Jun Zhao, Mu-Rong Xu, Wei-Jun Jiang, Bing-Jie Feng, Jia-Jie Liu and Yi Zhao*



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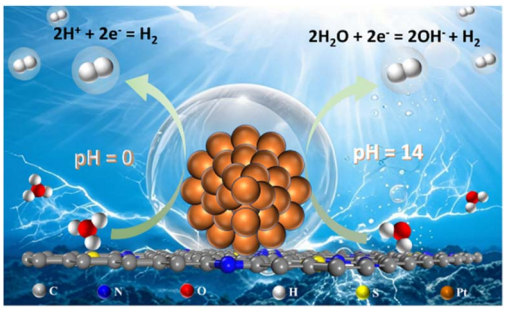
PAPERS

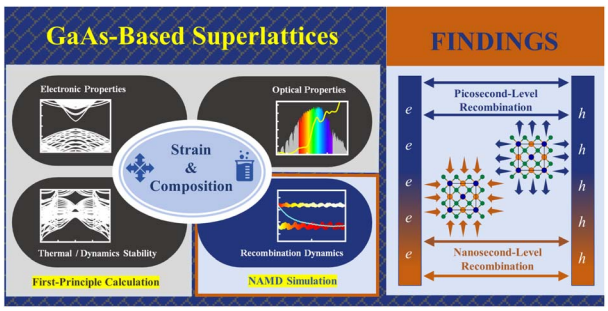
11518



Sulfur doping activated metal–support interaction drives Pt nanoparticles to achieve acid–base hydrogen evolution reaction

Yagang Li, Jiaqing Luo,* Peilin Liu, Liangkun Zhang, Weiyu Song, Yuechang Wei, Zhen Zhao, Xiao Zhang,* Jian Liu and Yuanqing Sun*

11530



Strain and composition engineering of excited-state carrier recombination dynamics in GaAs/GaP and GaAs/AlAs superlattices: insights from time-domain nonadiabatic molecular dynamics simulations

Yue Tang, Yipeng Wang, Xinlu Cheng, Pengfei Lu* and Hong Zhang*

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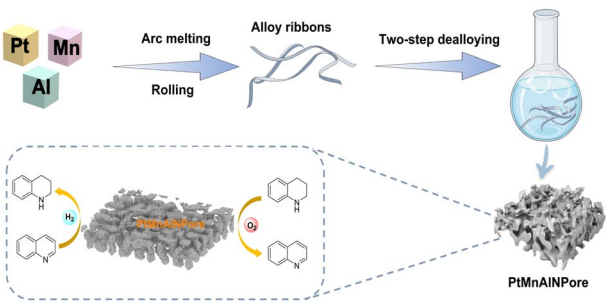

A Pt–Mn–Al trimetallic nanoporous catalyst for reversible hydrogenation/oxidative dehydrogenation of N-heterocycles

Yunpeng Wang, Ziyi Zhang, Shize Wang, Qiang Xu, Xiujuan Feng,* Yanhui Li, Xuan Zhang,* Yoshinori Yamamoto and Ming Bao*

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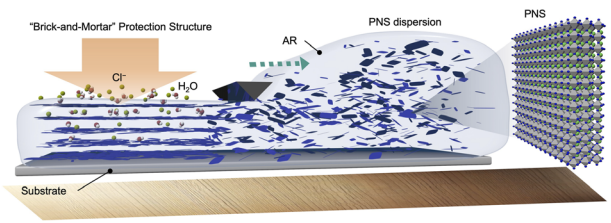

High-transparency, weather-resistant nanocomposite coatings from a shear-aligned 2D unit-cell-thick perovskite for wooden artifact preservation

Zhuangzhuang Li, Ya Nan Ye, Beibei Kang, Yiming Hua, Zhe Wang, Dongdong Yan, Huijie Zhou, Wenwen Yu and Shilei Zhu*

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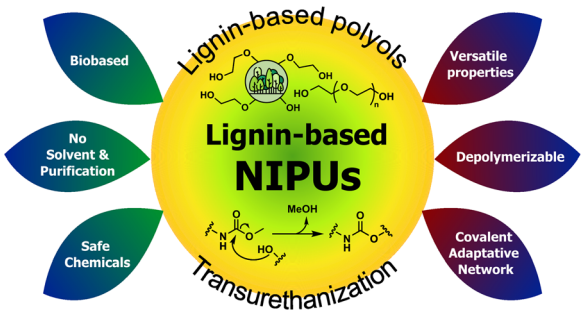
PAPERS

11557

Unlocking sustainable, aromatic, and versatile materials through transurethanization: development of non-isocyanate polyurethanes from lignins

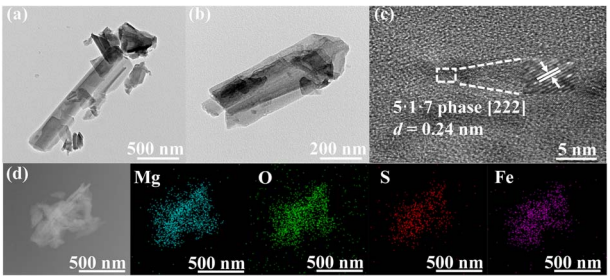
Nathan Wybo, Elise Cherasse, Antoine Duval* and Luc Avérous*



11573

Designing an iron-doped basic magnesium sulfate photocatalyst for wide spectral photoresponse and superior catalytic activity

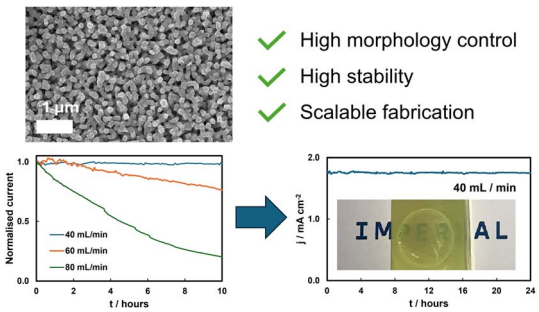
Zhongmei Song, Huifang Zhang,* Liang Ma, Qinghong Li, Siyuan Zhang, Chunyan Wang, Chengyou Wu,* Xuefeng Yu, Zhen Ma, Haining Liu,* Xiushen Ye and Zhijian Wu



11585

Mechanically and photoelectrochemically stable $WO_3|BiVO_4|NiFeOOH$ photoanodes synthesised by a scalable chemical vapour deposition method

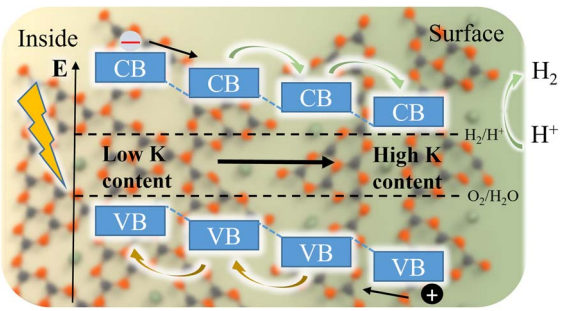
George H. Creasey,* Tristan W. McCallum, Guangrui Ai, Brian Tam, John W. Rodriguez Acosta, Alvia Mohammad Yousuf, Sarah Fearn, Flurin Eisner, Andreas Kafizas and Anna Hankin*



11605

Enhanced photocatalytic performance of g-C_3N_4 by introducing gradient energy band structure and activated n–π* electronic transition for visible light hydrogen generation

Jiaqiao Hu, Xiongtao Wu, Xingang Kong, Shinobu Uemura, Takafumi Kusunose, Yasuhiro Tanaka and Qi Feng*



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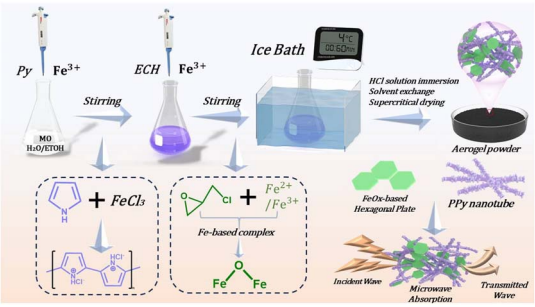
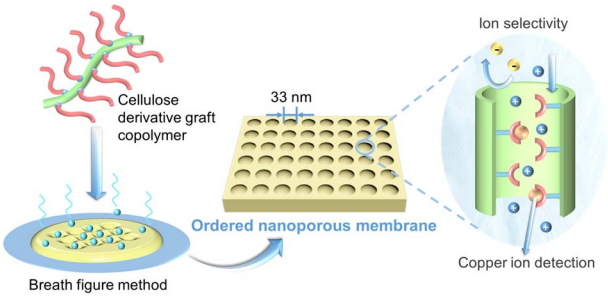
11617



One-pot synthesis of a magnetic polypyrrole aerogel with 1D/2D hybrid nanostructures for microwave absorption

Jianjian Yang,* Lingyan Qin, Guojie Liang, Qizhi Zhao, Kejun Wang, Hua Yan* and Zhide Hu*

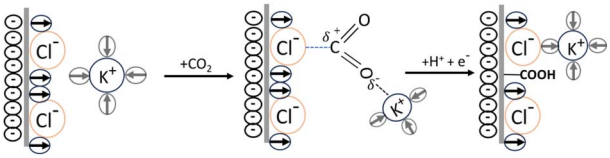
11625



Ordered nanoporous cellulose-based membranes fabricated *via* breath figure method for copper ion detection

Yingfan Hu, Xuejiao Lin, Xijun Wang,* Zhouyang Xiang, Hui Li, Peng-Cheng Ma* and Haisong Qi*

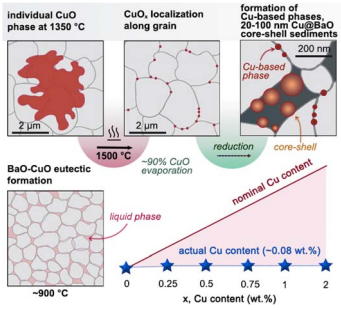
11637



Efficient ethane production *via* $SnCl_4$ Lewis acid-enhanced CO_2 electroreduction in a flow cell electrolyser

Sankeerthana Bellamkonda,* Ian Brewis, Venkateswara Rao Gedela, Rana Faisal Shahzad, Mohamed Mamlouk and Shahid Rasul*

11650



The effect of a CuO sintering additive on the sinterability of Ba-based perovskite electrolytes for protonic ceramic electrochemical cell applications

George N. Starostin, Mariam T. Akopian, Inna A. Starostina, Guangming Yang, Dmitry A. Medvedev* and Zongping Shao*

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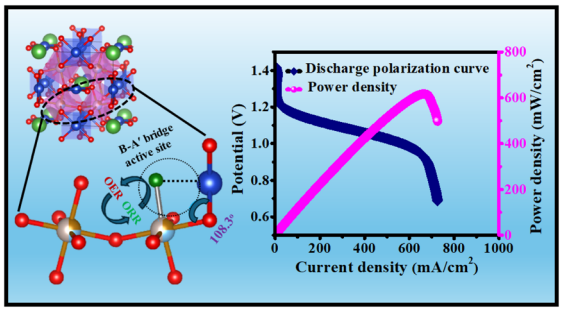
PAPERS

11666

Ultrahigh peak power density of rechargeable Zn–air batteries using quadruple perovskite as air-cathode electrocatalysts

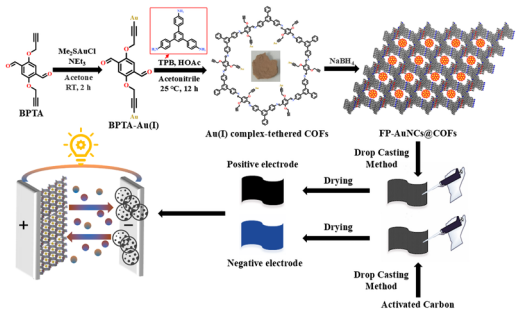
Sujan Sen and Tapas Kumar Mandal*



11676

Fully packed ultrasmall Au nanoclusters in covalent organic frameworks as positive electrodes for supercapacitors

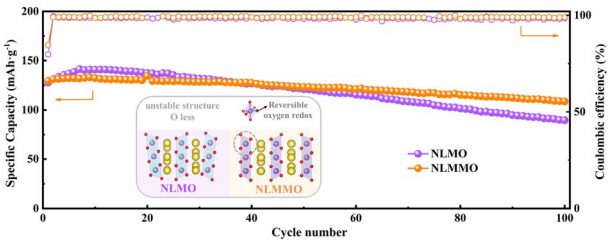
Jianxin Ma, Yanping Sun, Zhongjie Cai, Faisal Ahmad, Yelan Xiao, Tong Shu* and Xueji Zhang*



11684

Improved anionic redox reversibility of layered oxides by modulating transition metal–oxygen bonds for sodium ion batteries

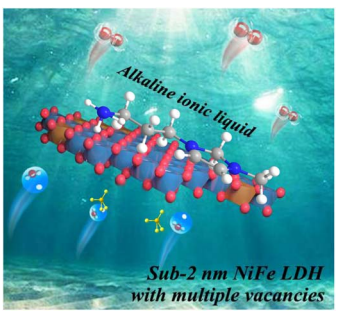
Jiaxin Yan, Yuanheng Wang, Qingjie Zhou, Xin Chen, Haixia Yang, Xingyu Wang, Jianting Li, Xing Xu, Zaifang Yuan and Pengjian Zuo*



11694

Surface defect engineering of sub-2 nm NiFe layered double hydroxide with multiple vacancies induced by alkaline ionic liquid enabling enhanced water oxidation

Youhai Cao, Zhiwei Li, Mengyuan Yue, Qihui Yuan, Rui Huang, Cuihua An, Qibo Deng* and Yijing Wang*



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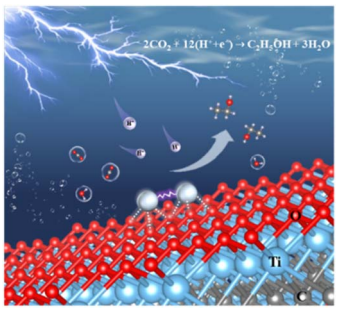
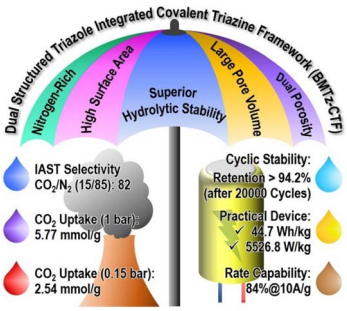
11703



Highly active and selective dual-atom modified MXene catalysts for carbon dioxide reduction to ethanol

Yana Sun, Rui Yu, Junwei Sun, Dominik Legut, Joseph S. Francisco and Ruifeng Zhang*

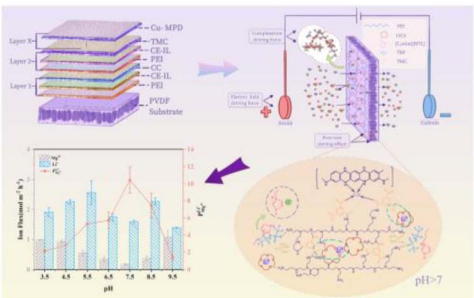
11717



Triazole-boosted dual-structured covalent triazine frameworks for ultra-stable high-energy and -power density aqueous supercapacitors and notable selective CO_2 capture

Ashish Kumar Maharana, Sourav Kumar Sarkar, Soumya Mukherjee, Rahul Sarkar, Gugulothu Rambabu, Koh Sugamata and Sanjib Das*

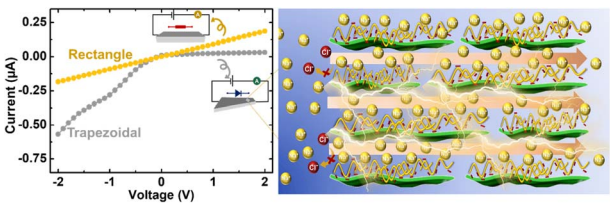
11732



Development of metal–ligand ion-exchange membranes functionalized with crown ether–ionic liquids for selective Li^+/Mg^{2+} separation

Ning Zhang, Yuan Li, Wei Zhang, Yanling Liu, Yongjian Pei, Jie Zhao,* Ping Ning* and Kai Li

11749



Geometrical engineering of nearly fully cation-selective 2D angstrom-scale ionic diode membranes for highly efficient osmotic energy conversion

Amalia Rizki Fauziah, Rathi Aparna, Fery Prasetyo, Kalon Gopinadhan* and Li-Hsien Yeh*

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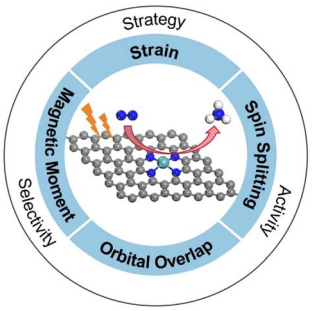
PAPERS

11760

Regulating spin states of single transition metal atoms on N-doped graphene for efficient ammonia synthesis

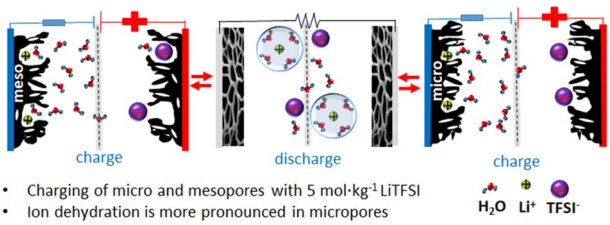
Wei Li, Jing Zhang, Xinxin Duan and Ding Yi*



11767

A novel approach to describe the electric double layer structure of water-in-salt electrolytes in porous carbon electrodes

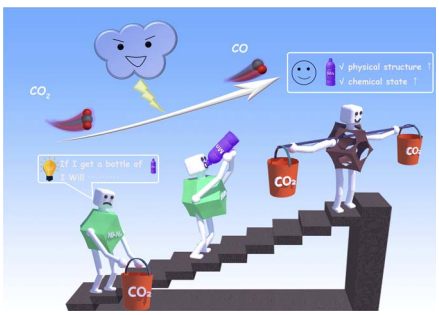
M. Tauhidul Islam, Harald Fitzek, Bernhard Gollas and Qamar Abbas*



11782

Kirkendall effect triggered by trace Mn element on a Ni–N–C catalyst for enhanced electroreduction of CO_2 to CO

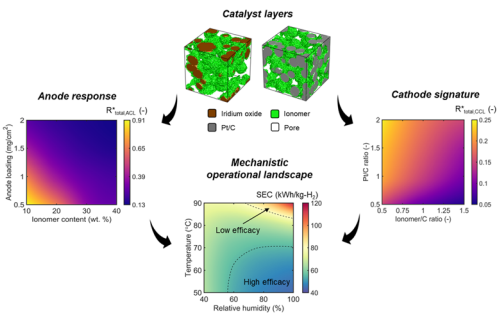
Caixia Liu, Ning Liu, Xiaoping Chen, Yuzheng Zhao, Jinxing Mi, Zongxiang Yang, Peng Wu, Jianjun Chen* and Junhua Li



11793

Probing the mechanistic role of the catalyst layer microstructure in proton exchange membrane water electrolyzers

Navneet Goswami, Abhinand Ayyaswamy, Anindya Nath, Bairav S. Vishnugopi and Partha P. Mukherjee*



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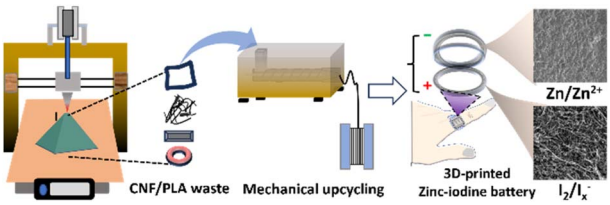
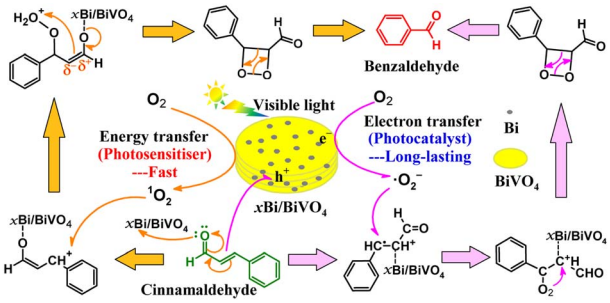
11804



Point-of-use upcycling of 3D printing waste for developing 3D-printed Zn–I_2 batteries

Keval K. Sonigara, Jayraj V. Vaghasiya, Carmen C. Mayorga-Martinez and Martin Pumera*

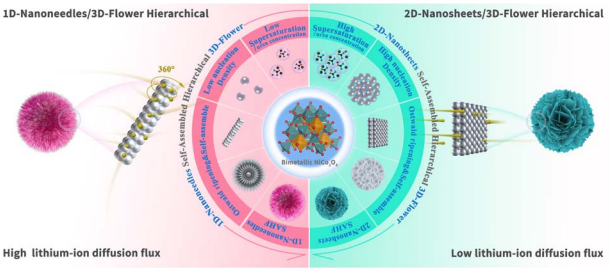
11817



***In situ* synthesis of dual-functional photocatalyst $xBi^0/BiVO_4$ for the selective oxidation of cinnamaldehyde to benzaldehyde under visible light using oxygen**

Jianghua Zhang, Zuzeng Qin,* Xuan Luo,* Tongming Su, Xinling Xie and Hongbing Ji

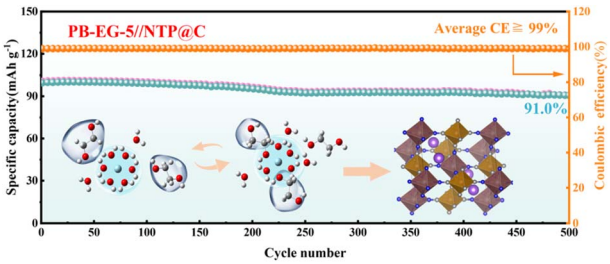
11834



Nucleation-density-regulated dimensional evolution of growth unit from 2D nanosheets to 1D nanoneedles in self-assembled hierarchical $NiCo_2O_4$ for enhanced lithium storage

Xingyu Zhou, Jianwu Wen,* Di Shen, Hansong He, Maoling Liao, Yi Wang, Yuanyuan Li, Hubin Shi, Shuang Qiu, Cairong Jiang, Jianjun Ma* and John T. S. Irvine

11848



A novel strategy for the reduction of coordinated water in Prussian blue analogues for their application as cathode materials for sodium-ion batteries

Xin Xu, Shiji Zhu, Chen Yang, Yongdong Wang,* Zhennan Wu, Junzi Zheng, Jie Wu and Yunfang Gao*

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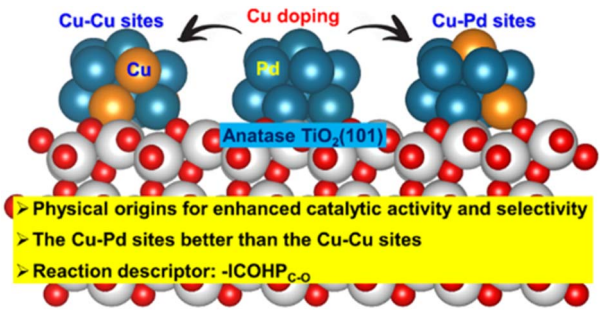
PAPERS

11861

Photoreduction of carbon dioxide enhanced by Cu atoms doped in a Pd cluster supported on TiO_2: mechanism, selectivity, and catalytic descriptor

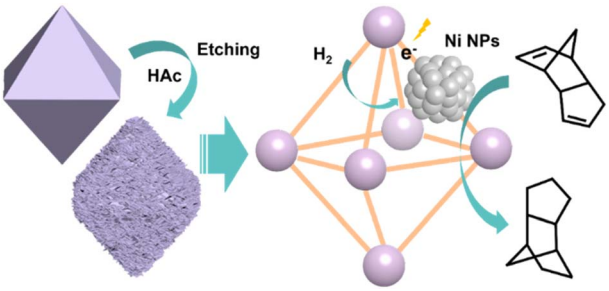
Jia-Jia Yang,* Shi-Ru Zhang, Feng Li, Laicai Li, Wei-Hai Fang and Ganglong Cui*



11874

Monocarboxylic acid etching strategy: modulation of the chemical environment of Ni nanoparticles in defective Ce-UiO-66 to construct heterogeneous interfaces for dicyclopentadiene hydrogenation

Fajie Hu, Danfeng Zhao, Rushuo Li, Yunqi Zhang, Tianyu Zhang, Xiubing Huang* and Ge Wang*



11886

Transparent nature-based luminescent solar concentrator with NIR emission and integrated thermal sensing

Sandra F. H. Correia,* Bruno P. Falcão, Gonçalo Figueiredo, Bárbara M. C. Vaz, Letícia S. Contieri, Leonardo M. de Souza Mesquita, Juliana Almeida, Joana C. Fradinho, Diana C. G. A. Pinto, Lianshe Fu, Paulo S. André, Sónia P. M. Ventura, Rute A. S. Ferreira and Vitor Sencadas*