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Journal of Materials Chemistry A

Materials for energy and sustainability

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IN THIS ISSUE

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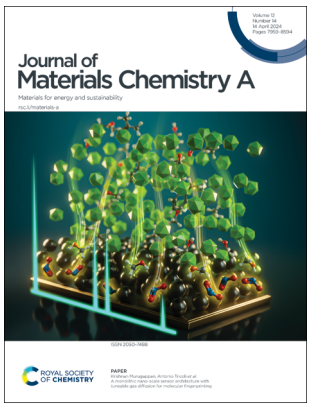


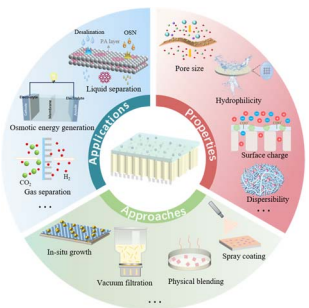
Cover
See Krishnan Murugappan, Antonio Tricoli *et al.*, pp. 8155–8166. Image reproduced by permission of Prof. Antonio Tricoli, Dr Krishnan Murugappan, Alishba T. John from *J. Mater. Chem. A*, 2024, **12**, 8155.

REVIEWS

7975

Metal/covalent–organic framework based thin film nanocomposite membranes for advanced separations

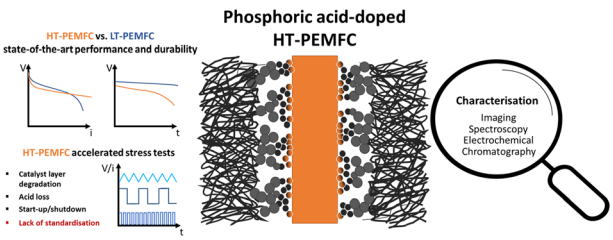
Lei Ge, Hengjie Song, Junyong Zhu,* Yatao Zhang,* Zhen Zhou and Bart Van der Bruggen



8014

Challenges and opportunities for characterisation of high-temperature polymer electrolyte membrane fuel cells: a review

Adam Zucconi, Jennifer Hack, Richard Stocker, Theo A. M. Suter, Alexander J. E. Rettie* and Dan J. L. Brett*



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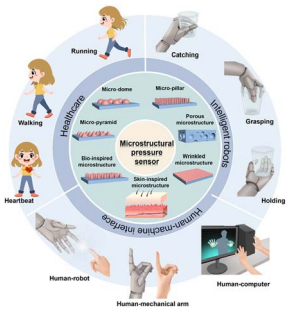
REVIEWS

8065

Flexible micro/nanopatterned pressure tactile sensors: technologies, morphology and applications

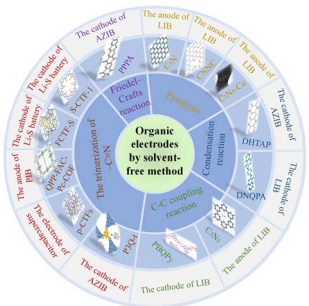
Lihong Wang, Jiaxu Liu, Xiangjun Qi, Xueji Zhang, Hang Wang, Mingwei Tian* and Lijun Qu*



8100

Solvent-free synthesis of organic electrodes for green sustainable energy storage

Haiping Yu, Jiakui Xiong, Chuanguang Wu, Mingjun Hu,* Jingru Liu* and Jun Yang*



8124

Chemical safety using functionalized carbon nanomaterials: neutralization and detection of organophosphorus compounds

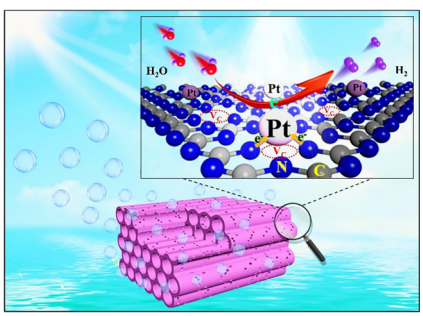
Jéssica E. S. Fonsaca, Leandro Hostert, Aldo J. G. Zarbin and Elisa S. Orth*

COMMUNICATION

8149

Synergistic carbon defect modulation in porous carbon nitride nanotubes for efficient photocatalytic hydrogen evolution

Bin Zhao, Beibei Zhang, Xing Liu, Zihao Mou, Baogang Wang,* Zhijun Wang* and Qingyuan Wang*



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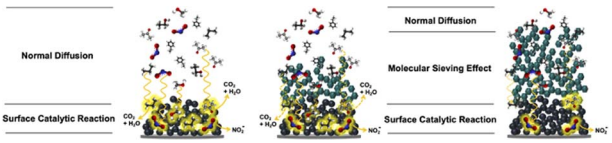
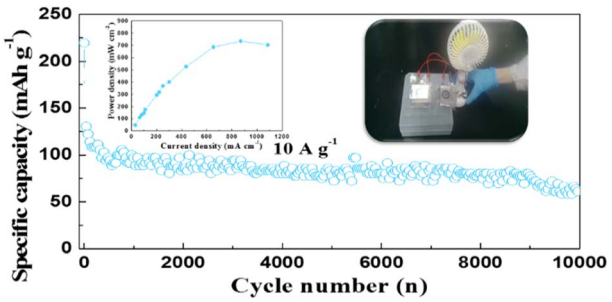
8155



A monolithic nano-scale sensor architecture with tuneable gas diffusion for molecular fingerprinting

Alishba T. John, Mahdiar Taheri, Jodie A. Yuwono, Priyank Kumar, David R. Nisbet, Krishnan Murugappan* and Antonio Tricoli*

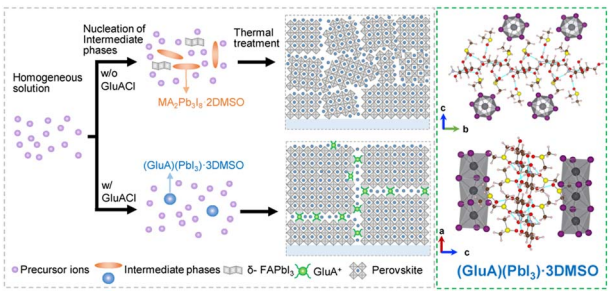
8167



Fe-doped α-MnO_2/rGO cathode material for zinc ion batteries with long lifespan and high areal capacity

Qiang Zhang, Hefei Fan, Qianfeng Liu, Yangga Wu and Erdong Wang*

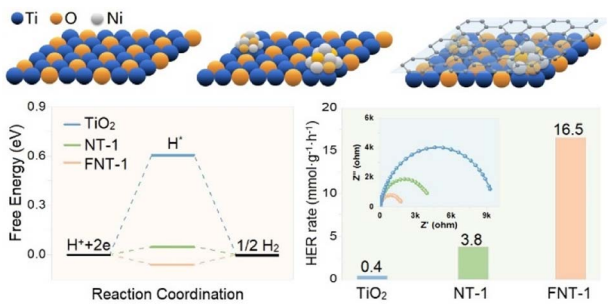
8175



Management of an intermediate phase *via* a multifunctional dietary supplement for efficient and stable perovskite solar cells

Chuizheng Feng, Jia Yang, Shungao Yin, Gang Xie, Mengqing Wang, Jianxing Yu, Ruonan Zhao, Yang Pan, Aihui Liang* and Yiwang Chen*

8186



Fluorinated carbon encapsulated NiO cluster/TiO_2 nanotubes as a robust photocatalyst for hydrogen evolution

Lihong Yuan, Panpan Wang, Chunyao Niu, Chenghua Sun, Rachel A. Caruso and Xiao Li Zhang*

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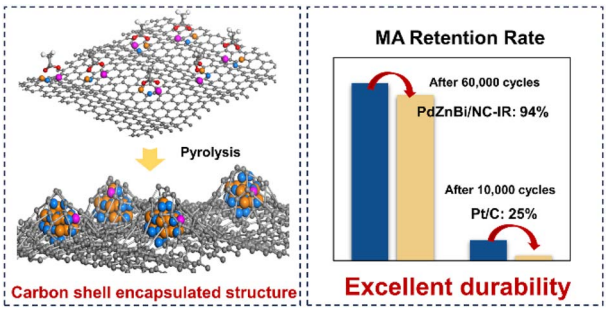
***In situ* confined synthesis of an interlayer-riveted carbon shell encapsulated PdZnBi alloy as a highly active and durable oxygen reduction reaction catalyst**

Liyuan Chang, Kailing Zhou, Weihan Si, Chao Wang, Changhao Wang,* Manchen Zhang, Xiaoxing Ke, Ge Chen* and Ruzhi Wang*



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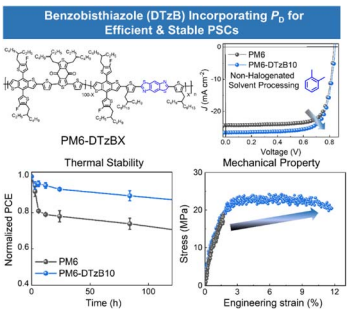
Benzobisthiazole-substituted terpolymers for non-halogenated solvent-processed polymer solar cells with enhanced efficiency, thermal stability and mechanical robustness

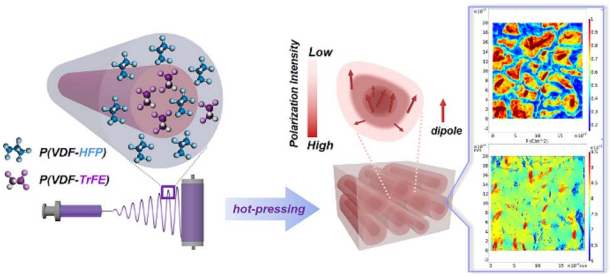
Soodeok Seo, Hyesu Jeon, Eun Sung Oh, Jin-Woo Lee, Chulhee Lim, Trieu Hoang-Quan Nguyen, Tan Ngoc-Lan Phan, Dahyun Jeong, Michael J. Lee, Taek-Soo Kim and Bumjoon J. Kim*



8216

Gradient core–shell structure enabling high energy storage performances in PVDF-based copolymers

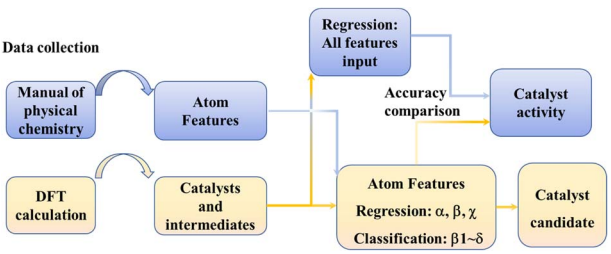
Xindi Sun, Yantao Zheng, Kaixin Liu, Zhigang Liu, Fengyuan Zhang, Yuan Deng and Yao Wang*



8226

Design and screening of a NORR electrocatalyst with co-coordinating active centers of the support and coordination atoms: a machine learning descriptor for quantifying eigen properties

Ying Zhao,* Qing-Kai Li, Chun-Lei Chi, Shuai-Shuai Gao, Shuang-Ling Tang and Xue-Bo Chen*



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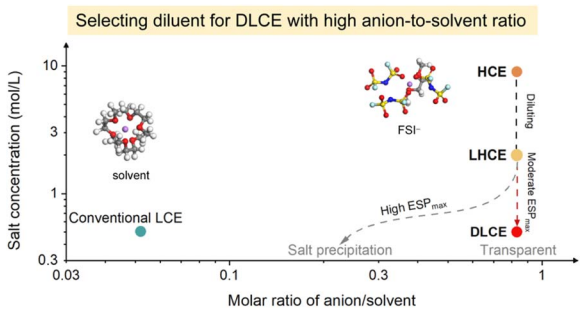
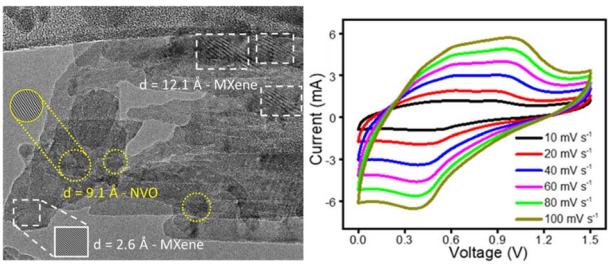


Developing diluted low-concentration electrolyte with a high anion-to-solvent ratio for high-voltage lithium metal batteries

Chengzong Li, Yan Li, Yan Wang, Fengwei Bai, Xiang Chen and Tao Li*

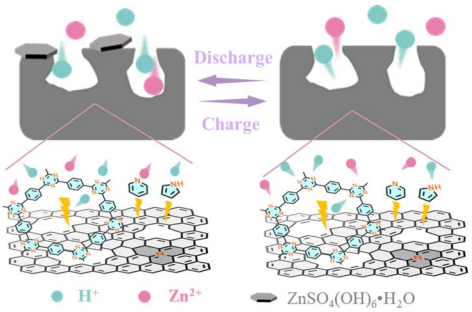
8244



An ammonium vanadate/MXene nanocomposite for high-performance ammonium ion storage

Syam G. Krishnan,* Chinmayee Padwal, Xijue Wang, Hong Duc Pham, Sadegh Aberoumand, Nunzio Motta, Kostya (Ken) Ostrikov and Deepak Dubal*

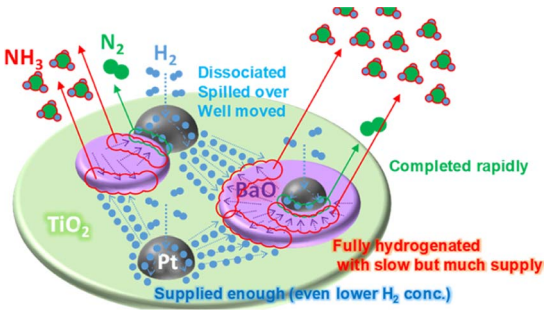
8254



Compact aqueous zinc–carbon capacitors with high capacity and ultra-long lifespan

Yang Xu, Tao Li, Shicong Zhang,* Yi Shen, Fuqiang Huang* and Tianquan Lin*

8262



Low-temperature synthesis of NH_3 *via* an alternate gas-switching NO_x storage-reduction process using a BaO/Pt@mTiO_2 nanocomposite catalyst

Yuxiao Zhang, Atsuko Tomita, Ryutaro Wakabayashi and Tatsuo Kimura*

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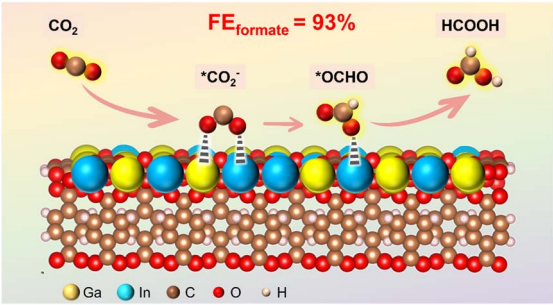
Gallium–indium bimetal sites in the indium–gallium metal organic framework for efficient electrocatalytic reduction of carbon dioxide into formate

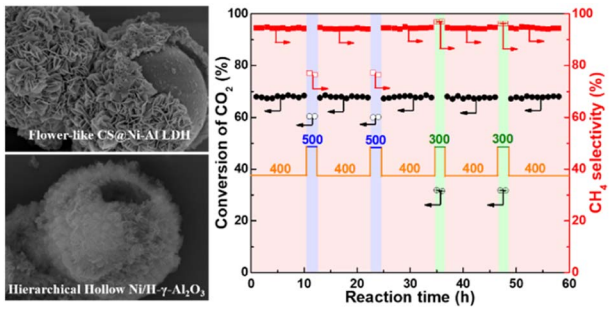
Yang Gao, He Xiao,* Xiaofang Ma, Zhizhu Yue, Chunmei Liu, Man Zhao, Li Zhang, Junming Zhang, Ergui Luo, Tianjun Hu, Baoliang Lv, Jianfeng Jia* and Haishun Wu*



8281

A hierarchical hollow Ni/γ-Al_2O_3 catalyst derived from flower-like Ni–Al layered double hydroxide with stable catalytic performance for CO_2 methanation

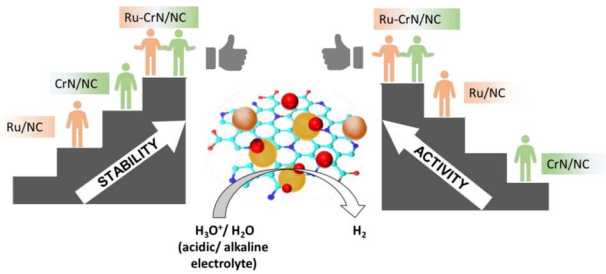
Chengxiong Dang,* Jingxun Zhou, Huanhuan Xia and Weiquan Cai*



8291

Combinatorial modulation to augment the all-round HER activity of a Ru–CrN catalyst

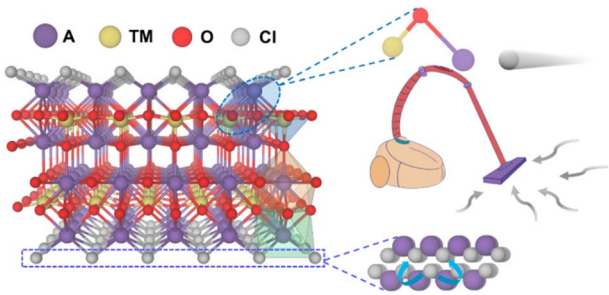
Bidushi Sarkar, Barun Kumar Barman, Arko Parui, Abhishek Kumar Singh and Karuna Kar Nanda*



8302

High-throughput screening of stable layered anode materials A_2TMO_3Cl for chloride-ion batteries

Dexing Wang, Fusheng Zhang, Jianglong Wang, Xingqiang Shi, Penglai Gong, Huanjuan Liu, Mengqi Wu,* Yingjin Wei* and Ruqian Lian*



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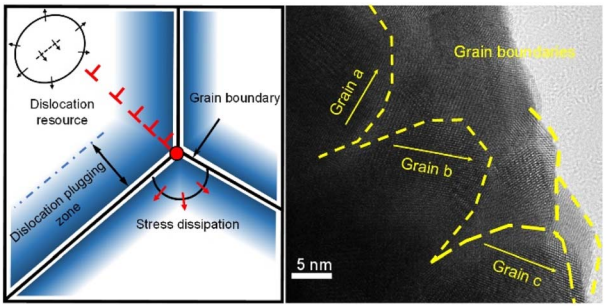
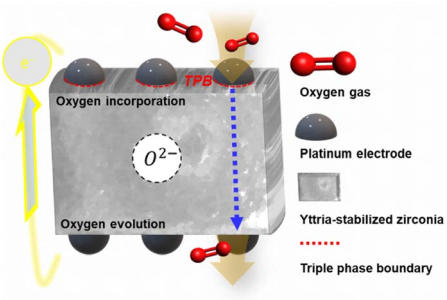


Making Gd_2O_3 nanofibers flexible by grain-boundary toughening

Li Xu, Wenqian Zhou, Liqian Huang, Jianyong Yu, Yang Si* and Bin Ding*

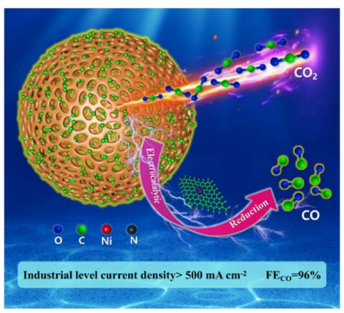
8319



Understanding the phase stability of yttria stabilized zirconia electrolyte under solid oxide electrolysis cell operation conditions

Seong Kyun Kim, Hyeon Jin Lee, Jin Young Moon, Yong-Ryun Jo, Jinsil Lee, Ji-Hoon Park, Sun-Dong Kim* and Jong Hoon Joo*

8331



A robust Ni single-atom catalyst for industrial current and exceptional selectivity in electrochemical CO_2 reduction to CO

Zhicheng Liu, Longsheng Cao,* Manli Wang, Yun Zhao, Ming Hou* and Zhigang Shao*

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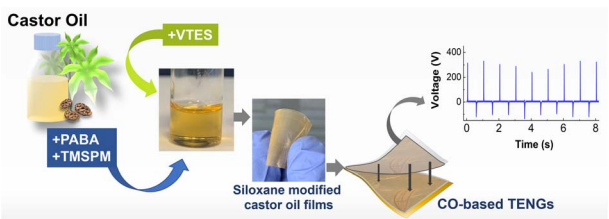

High performance flexible triboelectric nanogenerators using bio-derived films made of siloxane-modified castor oil

Kishore K. Jena, Bushara Fatma, Sagar S. Arya, Saeed M. Alhassan, Vincent Chan, Anna Maria Pappa and Charalampos Pitsalidis*

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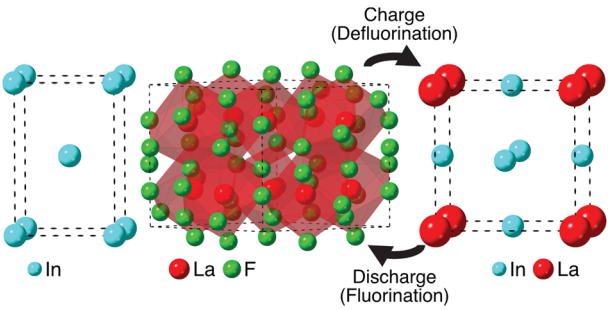
Composite anode for fluoride-ion batteries using alloy formation and phase separation in charge and discharge processes

Kei Nakayama,* Hidenori Miki,* Takashi Nakagawa, Kousuke Noi, Yoshihiro Sugawara, Shunsuke Kobayashi, Katsutoshi Sakurai, Hideki Iba, Akihide Kuwabara, Yuichi Ikuhara and Takeshi Abe



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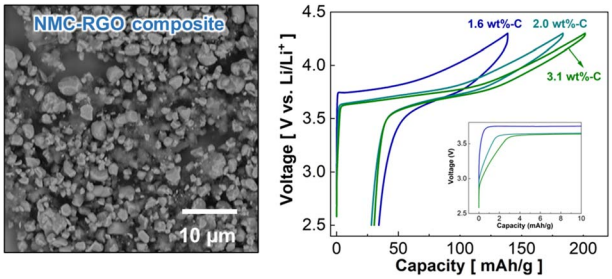
Conductive carbon embedded beneath cathode active material for longevity of solid-state batteries

Young-Woon Byeon, Sizhuo Yang, Guang Yang, Dong-Min Kim, Venkata Sai Avvaru, Tofunmi Ogunfunmi, Mary Scott, Brett A. Helms, Jeffrey Urban* and Haegyeom Kim*



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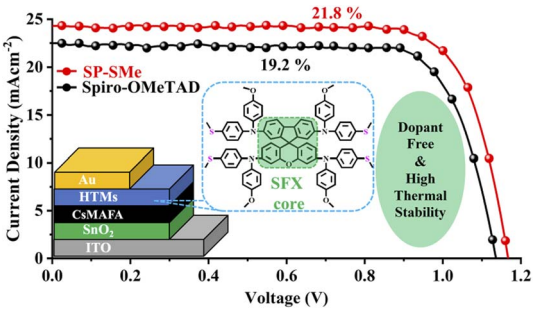
Molecular modification of spiro[fluorene-9,9′-xanthene]-based dopant-free hole transporting materials for perovskite solar cells

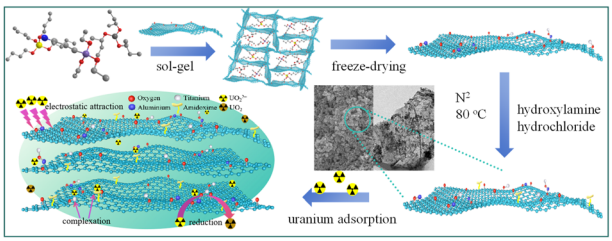
Vinay Kumar, Deepak Kumar, Rohit D. Chavan, Kodali Phani Kumar, Bommaramoni Yadagiri, Muhammad Ans, Joanna Kruszyńska, Apurba Mahapatra, Jan Nawrocki, Kostiantyn Nikiforow, Nada Mrkyvkova, Peter Siffalovic, Pankaj Yadav, Seckin Akin, Surya Prakash Singh* and Daniel Prochowicz*



8381

One-pot synthesis of a graphene oxide-supported $Ti_xAl_{1-x}O_y$-based material modified with amidoxime for highly efficient uranium(VI) adsorption

Ling Ding, Xiangyu Wan, Bowen Zheng, Zhenhua Dang, Shuai Zhang* and Lin Zhang*



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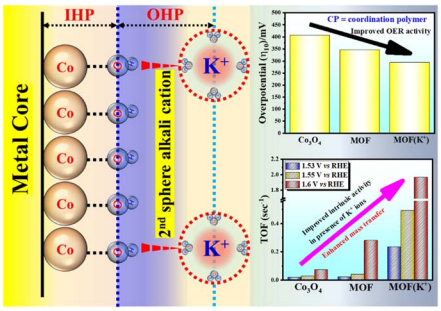
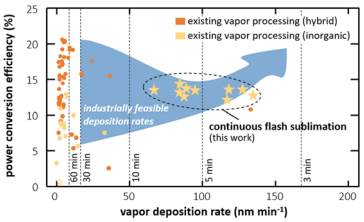


Redox insights and OER activity in 3D-MOFs: the role of alkali metal ions

Susanta Dinda, Arun Karmakar, Debajyoti Ghoshal* and Subrata Kundu*

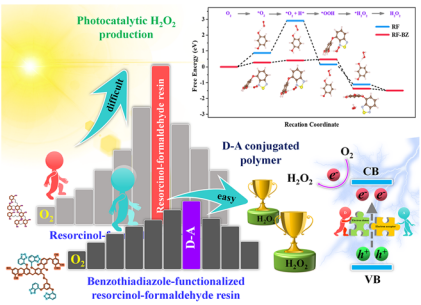
8405



Continuous flash sublimation of inorganic halide perovskites: overcoming rate and continuity limitations of vapor deposition

Tobias Abzieher,* Christopher P. Muzzillo, Mirzo Mirzokarimov, Gabriella Lahti, Wylie F. Kau, Daniel M. Kroupa, Spencer G. Cira, Hugh W. Hillhouse, Ahmad R. Kirmani, Jackson Schall, Dana Kern, Joseph M. Luther and David T. Moore*

8420



Introduction of electron-deficient unit in resorcinol-formaldehyde resin to construct donor–acceptor conjugated polymer for enhancing photocatalytic H_2O_2 production

Xinyue Li, Qiuang Zheng, Xiaoran Wang, Qiuyu Zheng, Yi Zhang, Yanqing Cong* and Shi-Wen Lv*

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Cutting off the upstream and downstream costs for CO_2 electroreduction by upcycling fermentation emissions into ethanol

Ruofan Sun, Jiwu Zhao and Xu Lu*

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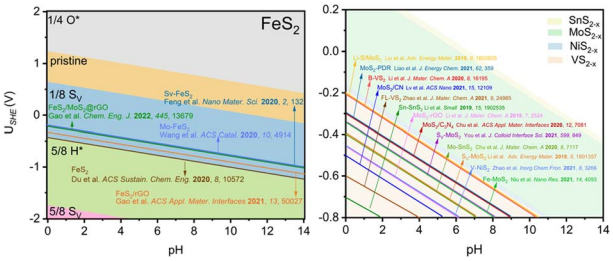
Origin of electrocatalytic nitrogen reduction activity over transition metal disulfides: critical role of *in situ* generation of S vacancy

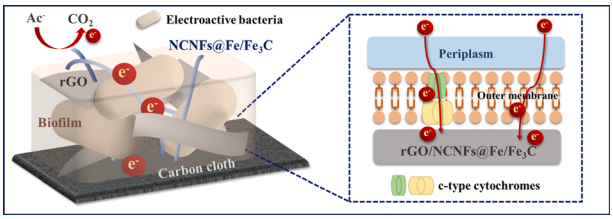
Tianyi Wang, Zhongyuan Guo, Hirofumi Oka, Akichika Kumatani,* Chuangwei Liu* and Hao Li*



8447

Fe/Fe$_3$C nanoparticles *in situ*-doped with carbon nanofibers embedded in rGO as high-performance anode electrocatalysts of microbial fuel cells

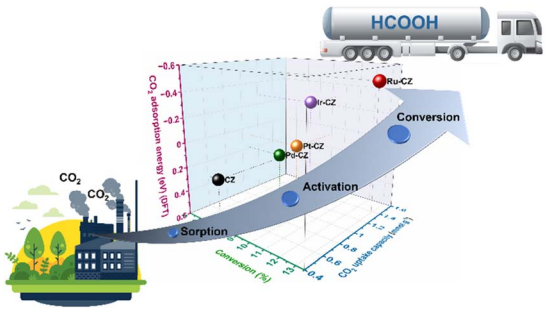
Tingli Ren, Yuanfeng Liu, Xiaoqiu Lin and Congju Li*



8457

Sorption enhanced CO_2 hydrogenation to formic acid over CuZn-MOF derived catalysts

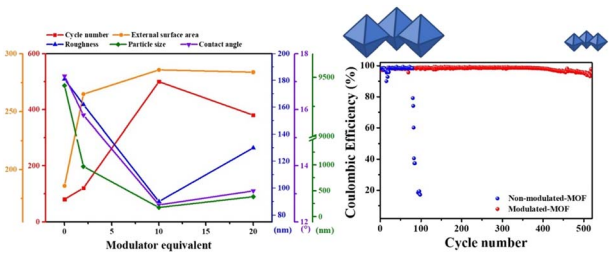
Jyotishman Kaishyop, Jyoti Gahtori, Suman Dalakoti, Md. Jahiruddin Gazi, Tuhin Suvra Khan and Ankur Bordoloi*



8474

A modulated MOF as a modification layer on copper foil for lithium dendrite suppression

Nien-Chih Cheng, Yan Cheng Wu, Yi-Chuan Chu, Hsuan-Yu Hsu, Wei-Chao Chen, Pin-Han Wang, Tseng-Lung Chang, Jeng-Kuei Chang* and Cheng-Yu Wang*



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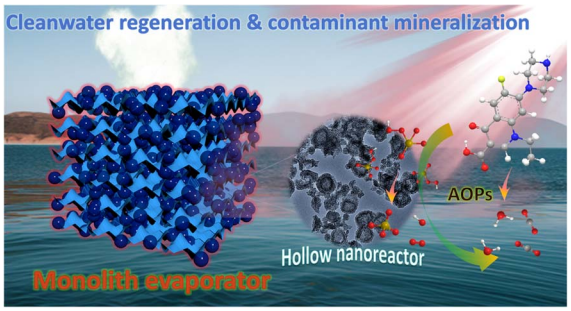
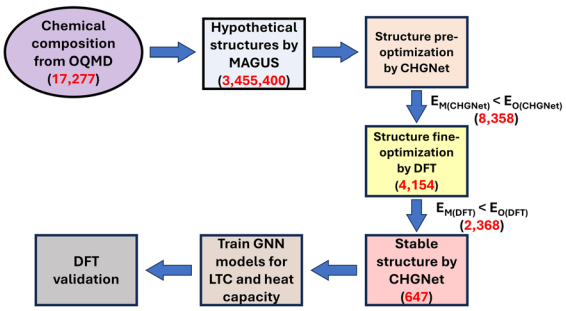
8487



Constructing a multivalent Co-confined N-doped C–Si hybrid hollow nanoreactor for synchronous pollutant mineralization and solar-driven interfacial water regeneration

Hongyang Zhu, Rongrong Du, Hongyao Zhao, Mengting Liu, Yanyun Wang, Chao Yu, Zengjing Guo, Sheng Tang, Edison Huixiang Ang* and Fu Yang*

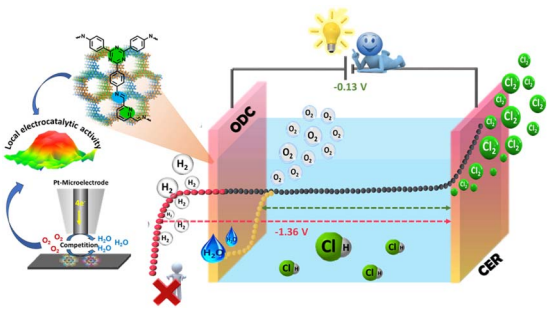
8502



Graph theory and graph neural network assisted high-throughput crystal structure prediction and screening for energy conversion and storage

Joshua Ojih, Mohammed Al-Fahdi, Yagang Yao, Jianjun Hu and Ming Hu*

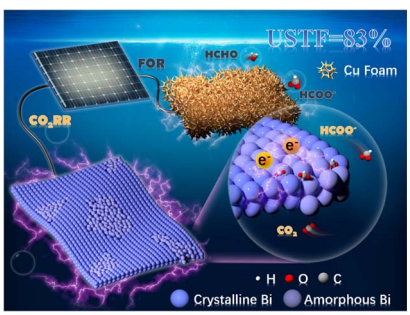
8516



Electrochemical valorization of HCl for the production of chlorine *via* a proton-filter functional covalent organic framework

Sukhjot Kaur, Kayaramkodath C. Ranjeesh, Kalpana Garg, Safa Gaber, Shivangi Mehta, Tharamani C. Nagaiah* and Dinesh Shetty*

8526



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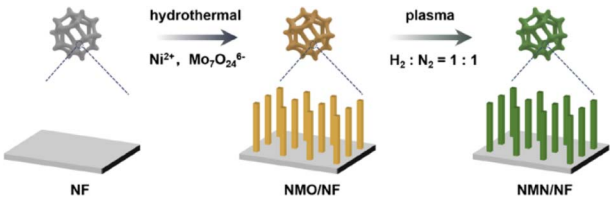
8534

Ni–Mo nitride synthesized *via* mild plasma for efficient alkaline hydrogen evolution electrocatalysis

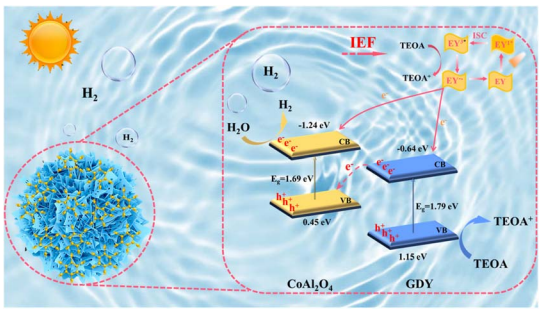
Yunpeng Wei, Lingya Yi, Siyue Zhang, Chengsheng Ni,* Xinghong Cai,* Wei Sun* and Weihua Hu*



8543

Engineering of a hierarchical S-scheme 2D/3D heterojunction with graphdiyne (g-C_nH_{2n-2}) coated 3D porous $CoAl_2O_4$ nanoflowers for highly efficient photocatalytic H_2 evolution

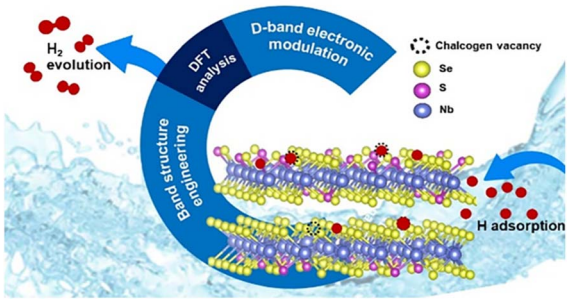
Xuqiang Hao,* Wei Deng, Yu Fan* and Zhiliang Jin*



8561

Chalcogen alloying mediated electronic structure modulation in ultrathin $Nb(S_xSe_{(1-x)})_2$ nanosheets for the hydrogen evolution reaction

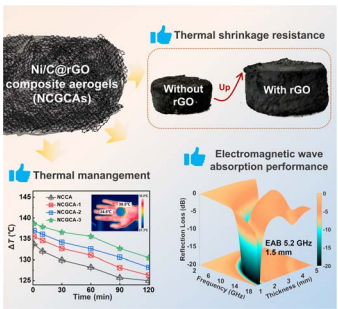
Varsha Jha, Md. Samim Hassan, Ankita Kumari, Shubham Kumar, Sahil Singh, Jyoti Yadav, Dibyajyoti Ghosh and Sameer Sapra*



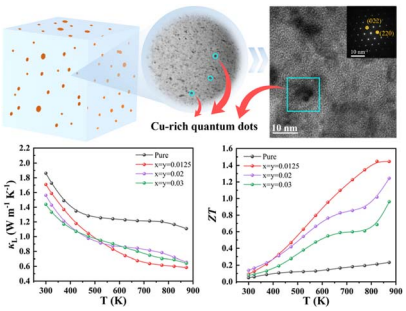
8571

Synthesis of graphene oxide-mediated high-porosity Ni/C aerogels through topological MOF deformation for enhanced electromagnetic absorption and thermal management

Pan Wang, Dingge Fan, Lixue Gai, Bo Hu, Ping Xu, Xijiang Han* and Yunchen Du*



8583



High wide-temperature-range thermoelectric performance in n-PbSe integrated with quantum dots

Qinxuan Xia, Qingtang Zhang, Yaru Gong, Xinqi Huang, Muhammad Faisal Iqbal, Deshang Xiang, Yuqi Liu, Song Li, Pan Ying* and Guodong Tang*

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