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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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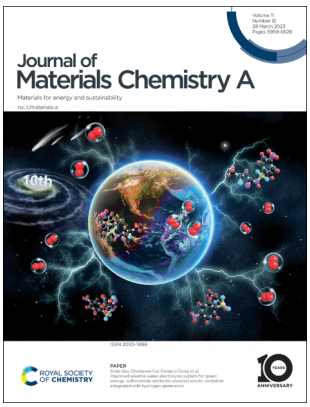


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See Shan Qiu, Chongwei Cui, Fengxia Deng *et al.*, pp. 6129–6143. Image reproduced by permission of Chongwei Cui from *J. Mater. Chem. A*, 2023, **11**, 6129.

## EDITORIAL

5975

**Introduction to Polymer Upcycling**

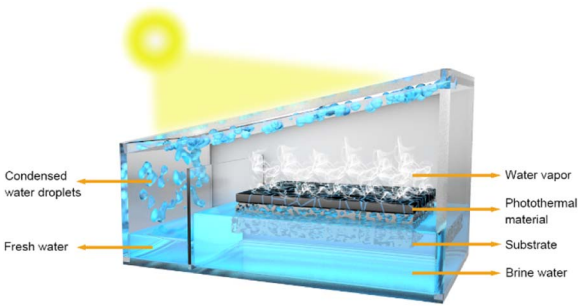
Blair Brettmann,* Marco A. Fraga, Monika Gosecka and Natalie Stingelin

## REVIEWS

5978

**Recent advances in interfacial solar vapor generation: clean water production and beyond**

Shudong Yu,* Yuheng Gu, Xujiang Chao, Guanghan Huang and Dahua Shou*



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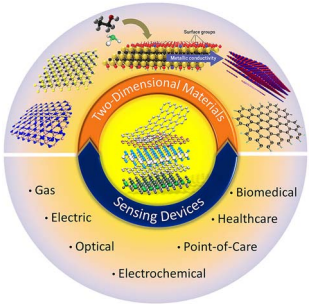
## REVIEWS

6016

**2D material-based sensing devices: an update**

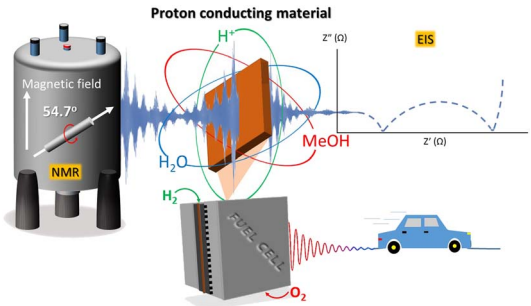
Jahan Zeb Hassan, Ali Raza,* Zaheer Ud Din Babar, Usman Qumar, Ngeywo Tolbert Kaner and Antonio Cassinese




6064

**Advances in nuclear magnetic resonance spectroscopy: case of proton conductive materials**

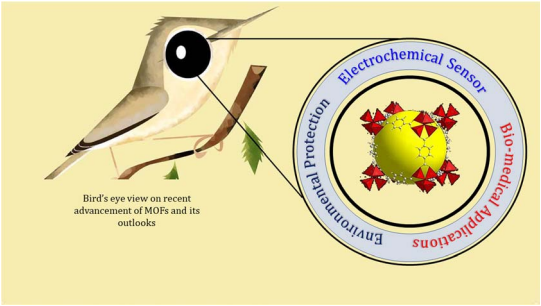
Ya. Kobzar, H. Oulyadi, S. Marais and K. Fatyeyeva*




6090

**Recent advancements of metal–organic frameworks in sensing platforms: relevance in the welfare of the environment and the medical sciences with regard to cancer and SARS-CoV-2**

Arindam Das, Sourav Bej, Nithun Ranjan Pandit, Priyabrata Banerjee* and Biplab Biswas*

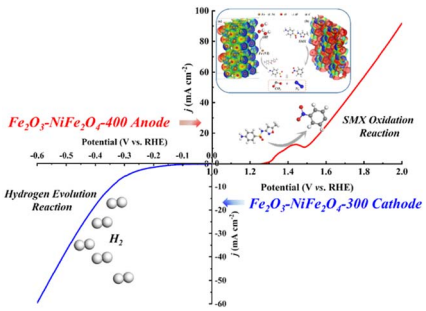



## PAPERS

6129

**Improved alkaline water electrolysis system for green energy: sulfonamide antibiotic-assisted anodic oxidation integrated with hydrogen generation**

Qiwei Zhang, Yuhang Tong, Zhuowen Wang, Baojian Jing, Yingshi Zhu, Shan Qiu,* Chongwei Cui* and Fengxia Deng*



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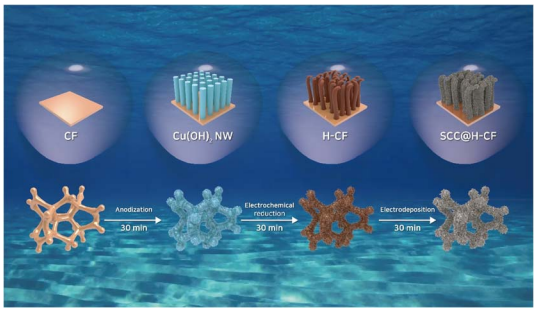
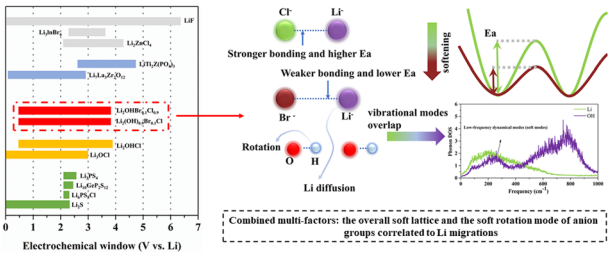
6144




**Ultrathin electrochemical layer tailoring of lithiophilic materials with 3D hierarchical configuration for lithium metal batteries: Sn/$Cu_6Sn_5$@$Cu_{2+1}O$ nanowires on Cu foam**

Garam Lee, Jaeyun Ha, Jinhee Lee, Yong-Tae Kim* and Jinsub Choi*

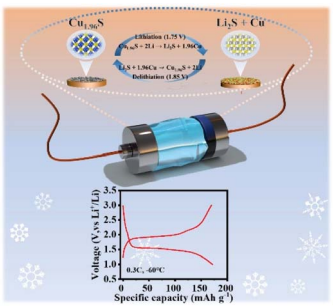
6157




**Enhanced ionic conductivity of protonated antiperovskites *via* tuning lattice and rotational dynamics**

Chaohong Guan, Yu Yang, Runxin Ouyang, Huirong Jing, Jieqiong Yan and Hong Zhu*

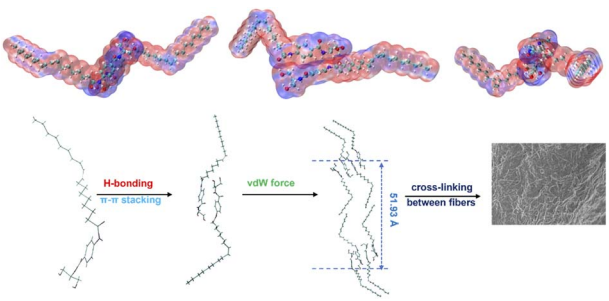
6168




**Uncovering the untapped potential of copper(I) sulphide toward lithium-ion storage under ultra-low temperatures**

Yifan Chen, Jinze Wang, Youran Hong, Yusi Yang, Lulu Tan, Nan Li, Can Ma, Jiangwei Wang, Xiulin Fan and Yujie Zhu*

6181




**A new class of amide-based organogels: from oil spill recovery to self-assembly structure analysis**

Dongdong Yang, Shuwei Xia, Mutai Bao, Xiuping Chen, Hu Kang, Haosen Zhao and Yiming Li*



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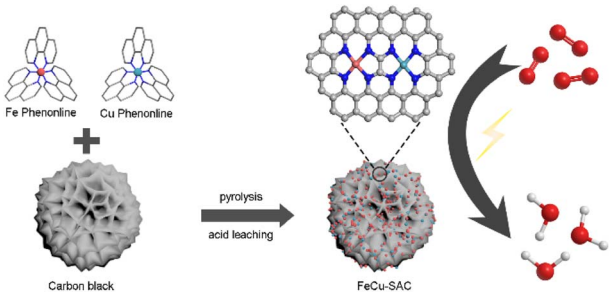
## PAPERS

6191

**Fe, Cu dual-metal single atom catalyst on commercial carbon black for efficient oxygen reduction reaction**

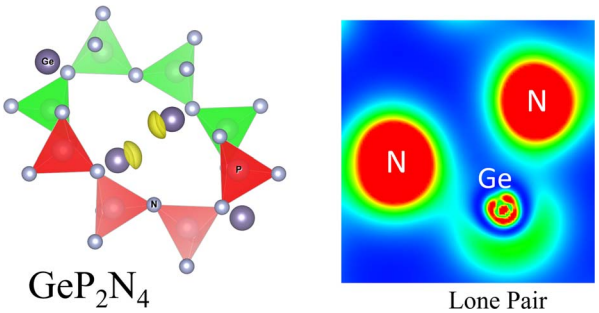
Hongzhou Yang, He Huang, Qing Wang, Lu Shang,* Tierui Zhang and Shouguo Wang*




6198

**The importance of lone pairs to structure and bonding of the novel germanium nitridophosphate $GeP_2N_4$**

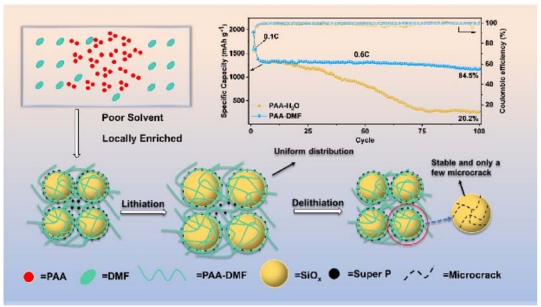
Tristan de Boer,* Cody Somers, Teak Boyko, Sebastian Ambach, Lucien Eisenburger, Wolfgang Schnick and Alexander Moewes




6205

**Poly(acrylic acid) locally enriched in slurry enhances the electrochemical performance of the $SiO_x$ lithium-ion battery anode**

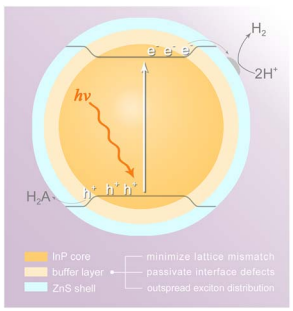
Ming Yang, Peng Chen, Jiapei Li, Ruoxuan Qi, Yudai Huang, Peter Müller-Buschbaum, Ya-Jun Cheng,* Kunkun Guo* and Yonggao Xia*




6217

**Interface engineering of InP/ZnS core/shell quantum dots by the buffer monolayer for exceptional photocatalytic $H_2$ evolution**

Rong-Jin Huang, Zhi-Kai Qin, Li-Lei Shen, Guangqiang Lv, Furong Tao, Jingui Wang and Yu-Ji Gao*



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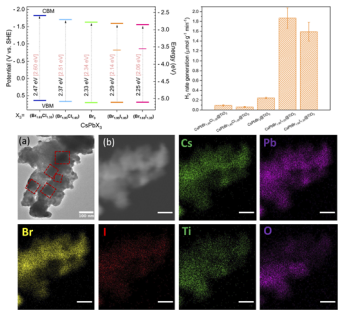
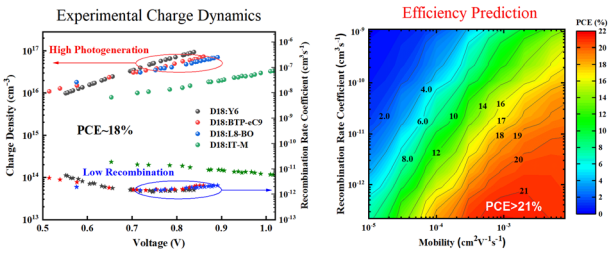



**Adjusting the band gap of $CsPbBr_{3-y}X_y$ (X = Cl, I) for optimal interfacial charge transfer and enhanced photocatalytic hydrogen generation**

Marija Knezevic, Vien-Duong Quach, Isabelle Lampre, Marie Erard, Pascal Pernot, David Berardan, Christophe Colbeau-Justin and Mohamed Nawfal Ghazzal*

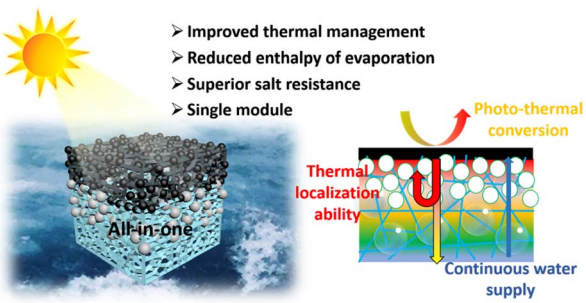
6237




**High photogeneration and low recombination rate leading to high-performance non-fullerene organic solar cells**

Yanxian Ma, Quanbin Liang,* Hongbin Wu* and Yong Cao

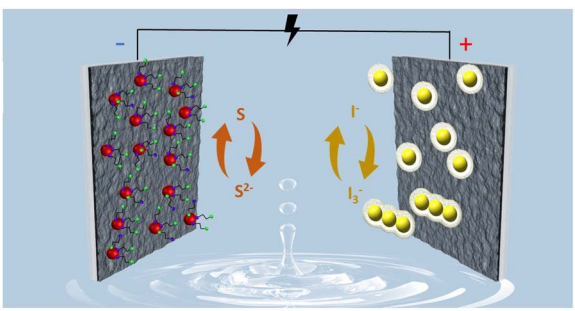
6248




**An integrated cellulose aerogel evaporator with improved thermal management and reduced enthalpy of evaporation using a hierarchical coordinated control strategy**

Jiaming Sun, Rui Teng, Jia Tan, Mingcong Xu, Chunhui Ma, Wei Li* and Shouxin Liu*

6258




**A double-redox aqueous capacitor with high energy output**

Adam Slesinski,* Sylwia Sroka, Sergio Aina, Justyna Piwek, Krzysztof Fic, M. Pilar Lobera, Maria Bernechea and Elzbieta Frackowiak*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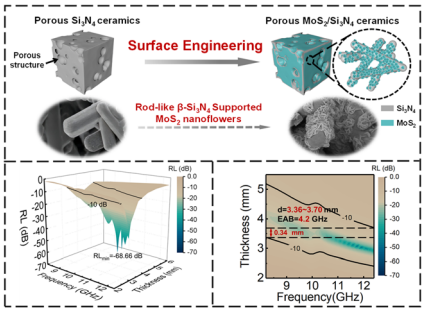
## PAPERS

6274

**Surface engineering of nanoflower-like $MoS_2$ decorated porous $Si_3N_4$ ceramics for electromagnetic wave absorption**

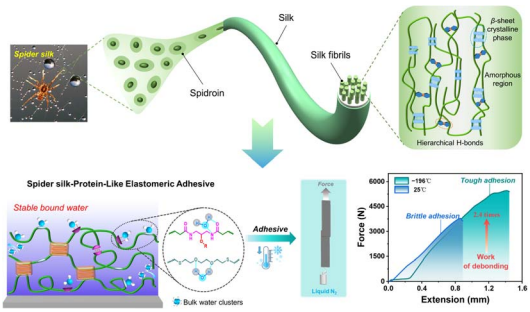
Jialin Bai, Shijie Huang, Xiumin Yao,* Xuejian Liu* and Zhengren Huang*




6286

**Natural-silk-inspired design provides ultra-tough biobased structural adhesives with supercold tolerance**

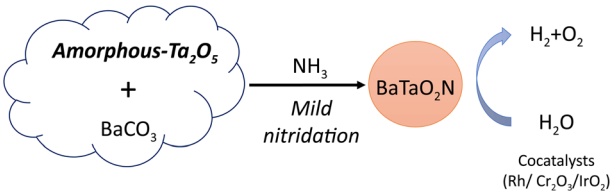
Xiankun Wu, Haonan Li, Peng Chen, Jiale Zhang, Ming Li, Shujun Zhao, Zhongkai Wang and Zhong Wang*




6299

**Active $BaTaO_2N$ photocatalysts prepared from an amorphous $Ta_2O_5$ precursor for overall water splitting under visible light**

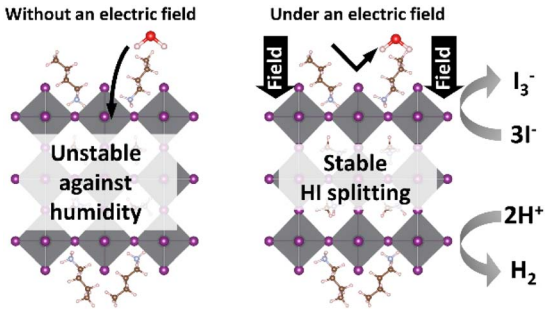
Shinji Nishimae, Junie Jhon M. Vequizo, Yasunobu Inoue, Akira Yamakata, Mamiko Nakabayashi, Tomohiro Higashi and Kazunari Domen*




6311

**Enhanced stability of two-dimensional halide perovskites under an electric field for photocatalytic HI splitting**

Seulyoung Park, Sehoon Oh and Jaichan Lee*



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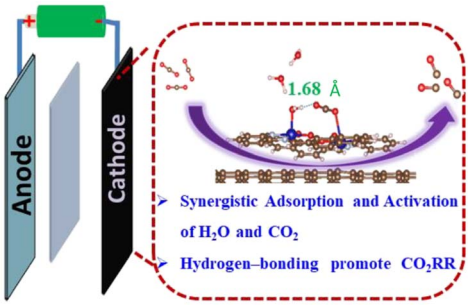
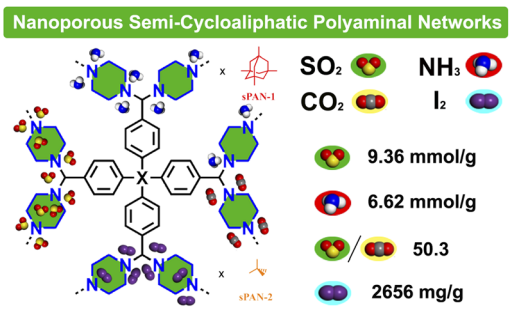



**Diatomic molecule catalysts toward synergistic electrocatalytic carbon dioxide reduction**

Liming Hong, Xian Liu, Baozhu Chi, Guomin Xia and Hongming Wang*

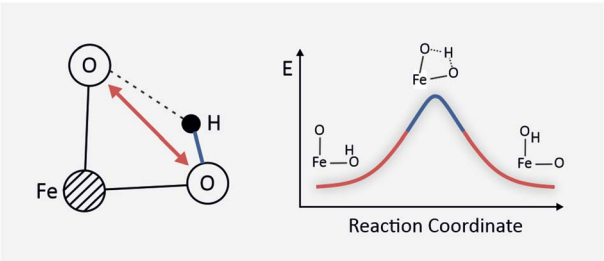
6329




**Nanoporous semi-cycloaliphatic polyaminal networks for capture of $SO_2$, $NH_3$, and $I_2$**

Jun Yan,* Sihan Tong, Haiyu Sun and Shengwei Guo

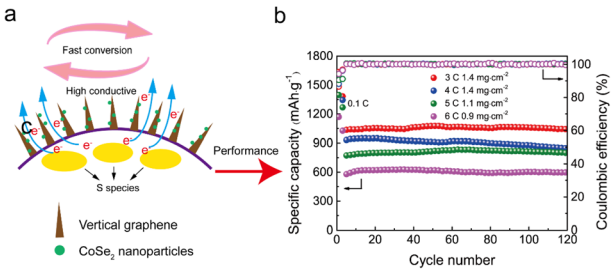
6336




**Proton migration barriers in $BaFeO_{3-\delta}$ – insights from DFT calculations**

M. F. Hoedl, A. Chesnokov, D. Gryaznov,* R. Merkle,* E. A. Kotomin and J. Maier

6349




**$CoSe_2$ anchored vertical graphene/macroporous carbon nanofibers used as multifunctional interlayers for high-performance lithium–sulfur batteries**

Yangcheng Mo, Kaochun Yang, Junsheng Lin, Mengting Liu, Guanfei Ye and Jie Yu*



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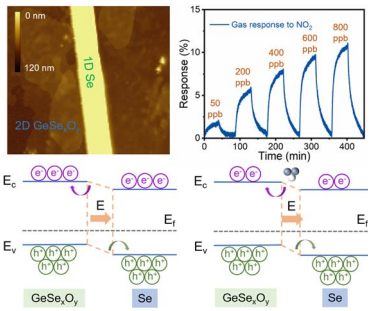
## PAPERS

6361

**Single-step growth of p-type 1D Se/2D $GeSe_xO_y$ heterostructures for optoelectronic $NO_2$ gas sensing at room temperature**

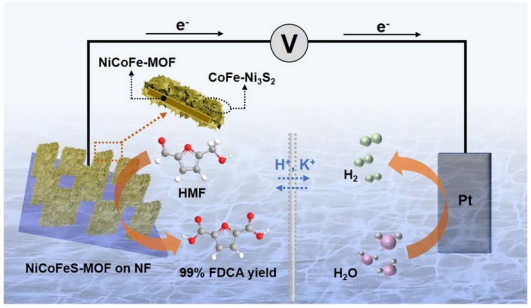
Tao Tang, Zhong Li,* Yin Fen Cheng, Kai Xu, Hua Guang Xie, Xuan Xing Wang, Xin Yi Hu, Hao Yu, Bao Yue Zhang, Xue Wei Tao, Chu Manh Hung, Nguyen Duc Hoa, Guan Yu Chen, Yong Xiang Li and Jian Zhen Ou*




6375

**Metal sulfide enhanced metal–organic framework nanoarrays for electrocatalytic oxidation of 5-hydroxymethylfurfural to 2,5-furandicarboxylic acid**

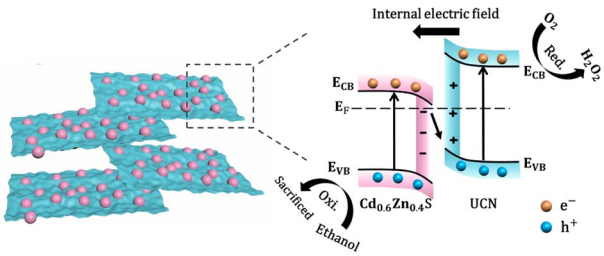
Yixuan Feng, Kun Yang, Richard L. Smith, Jr and Xinhua Qi*




6384

**Point-to-face *Z*-scheme junction $Cd_{0.6}Zn_{0.4}S$/g-$C_3N_4$ with a robust internal electric field for high-efficiency $H_2O_2$ production**

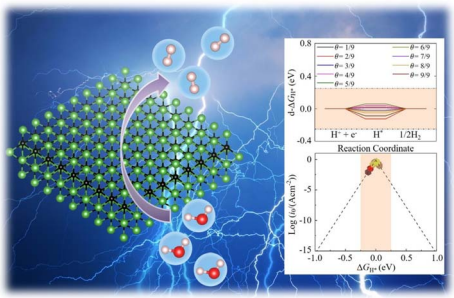
Wenying Yu, Zijian Zhu, Cheng Hu, Sen Lin, Yinghui Wang, Chunyang Wang, Na Tian,* Yihe Zhang and Hongwei Huang*




6394

**A metallic $La_3C_2$ monolayer with remarkable activity for the hydrogen evolution reaction: a first-principles study**

Huan Lou and Guochun Yang*



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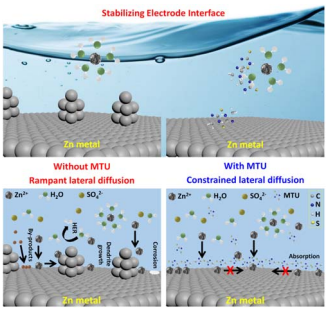
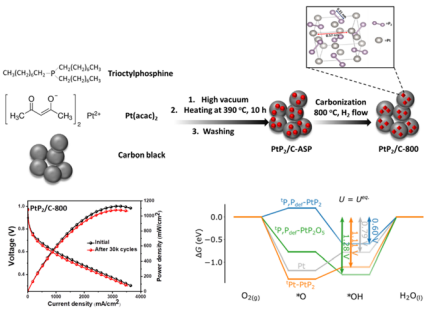
6403




**Simultaneous tailoring of hydrogen evolution and dendrite growth *via* a fertilizer-derived additive for the stabilization of the zinc anode interface**

Mahammad Rafi Shaik, Syryll Maynard Olidan, Jihoon Kim,* Kuk Young Cho* and Sukeun Yoon*

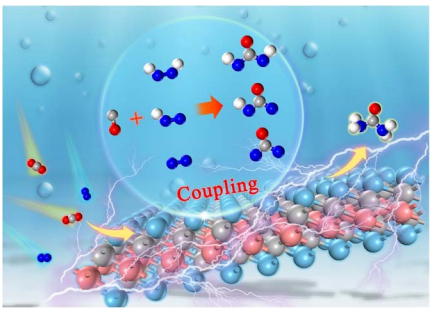
6413




**Active and stable $PtP_2$-based electrocatalysts solve the phosphate poisoning issue of high temperature fuel cells**

Jeong-Hoon Yu, Kiran Pal Singh, Se-Jun Kim, Tong-Hyun Kang, Kug-Seung Lee, Hyungjun Kim, Stefan Ringe* and Jong-Sung Yu*

6428




**Unveiling the key intermediates in electrocatalytic synthesis of urea with $CO_2$ and $N_2$ coupling reactions on double transition-metal MXenes**

Yufei Yang, Jiahe Peng, Zuhao Shi, Peng Zhang, Arramel Arramel and Neng Li*

6440

**Universal assembly of ordered Ag nanowire micromesh conductors on arbitrary substrates by manipulating the contact angle**

Bowen Sun, Jing Xu, Wang Hong, Zhiwei Fu, Shouguo Zheng, Zede Zhu, Rong Cai and Kai Qian*



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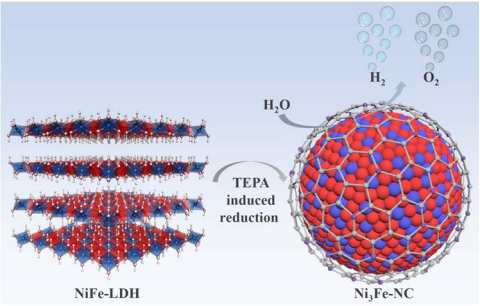
## PAPERS

6452

**Amine-assisted synthesis of the $Ni_3Fe$ alloy encapsulated in nitrogen-doped carbon for high-performance water splitting**

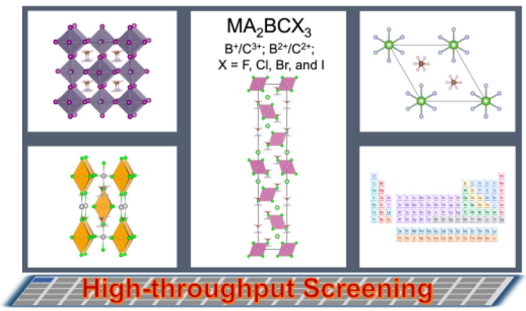
Mengzhi Guo, Hong Meng,* Junsu Jin and Jianguo Mi*




6465

**High-throughput screening of hybrid quaternary halide perovskites for optoelectronics**

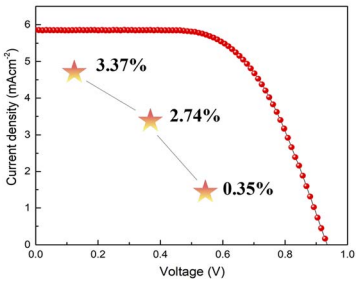
Kesong Yang,* Yuheng Li and Jingning Zhang




6474

**DMAI-driven all-inorganic antimony-based perovskite-inspired solar cells with record open-circuit voltage**

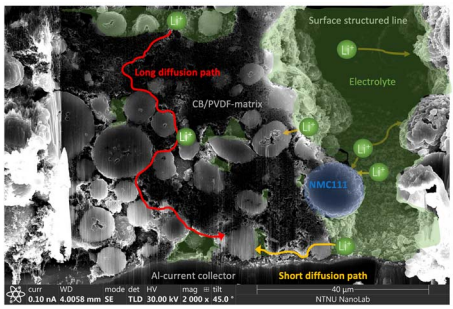
Yixin Guo, Fei Zhao,* Peizhi Yang,* Minjie Gao, Junhao Shen, Jiahua Tao, Jinchun Jiang and Junhao Chu



6483

**Structured aqueous processed lignin-based NMC cathodes for energy-dense LIBs with improved rate capability**

Silje Nornes Bryntesen, Per Håkon Finne, Ann Mari Svensson, Paul R. Shearing, Nikolai Tolstik, Irina T. Sorokina, Jakob Vinje, Jacob Joseph Lamb and Odne Stokke Burheim*



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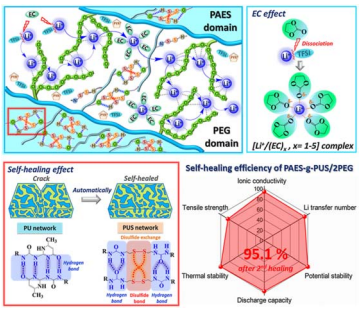
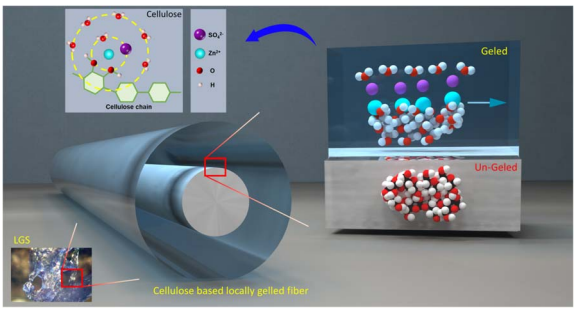
6503




**Self-healable, super Li-ion conductive, and flexible quasi-solid electrolyte for long-term safe lithium sulfur batteries**

Anh Le Mong and Dukjoon Kim*

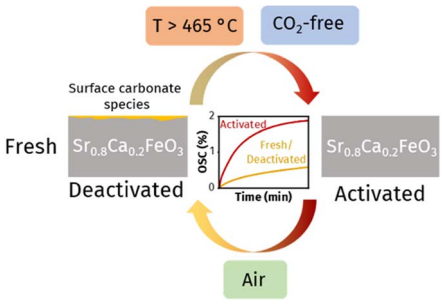
6522




**Localized gelation cellulose separators enable dendrite-free anodes for future zinc-ion batteries**

Chenpeng Xi, Yuanbin Xiao, Chengkai Yang,* Mengchao Li, Long Li, Yu Chao, Lingyun Li,* Chunnian He and Yan Yu*

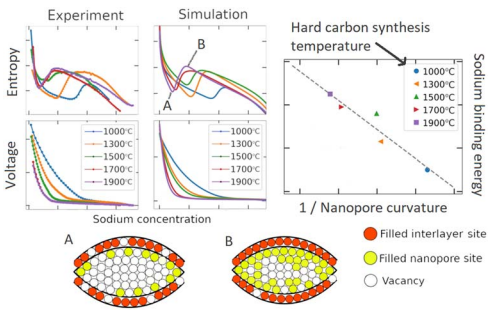
6530




**Activation in the rate of oxygen release of $Sr_{0.8}Ca_{0.2}FeO_{3-\delta}$ through removal of secondary surface species with thermal treatment in a $CO_2$-free atmosphere**

Giancarlo Luongo, Alexander H. Bork, Paula M. Abdala, Yi-Hsuan Wu, Evgenia Kountoupi, Felix Donat* and Christoph R. Müller*

6543




**Sodiation energetics in pore size controlled hard carbons determined *via* entropy profiling**

Michael P. Mercer,* Mangayarkarasi Nagarathinam, E. Maximiliano Gavilán-Arriazu, Anshika Binjrajka, Swoyam Panda, Heather Au, Maria Crespo-Ribadeneyra, Maria-Magdalena Titirici, Ezequiel P. M. Leiva and Harry E. Hoster



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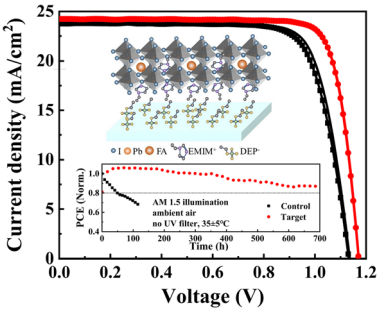
## PAPERS

6556

**Interfacial defect passivation by using diethyl phosphate salts for high-efficiency and stable perovskite solar cells**

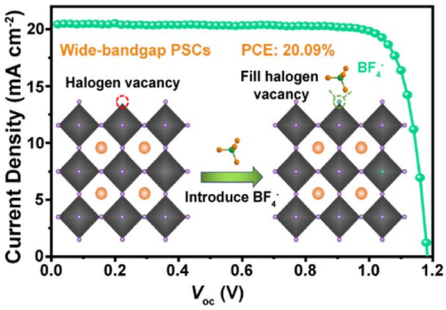
Xuan Sha, Jiang Sheng,* Weichuang Yang, Jingsong Sun, Chunhui Shou, Luyan Zhang, Ningjun Zhang, Zhiqin Ying, Xi Yang, Hongbin Zhao* and Jichun Ye*




6565

**Fluoride-assisted crystallization regulation enables efficient and stable wide-bandgap perovskite photovoltaic**

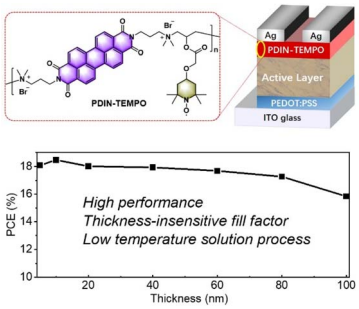
Chao Su, Rui Wang, Junlei Tao, Jinliang Shen, Di Wang, Lixin Wang, Guangsheng Fu, Shaopeng Yang,* Mingjian Yuan and Tingwei He*




6574

**Stable radical based conjugated electrolytes as a cathode interlayer for organic solar cells with thickness-insensitive fill factors**

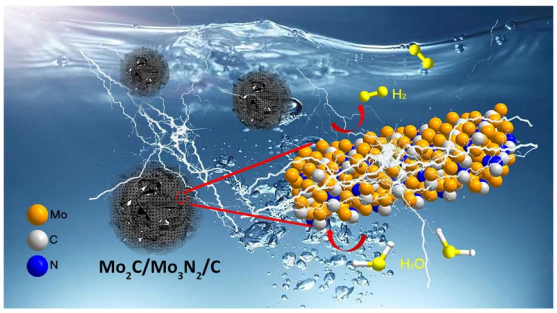
Jie Fang, Ziwei Zhang, Zhou Zhang, Yingzi Han, Dongdong Xia, Chaowei Zhao,* Yuefeng Zhang, Lingling Wang, Chengyi Xiao, Shengyong You, Yonggang Wu and Weiwei Li*




6581

**Dual-phased $Mo_2C/Mo_3N_2/C$ nanosheets for efficient electrocatalytic hydrogen evolution**

Guangyan Tian, Bingxue Yao, Gaofeng Han,* Yan Li, Kefeng Zhang and Junping Meng*



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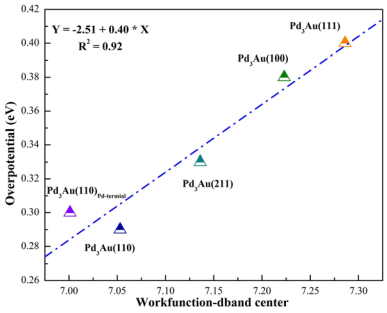
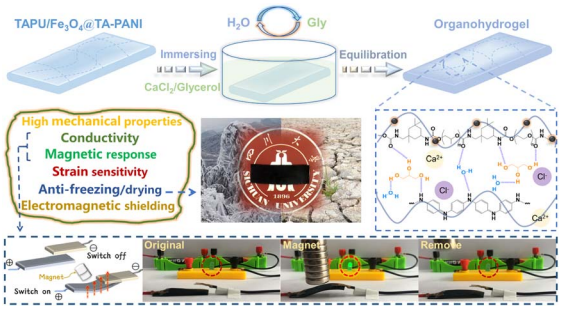
6591




**Theoretical study on the reduction mechanism of $CO_2$ to HCOOH on $Pd_3Au$: an explicit solvent model is essential**

Ming Zheng, Xin Zhou,* Yixin Wang, Gang Chen and Mingxia Li*

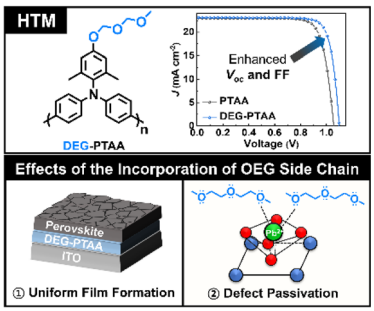
6603




**A stretchable, environmentally stable, and mechanically robust nanocomposite polyurethane organohydrogel with anti-freezing, anti-dehydration, and electromagnetic shielding properties for strain sensors and magnetic actuators**

Yang Liu, Zetian Zhang, Xiaohan Yang, Fufen Li, Ze Liang, Yong Yong, Songbo Dai and Zhengjun Li*

6615




**Oligo(ethylene glycol)-incorporated hole transporting polymers for efficient and stable inverted perovskite solar cells**

Chulhee Lim, Youngwoong Kim, Seungjin Lee, Helen Hejin Park, Nam Joong Jeon* and Bumjoon J. Kim*

## CORRECTION

6625

**Correction: Hierarchically porous Ni foam-supported Co and Sn doped $Ni_3S_2$ nanosheets for oxygen evolution reaction electrocatalysts**

Won Young An, Hyungwoo Lee, Sung Ryul Choi, Sungyong Choi, Hyun-Seok Cho, Minseok Choi* and Jun-Young Park*



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