

Journal of Materials Chemistry A

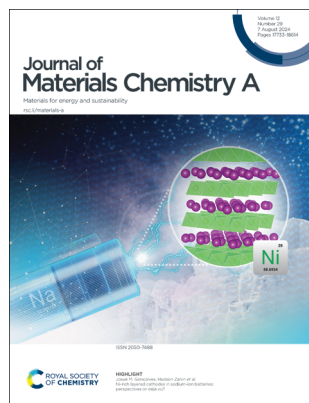
Materials for energy and sustainability

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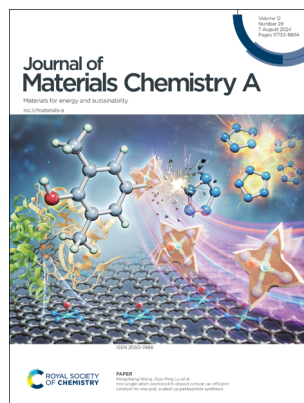
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ISSN 2050-7488 CODEN JMCAET 12(29) 17733–18614 (2024)



Cover

See Josué M. Gonçalves, Hudson Zanin *et al.*, pp. 17756–17770. Image reproduced by permission of Josué M. Gonçalves from *J. Mater. Chem. A*, 2024, 12, 17756.



Inside cover

See Pengcheng Wang, Guo-Ping Lu *et al.*, pp. 18096–18103. Image reproduced by permission of Guo-Ping Lu from *J. Mater. Chem. A*, 2024, 12, 18096.

EDITORIAL

17753

Promoting your work to the materials community: editor top tips for writing an effective research paper

Veronica Augustyn,* Serena A. Cussen,* Subrata Kundu,* Frank E. Osterloh* and Miriam M. Unterlass*

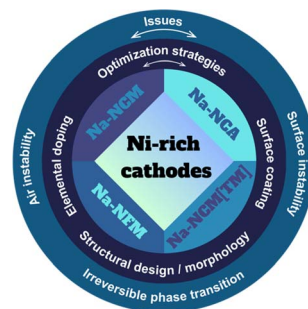


HIGHLIGHT

17756

Ni-rich layered cathodes in sodium-ion batteries: perspectives or déjà vu?

Josué M. Gonçalves,* Gustavo T. M. Silva and Hudson Zanin*



Environmental Science: Atmospheres

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Fundamental questions
Elemental answers

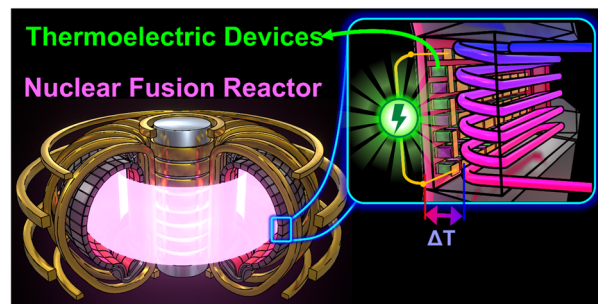


REVIEWS

17771

Thermoelectrics for nuclear fusion reactors: opportunities and challenges

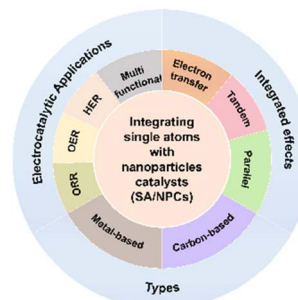
Xian Yi Tan, Hongfei Liu, Jinfeng Dong, Andrew Chun Yong Ngo,* Ady Suwardi* and Jing Cao*



17793

Integrating single atoms with nanoparticle catalysts for efficient electrochemical energy conversion

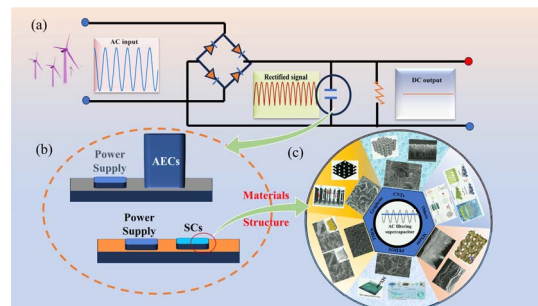
Xiaorong Lin, Lin Zeng* and Maochun Wu*



17817

Recent progress on the materials and structure of supercapacitors for AC line filtering applications

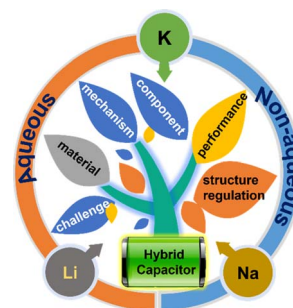
Xiaodong Ma, Junwei Sha, Biao Chen, Chunsheng Shi, Liying Ma, Hao Wang,* Naiqin Zhao and Jianli Kang*



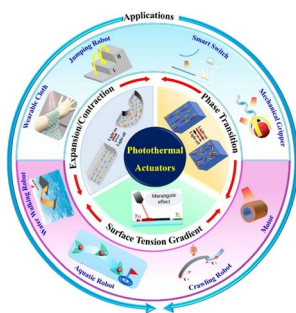
17835

Recent advances in aqueous and non-aqueous alkali metal hybrid ion capacitors

Ziyang Jia, Shunkang Hou, Jun Peng, Xiongwei Wu, Wei Tang, Wei Sun, Shanguang Lv, Xinhai Yuan,* Lili Liu and Yuping Wu*



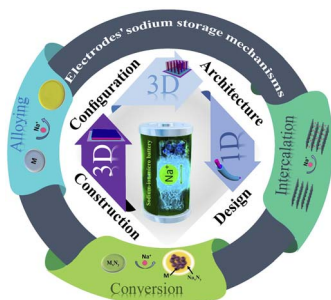
17896



Design and mechanism of photothermal soft actuators and their applications

Rajaram S. Sutar, Sanjay S. Latthe, Xinna Wu, Kazuya Nakata, Ruimin Xing, Shanhu Liu* and Akira Fujishima

17923



Unveiling the recent advances in micro-electrode materials and configurations for sodium-ion micro-batteries

Mina Moghadami, Abouzar Massoudi* and Mahya Nangir

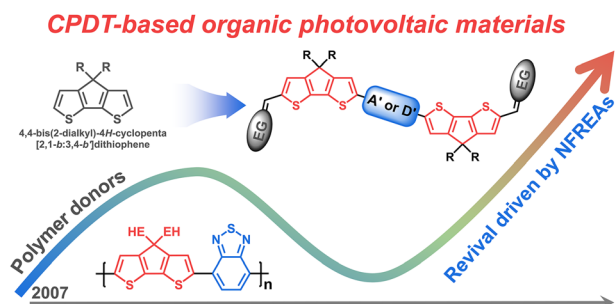
17958



Non-Ir based catalysts for the electrocatalytic oxygen evolution reaction: progress and challenges

Lin Lin, Kai Wei, Xian Wang,* Wei Ma, Chunlei Bian and Junjie Ge*

17973



The revival of 4H-cyclopenta[2,1-b:3,4-b'] dithiophene (CPDT) driven by low-cost and high-performance nonfused-ring electron acceptors

Xiaobin Gu, Xin Zhang* and Hui Huang*

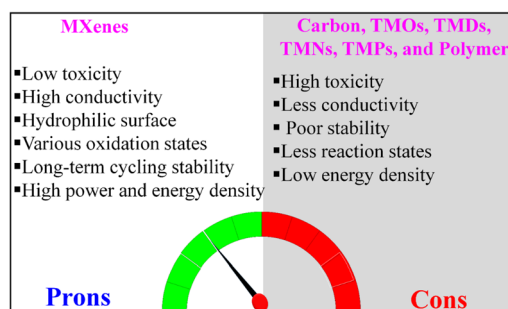


REVIEWS

17992

Advancements in 2D MXene-based supercapacitor electrodes: synthesis, mechanisms, electronic structure engineering, flexible wearable energy storage for real-world applications, and future prospects

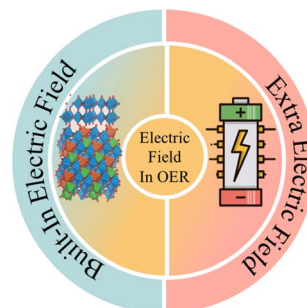
Sujit Anil Kadam,* Komal Prakash Kadam and Nihar R. Pradhan*



18047

Built-in electric fields and extra electric fields in the oxygen evolution reaction

Zihang Feng, Fangyin Lu, Qiming Hu, Jiangyuan Qiu, Xuefei Lei, Biao Wang, Rui Guo, Ye Tian, Xuanwen Liu* and Junhua You*

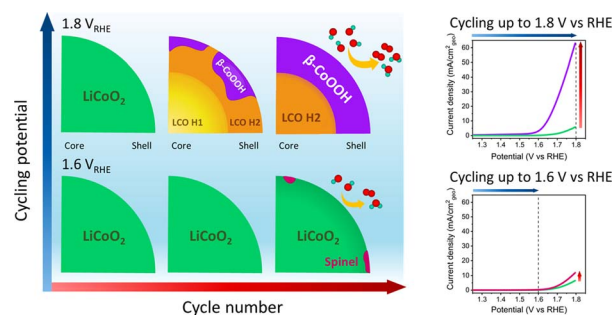


COMMUNICATIONS

18071

Potential-driven restructuring of lithium cobalt oxide yields an enhanced active phase for the oxygen evolution reaction

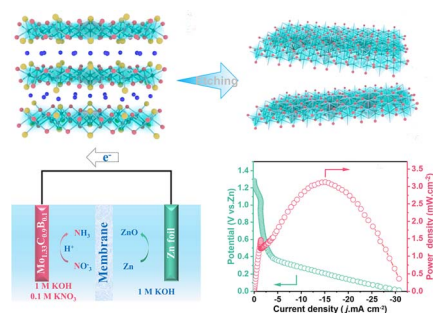
Alexander A. Ryabin, Subin Choi, Yumin Heo, Sebastian Kunze, Dmitry V. Pelegov* and Jongwoo Lim*



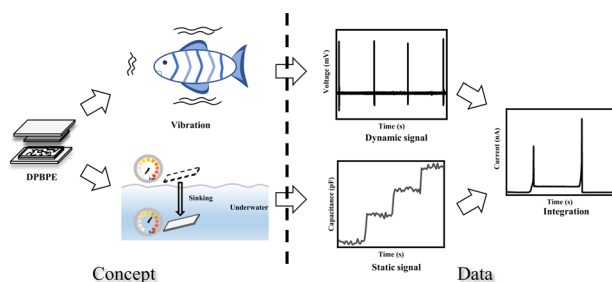
18082

MAX-derived B-doped Mo_{1.33}C MXene for ambient electrocatalytic conversion of nitrate to ammonia

Jianjia Mu, Da Wang, Shenye Zhou, Xianli Jia, Xuan-Wen Gao,* Zhaomeng Liu and Wen-Bin Luo*



18089

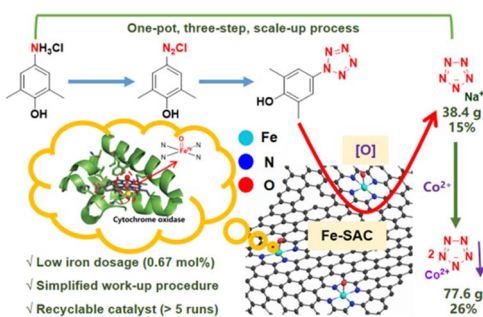


Synchronous monitoring of underwater dynamic/static pressure based on piezoelectric/capacitive polyester elastomer/carbon nanotube composites

Yuxing Tang, Qing Dang, Wei Zhang, Haiquan Guo, Hong Pan, Yong Xiang, Bin Liao* and Xiaoran Hu*

PAPERS

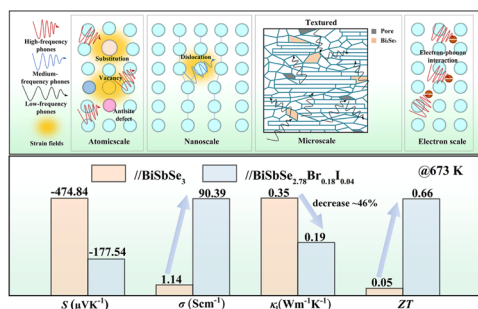
18096



Iron single-atom anchored N-doped carbon: an efficient catalyst for one-pot, scaled-up pentazole synthesis

Pengbo Wang, Xiaopeng Zhang, Shuaijie Jiang, Zheting Dong, Ruyi Lu, Yuangang Xu, Pengcheng Wang* and Guo-Ping Lu*

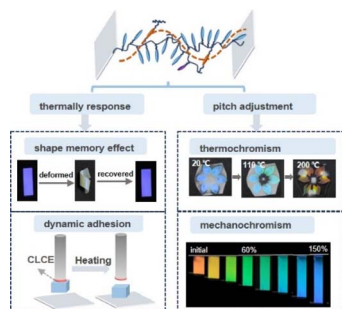
18104



Synergistic optimization of the thermoelectric performance of BiSbSe₃ using doping and multi-scale defect engineering

Xiaowei Shi, Zhen Tian, Quanwei Jiang, Yu Yan, Huijun Kang,* Enyu Guo, Zongning Chen and Tongmin Wang*

18117



High-strength thermochromic and mechanochromic liquid-crystal elastomers with responsive shape memory and dynamic adhesion

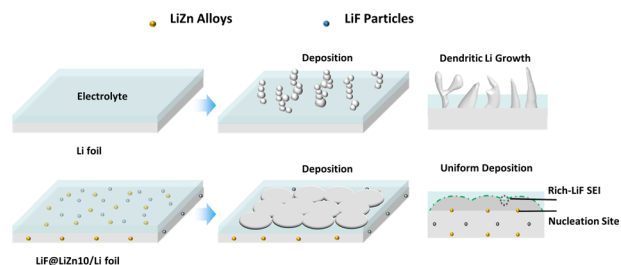
Lu Li, Xi Yin, Yu-Xi Zhao, Ling-Ying Shi,* Ke-Ke Yang* and Yu-Zhong Wang



18127

Advancing anode-less lithium metal batteries: ZnF₂ modification and *in situ* structural regulation for enhanced performance

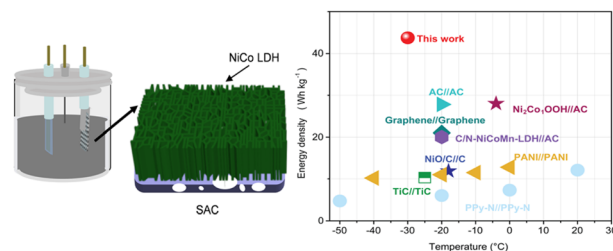
Jing Tao, Can Zhang, Xueyang Li, Xinlong Chen, Chenzhen Ji, Wang Wan* and Chao Wang*



18137

Biologically structured composite materials for low temperature energy storage

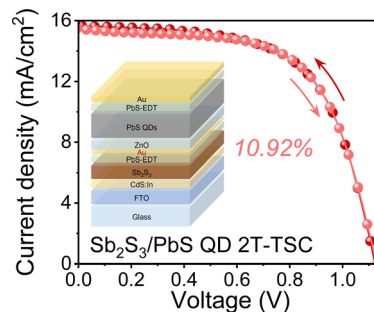
Yu Wang, Xin Chen, Bo Cui, Cuiping Guo, Yao Li, Qinglei Liu, Hui Pan* and Di Zhang*



18148

All-inorganic Sb₂S₃-based two-terminal tandem solar cells enable over 10.9% efficiency employing a concise interconnection layer

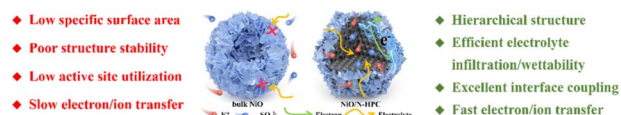
Shiwu Chen, Xinzhao Zhao, Guohuan Shen, An Ke, Bohang Liu, Hsien-Yi Hsu, Chao Chen, Peizhi Yang, Jiang Tang and Haisheng Song*



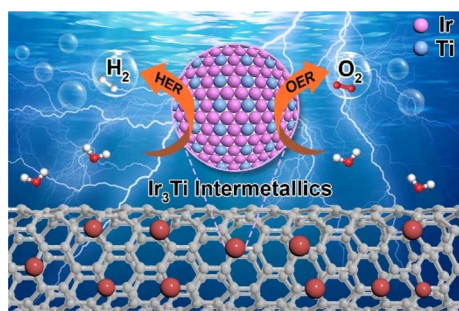
18157

Ultrathin NiO nanosheets anchored to a nitrogen-doped dodecahedral carbon framework for aqueous potassium-ion hybrid capacitors

Tianlu Wang, Wei Zong, Jieru Yang, Leiqian Zhang, Jian Meng, Jiale Ge, Guozheng Yang, Jianguo Ren, Peng He, Elke Debroye, Jean-François Gohy, Tianxi Liu* and Feili Lai*



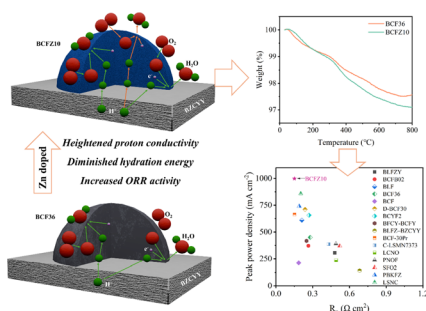
18167



Atomically ordered Ir₃Ti intermetallics for pH-universal overall water splitting

Jianing Song, Caihong He, Chaoqun Ma, Jing Xia, Fukai Feng, Xiao Ma, Sumei Han, Huaifang Zhang, Yuanqiang Yang, Banggao Li, Qipeng Lu,* Wenbin Cao* and Lijie Zhu*

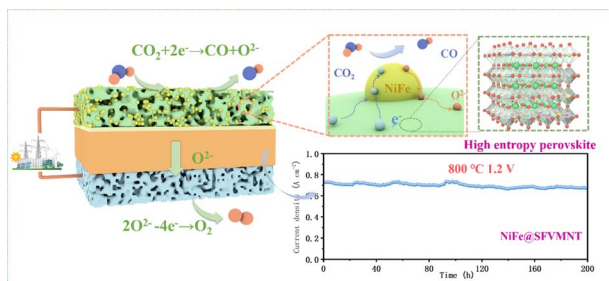
18175



Balancing the triple conductivity of zinc-doped cathodes for proton-conducting solid oxide fuel cells

Xiangbo Deng, Mingming Zhang, Yang Gao, Min Fu, Qian Wang, Yuxuan Zhu and Zetian Tao*

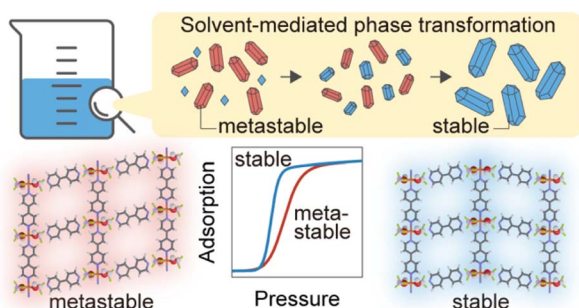
18182



Probing metal/high-entropy perovskite heterointerfaces for efficient and sustainable CO₂ electroreduction

Yan Zhu, Nan Zhang, Wenyu Zhang, Yansheng Gong, Rui Wang, Huanwen Wang, Jun Jin, Ling Zhao and Beibei He*

18193



Controlling the steepness of gate-opening behavior on elastic layer-structured metal-organic framework-11 via solvent-mediated phase transformation

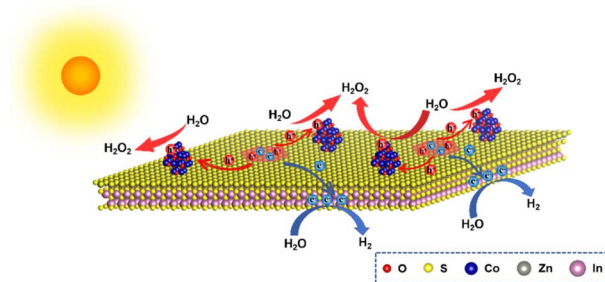
Shotaro Hiraide,* Keisuke Nishimoto and Satoshi Watanabe*



18204

Achieving long-lived photogenerated holes in ZnIn₂S₄ loaded with CoO_x clusters for enhanced photocatalytic pure water splitting

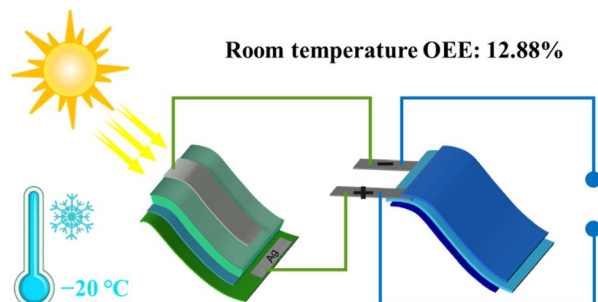
Qingsheng Zhang, Shuya Yuan, Huabing Yin,*
Jianjun Yang and Zhongjie Guan*



18214

Low-temperature suitability of flexible photo-rechargeable devices integrated with hydrogel-based lithium-ion batteries and perovskite solar cells

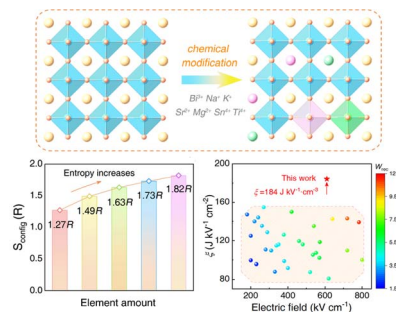
Wei Liu, Mingzhu He, Hai Lu, Hai Zhong,* Ziwei Cai,
Shaohang Wu,* Yingxiang Tan, Xingjiang Liu*
and Yaohua Mai



18224

Ultrahigh energy storage capacities in high-entropy relaxor ferroelectrics

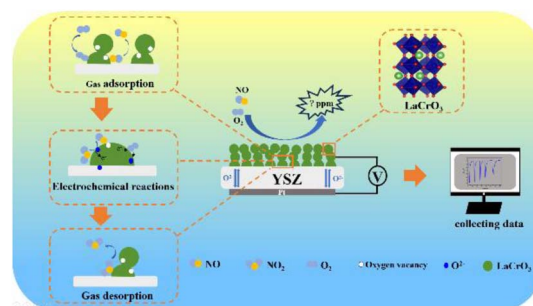
Yunhao Huang, Kaili Shang, Yule Yang, Wenjing Shi,
Leiyang Zhang, Vladimir Laletin, Vladimir Shur, Ruiyi Jing
and Li Jin*



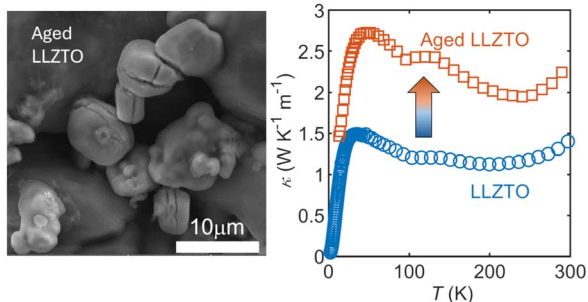
18234

Selective detection of NO using the perovskite-type oxide LaMO₃ (M = Cr, Mn, Fe, Co, and Ni) as the electrode material for yttrium-stabilized zirconia-based electrochemical sensors

Hongqian Sun, Jing Song,* Pengfei Shi, Zhenqian Cheng,
Liangliang Tian, Mingjun Zhou and Tao Qi*



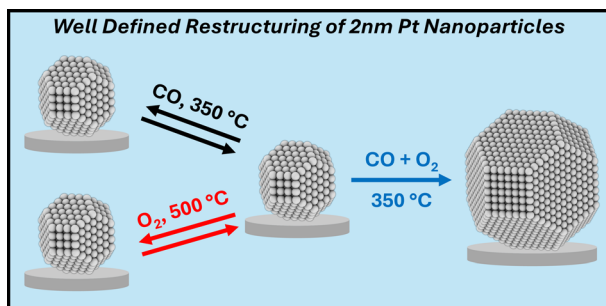
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Thermal properties and lattice anharmonicity of Li-ion conducting garnet solid electrolyte $\text{Li}_{6.5}\text{La}_3\text{Zr}_{1.5}\text{Ta}_{0.5}\text{O}_{12}$

Yitian Wang, Shuchen Li, Nan Wu, Qianru Jia, Thomas Hoke, Li Shi, Yutao Li* and Xi Chen*

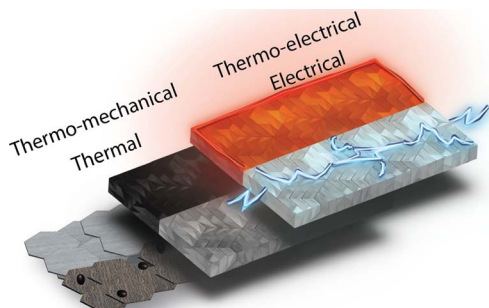
18258



A well-defined supported Pt nanoparticle catalyst for heterogeneous catalytic surface science

Taek-Seung Kim, Christopher R. O'Connor, Samantha L. Le and Christian Reece*

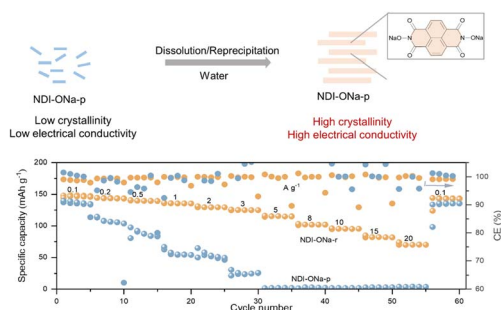
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3D printing carbon-carbon composites with multilayered architecture for enhanced multifunctional properties

Dharneedar Ravichandran, Anna Dmochowska, Barath Sundaravivelan, Varunkumar Thippanna, Emile Motta de Castro, Dhanush Patil, Arunachalam Ramanathan, Yuxiang Zhu, M. Taylor Sobczak, Amir Asadi, Jorge Peixinho, Guillaume Miquelard-Garnier and Kenan Song*

18286



A recrystallized organic cathode with high electrical conductivity for fast sodium-ion storage

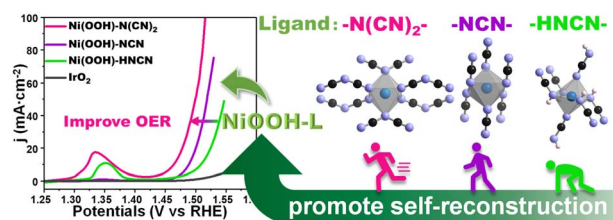
Zixuan Shan, Shuangqin Yang, Xinya Zhang and Yuan Chen*



18294

Ligand-regulated Ni-based coordination compounds to promote self-reconstruction for improved oxygen evolution reaction

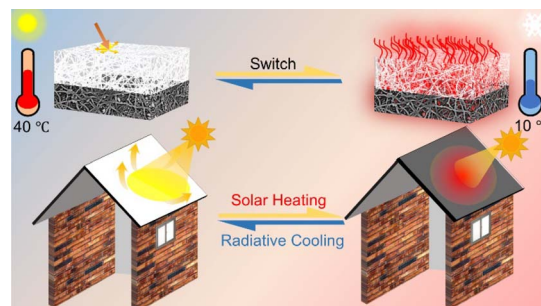
Muhammad Ajmal, Xiaolei Guo,* Mazhar Ahmed Memon, Muhammad Asim, Chengxiang Shi, Ruijie Gao, Lun Pan, Xiangwen Zhang, Zhen-Feng Huang* and Ji-Jun Zou



18304

In situ switchable nanofiber films based on photoselective asymmetric assembly towards year-round energy saving

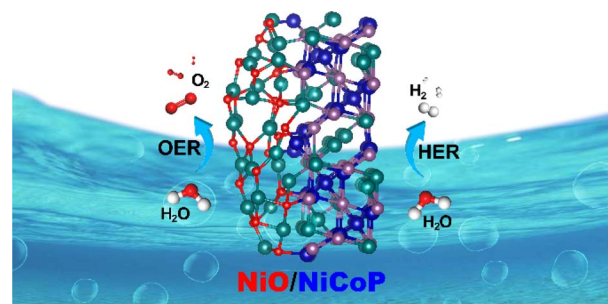
Liuqian An, Jiaxiang Ma, Peizhi Wang, Aleksandr Kuchmizhak, Jinxin Yao, Hongbo Xu* and Wei Wang*



18313

Regulating catalytic kinetics in nanoclimbing-wall-like NiO/NiCoP hybrids for enhanced overall water splitting

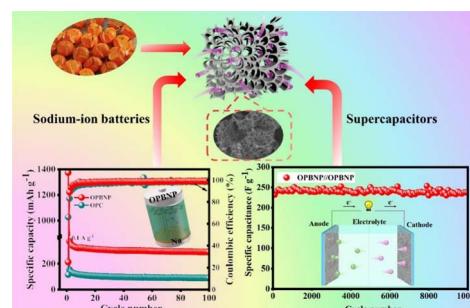
Xiuwen Wang,* Lan Yu, Chunmei Lv, Ying Xie, Yanqing Jiao,* Wen Xin, Tengfei Xu, Tingting Xu and Libin Yang*



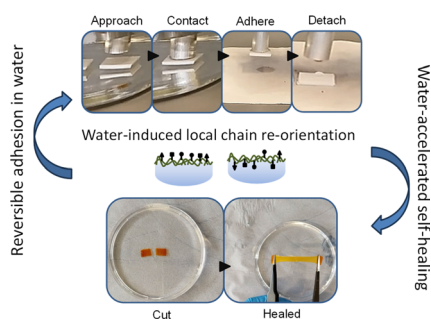
18324

Biomass-derived B/N/P co-doped porous carbons as bifunctional materials for supercapacitors and sodium-ion batteries

Yanjiao Li, Xufei Zou, Shiqi Li, Yingying Chen,* Guoxiu Wang, Hongxun Yang* and Hao Tian*



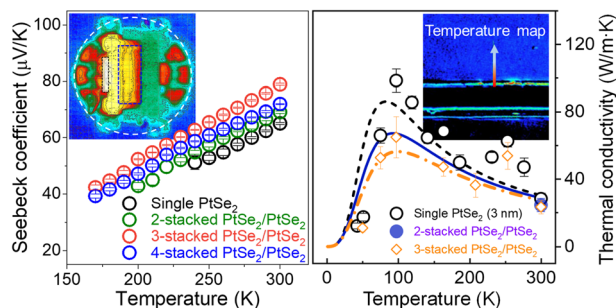
18338



Water-triggered self-healing and reversible underwater adhesion in metalorganic polymers

Elif Kaymazlar, Omer Andac and Santiago J. Garcia*

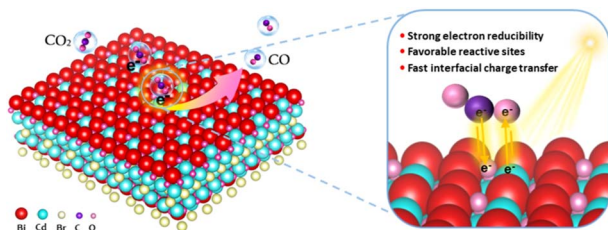
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Anomalous thermal transport of vertically stacked PtSe₂ thin films with interface formation

Jung-Min Cho, Won-Yong Lee, Farjana Ferdous Tonni, Min-Jeong Kim, Yun-Ho Kim, Hyeok Jun Kwon, Jae-Won Choi, Mona Zebarjadi, No-Won Park, Sree Sourav Das, Gil-Sung Kim* and Sang-Kwon Lee*

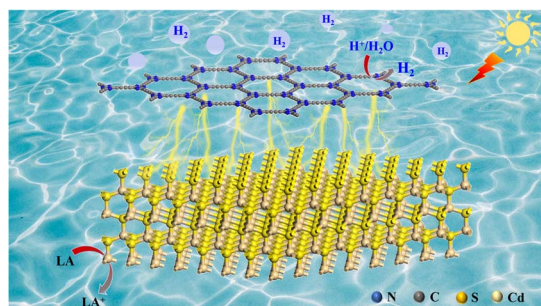
18358



Intrinsic bimetallic cations regulating band centers and reactive sites for boosting CO₂ photoreduction

Jingjing Wang, Fang Chen, Qing Liu and Hongwei Huang*

18367



Triazinyl-graphdiyne induces electron directional migration to drive charge separation of CdS for photocatalytic hydrogen evolution

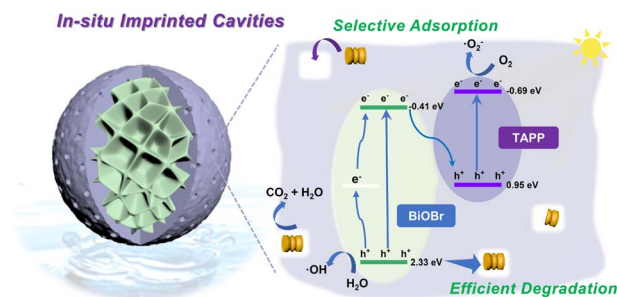
Qian Xiao, Linlin Fan, Yafeng Liu, Xin Guo* and Zhiliang Jin



18381

In situ imprinted cavity fabrication within BiOBr@porphyrin composites for selective and efficient degradation of trace norfloxacin

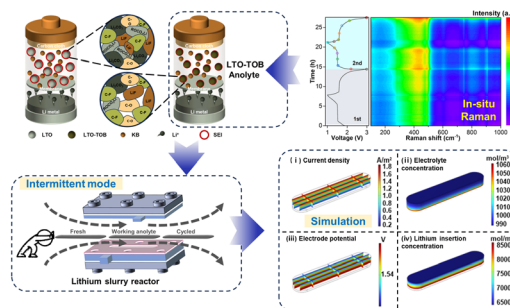
Xuemeng Tian, Pengcheng Wang, Yue Wang, Xiaoyu Shi, Long Zhang, Jinfeng Liu, Yangyang Wang and Ruixia Gao*



18393

Enhanced stability and the lithium storage mechanism of oxygen vacancy-induced heterogeneous $\text{Li}_4\text{Ti}_5\text{O}_{12}/\text{TiO}_2(\text{B})$ anolytes

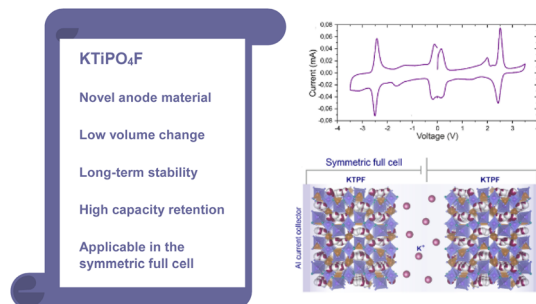
Fengjie Zhang, Wenhao Fang, Xiangkun Wu and Xingmei Lu*



18404

Exploring KTIPO_4F as a robust polyanion anode material for potassium-ion batteries

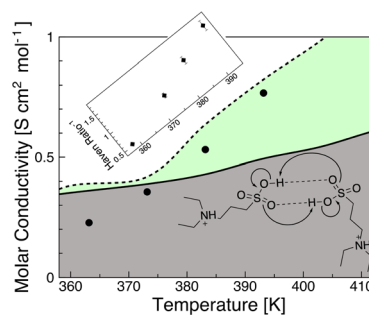
Vahid Ramezankhani,* Nikita D. Luchinin, Sergey N. Marshenya, Maxim V. Zakharkin, Alexander A. Golubnichiy, Anatolii V. Morozov, Olga Emilianova, Keith J. Stevenson, Evgeny V. Antipov, Artem M. Abakumov and Stanislav S. Fedotov*



18412

Superionicity by design: high proton conductivity in a fluorine-free protic ionic liquid

Hanno Maria Schütz, Stefano Nejrotti, Henry Adenusi, Alessandro Mariani,* Enrico Bodo,* Matteo Bonomo,* Alessandro Innocenti, Claudia Barolo, Xinpei Gao and Stefano Passerini*



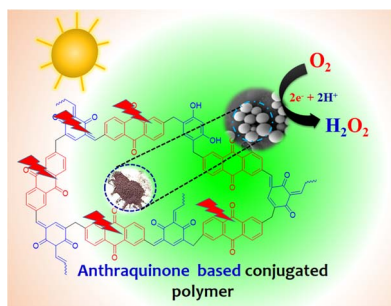
18423



A self-cleaning intraoral flex-occlusometer based on superhydrophobic capacitive sensors for dental health monitoring

Xin Sun, Ziyi Dai,^{*} Zijie Zhang, Xiaoli Fan, Zhiwei Fu, He Zhu, Rong Cai^{*} and Kai Qian^{*}

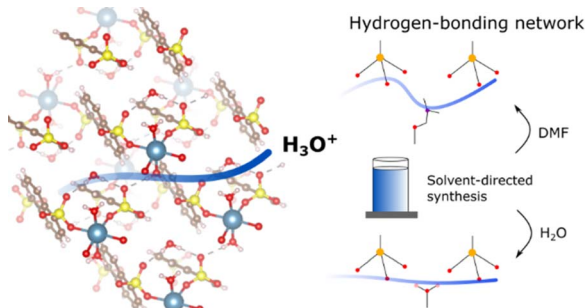
18433



An anthraquinone-based conjugated donor-acceptor (D-A) polymer as a highly efficient photocatalyst for hydrogen peroxide production

Ajay V. Munde, Devendra M. Sanke, Nani Gopal Ghosh, Jasmine Bezboruah, Shiladitya Roy and Sanjio S. Zade^{*}

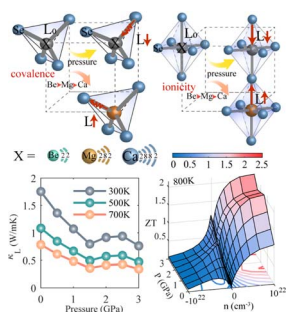
18440



Modulating proton conductivity through crystal structure tuning in arenedisulfonate coordination polymers

Chao Sun, Christopher M. Pask, Sang T. Pham, Emilio Rapaccioni, Andrew J. Britton, Stuart Micklethwaite, Andrew Bell, Maximilian O. Besenhard, Rik Drummond-Brydson, Ke-Jun Wu and Sean M. Collins^{*}

18452



Origin of positive/negative effects on pressure-dependent thermal conductivity: the role of bond strength and anharmonicity

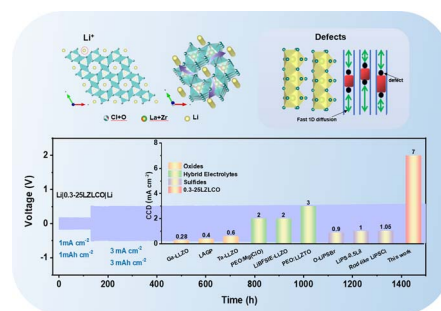
Fang Lyu, Wei Cao,^{*} Han-Pu Liang, Tan Peng, Yue Hou, Xiaolu Zhu, Ling Miao, Ziyu Wang,^{*} Rui Xiong^{*} and Jing Shi



18459

A novel LaCl_3 -based oxychloride solid-state electrolyte enables fast Li-ion transport and is compatible with lithium metal

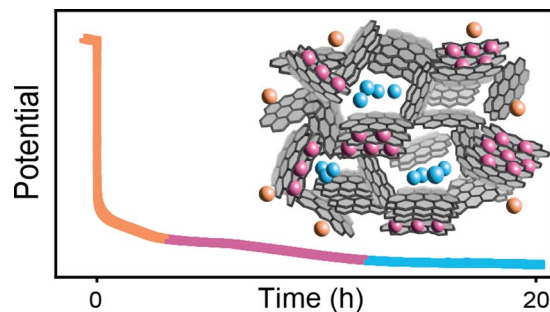
Xuxia Hao, Kai Chen,* Min Jiang, Yanping Tang, Yuexin Liu and Kefeng Cai*



18469

Investigation of sodium insertion in hard carbon with *operando* small angle neutron scattering

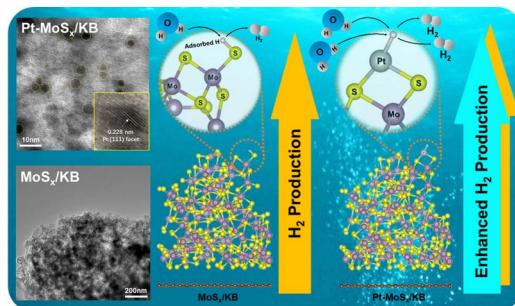
Emily M. Reynolds, Jack Fitzpatrick, Martin O. Jones, Nuria Tapia-Ruiz, Helen Y. Playford, Stephen Hull, Innes McClelland, Peter J. Baker, Serena A. Cussen and Gabriel E. Pérez*



18476

Low loading of Pt in radiation-synthesized Pt-MoS_x/KB nanocomposites for enhancing the electrocatalytic hydrogen evolution reaction

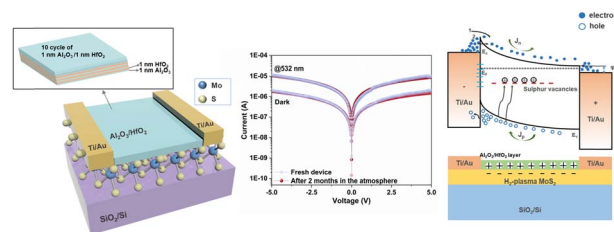
Yicheng Wang, Shuangxiao Li, Xueyan Que, Zeyu Zhang, Ling Xu, Yue Wang, Jing Peng, Jiuqiang Li, Shuanglin Hu, Yinyong Ao* and Maolin Zhai*



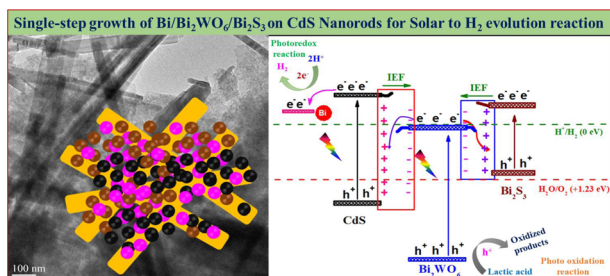
18487

High responsivity and stability of MSM structured MoS₂ photodetectors by remote hydrogen plasma treatment and alternating growth of Al₂O₃/HfO₂ passivation layers

Yulin Li, Yajun Tian, Lingjie Bao, Haoran Cheng* and Qijin Cheng*



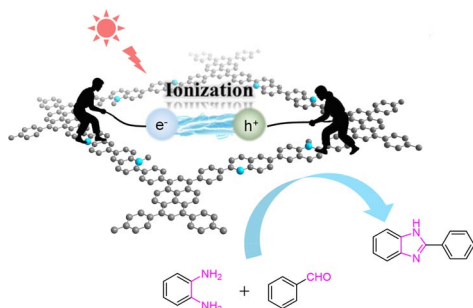
18498



Internal electric field promoted charge separation *via* bismuth-based ternary heterojunctions with near-infrared light harvesting properties for efficient photoredox reactions

Rama Krishna Chava,^{*} Younghwan Im and Misook Kang^{*}

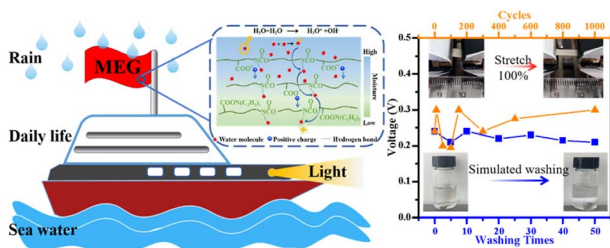
18512



Ionization-triggered low exciton binding energy in covalent organic frameworks for efficient photocatalytic synthesis of benzimidazole

Dekang Huang,^{*} Yuwei Zhang, Huaji Pang, Xianwen Hu^{*} and Yonggang Xiang^{*}

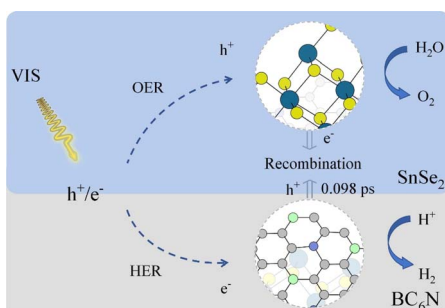
18519



Waterborne polyurethane: an easily available material for moist-electric generator with unique stretchability and water resistance

Yuying Zhang, Linghui Kong, Yuzhu Zhai, Lehao Pan, Wanying Cao, Mingwei Tian,^{*} Lijun Qu^{*} and Yijun Jiang^{*}

18528



Ultrafast carrier recombination in a BC₆N/SnXY Z-scheme heterostructure for water splitting: insights from ground- and excited-state carrier dynamics

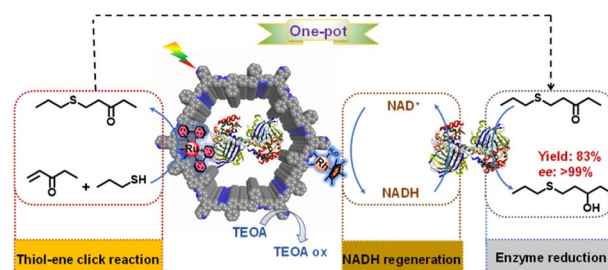
Jingshan Zong, Cheng He^{*} and Wenxue Zhang^{*}



18537

Enzyme immobilization in a Ru(N^N)₃-modified covalent organic framework for photoenzymatic cascade catalysis

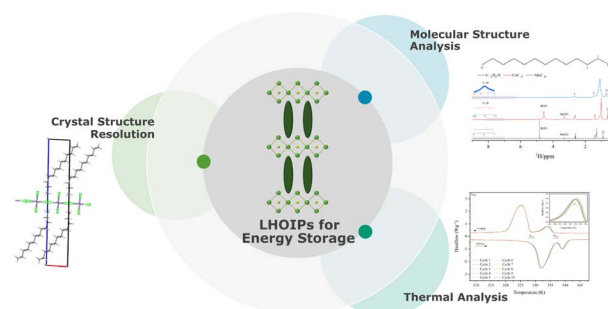
Yanxia Wang, Bingchen Guo, Zhihua Chai, Ming Gao, Yanlin Li, Yang Yu* and Shengli Huang*



18544

Copper- and manganese-based layered hybrid organic–inorganic compounds with polymorphic transitions as energy storage materials

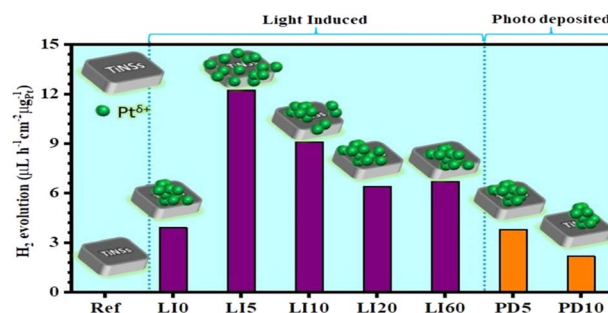
R. Salgado-Pizarro, C. Puigjaner, J. García, A. I. Fernández* and C. Barreneche



18554

Synergistic enhancement of photocatalytic hydrogen production in TiO₂ nanosheets through light-induced defect formation and Pt single atoms

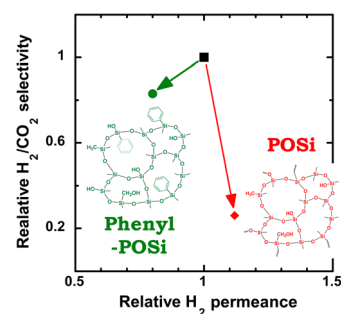
Majid Shahsanaei, Nastaran Farahbakhsh, Sadegh Pour-Ali, Annika Schardt, Setareh Orangpour, Carsten Engelhard, Shiva Mohajernia, Manuela S. Killian* and Sina Hejazi*



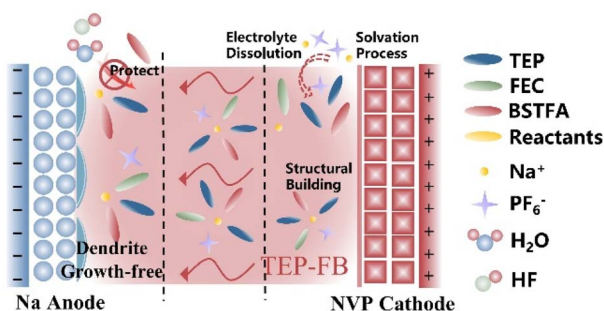
18563

Phenyl-incorporated polyorganosilica membranes with enhanced hydrothermal stability for H₂/CO₂ separation

Vinh T. Bui, Varun R. Satti, Elizabeth Haddad, Ameya Manoj Tandel, Narjes Esmaili, Sai Srikar Chundury, Fathy Attia, Lingxiang Zhu and Haiqing Lin*



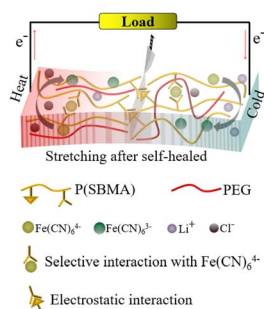
18572



Inhibition of sodium dendrites by solvent structural reorganization for non-flammable high-performance sodium-metal batteries

JiYuan You, Bo Zhang, Tianle Li, Yuqian Li and Wenju Wang*

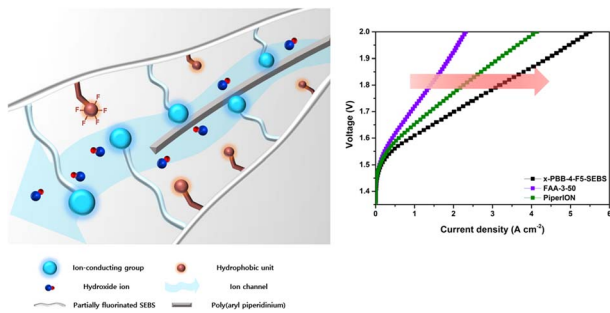
18582



A hydrogel thermo-electrochemical cell with high self-healability and enhanced thermopower both induced by zwitterions

Youfa Liu, Li Yin, Sheng Chen, Yao Liu, Qingjiang Liu, Liangliang Yang, Yingchun Li, Qian Zhang* and Yan Huang*

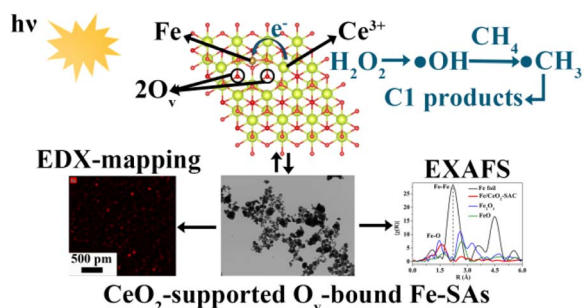
18593



Crosslinked high-performance anion exchange membranes based on poly(dibenzyl *N*-methyl piperidine) and pentafluorobenzoyl-substituted SEBS

Soomin Jeon, SeongMin Han, Junghwa Lee, Kyungwhan Min, Sang Yong Nam* and Tae-Hyun Kim*

18604



Highly efficient ambient temperature photo-oxidation of CH₄ to C₁ products over CeO₂ supported single-atom Fe with oxygen vacancies

Hailong Tang, Yongqing Ma, Chuhong Zhu, Min Wang, Ganhong Zheng, Xiao Sun* and Meiling Wang*

