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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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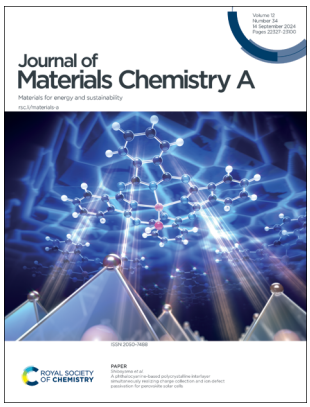

Cover
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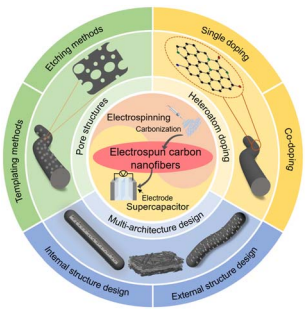
REVIEWS

22346

Improving supercapacitor electrode performance with electrospun carbon nanofibers: unlocking versatility and innovation

Hailang Xu, Bin Li, Zeyu Wang, Qian Liao, Lingcong Zeng, Heng Zhang, Xiaoliang Liu, Deng-Guang Yu and Wenliang Song*



22372

Polymer-based films for all-in-one piezo-driven self-charging power systems

Kewei Shu,* Wenjuan Li, Qijie Wu,* Yan Zong, Chen Zhao, Yi Zhang and Caiyun Wang*

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REVIEWS

22396

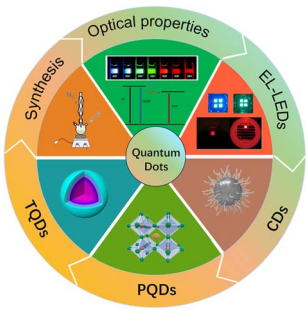
Wearable electrochemical bioelectronics for agriculture

Bing Xue, Xiaoqian Su, Le Li, Tedrick Thomas Salim Lew and Changsheng Wu*

22417

Shiny quantum dots: synthesis, properties, and electroluminescent light-emitting diodes

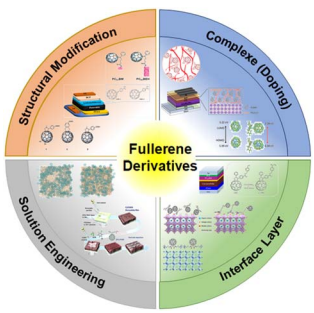
Hongwei Wang, Boyang Wang, Jiaxin Bai and Siyu Lu*



22442

Structural modification of fullerene derivates for high-performance inverted perovskite solar cells

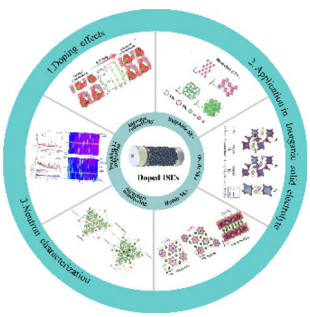
Han Wang, Zhiyuan Zhang, Chenyang Zhang, Yiguo Yao and Kai Wang*



22458

Heteroatom-based doping and neutron diffraction: doping strategies and mechanisms for ionic conductivity enhancement in inorganic solid-state electrolytes

Yingjie Dong, Haiting Shi,* Hao Li, Xianyan Wu,* Wanwei Jiang, Wenhui Cui, Jiarong Niu and Zhiwei Xu*



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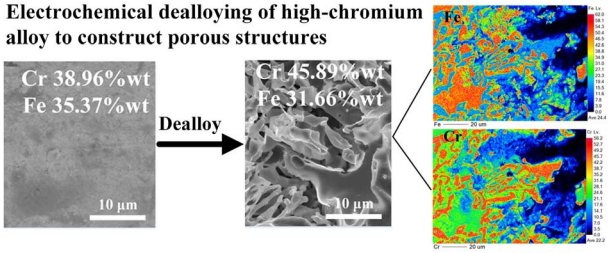
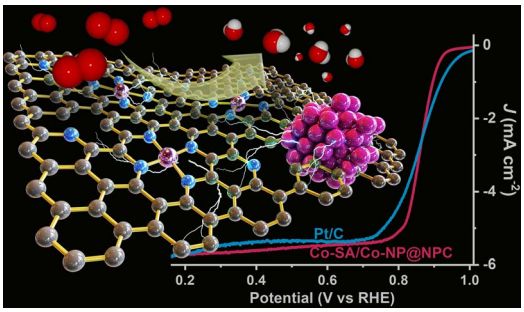
22487



Electrochemical dealloying of a high-chromium alloy at oxygen evolution potential

Lijia Ning, Chunmei Yang,* Guannan Jiang, Chenglin Wang, Shuaishuai Wang, Yang Chen, Huanxi Zheng,* Xin Liu and Jiyu Liu*

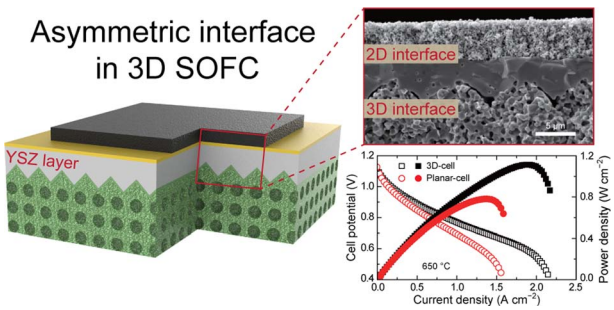
22494



Scalable nanoarchitectonics with microporous polymer composite for methanol-tolerant ORR electrocatalysts

Abin Sebastian, Atanu Panda, Ravi Nandan, Joel Henzie, Ovidiu Cretu, Jian Xu, Nadiia Velychkivska, Renzhi Ma, Pooja Gakhad, Abhishek Kumar Singh, Gary J. Richards, Koji Kimoto, Lok Kumar Shrestha, Katsuhiko Ariga, Yusuke Yamauchi and Jonathan P. Hill*

22504



Unraveling the effects of asymmetric interfaces in three-dimensional solid oxide fuel cells

Young Gyun Goh, Jeong Hun Kim,* Hyoungchul Kim* and Sung Soo Shin*

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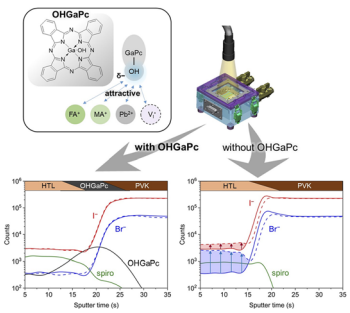
22510



A phthalocyanine-based polycrystalline interlayer simultaneously realizing charge collection and ion defect passivation for perovskite solar cells

Tatsuya Ohsawa,* Naoyuki Shibayama,* Nobuhiro Nakamura, Shigeto Tamura, Ai Hayakawa, Yohei Murayama, Kohei Makisumi, Michitaka Kitahara, Mizuki Takayama, Takashi Matsui, Atsushi Okuda, Yuiga Nakamura, Masashi Ikegami and Tsutomu Miyasaka

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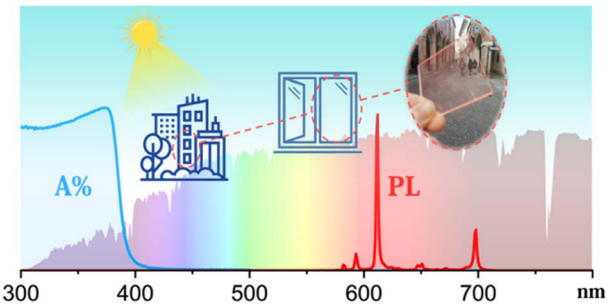
22516

Transparent and colour-neutral luminescent solar concentrators using bright Eu^{3+} supramolecular cages towards photovoltaic windows

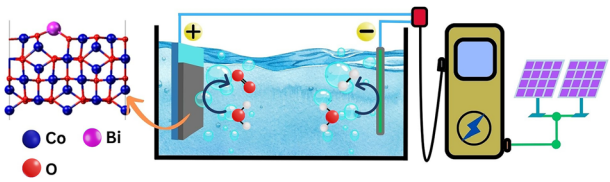
Irene Motta, Gregorio Bottaro,* Maria Rando, Marzio Rancan,* Roberta Seraglia and Lidia Armelao



22528

Improving the electrocatalytic activity of cobalt oxide with bismuth for acidic oxygen evolution reaction

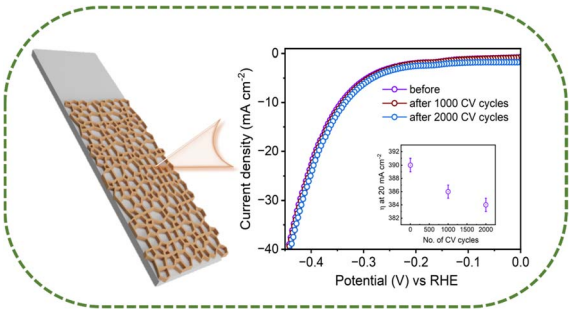
Belvin Thomas, Bowen Peng, Xiaoxi Huang* and Tewodros Asefa*



22539

Stainless steel-derived nano-porous oxide: a cost-efficient, stable, and corrosion-resistant hydrogen evolution catalyst

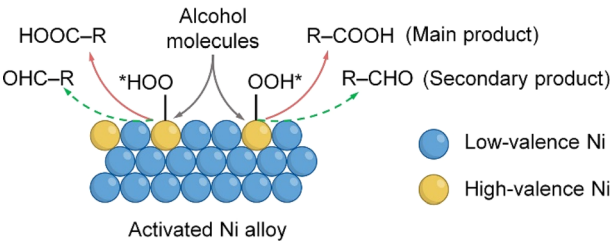
Ranjith Bose,* Surya Prakash Gajagouni, Imad Barsoum, Sung Oh Cho and Akram Alfantazi*



22550

Electro-oxidation of alcohols over electrochemically activated nickel alloys for energy-saving hydrogen production

Ming Ni, Minyuan Tan, Kang Luo, Daochuan Jiang, Yupeng Yuan, Chuhong Zhu,* Haiwei Du* and Hangjuan Ren*



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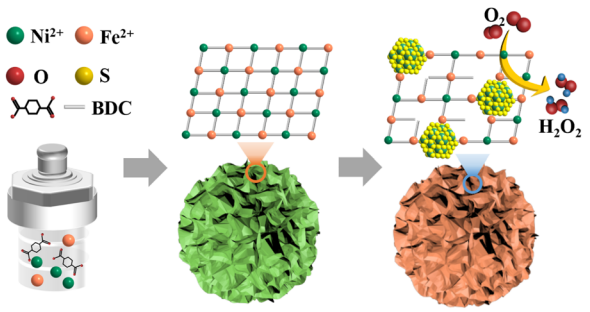
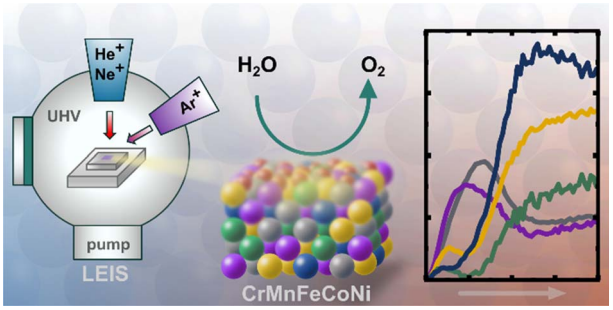


Transition metal chalcogenide nanoparticle embedded metal–organic framework nanosheets for high-performance H_2O_2 electrosynthesis

Xinchan Zhang, Chaoqi Zhang,* Yingying Zou, Tong Bao, Jing Wang,* Siham Yousuf Al-Qaradawi, Nageh K. Allam, Chengzhong Yu* and Chao Liu*

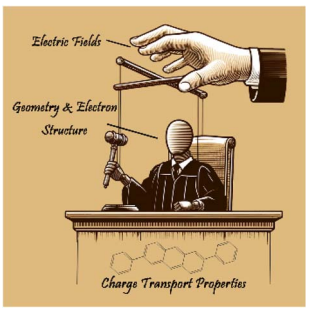
22565



Bulk-independent surface oxide composition controls the electrochemical performance of high-entropy alloys

Matthias Kogler, Matteo Olgiati, Markus Ostermann, Philipp Rachle, Soniya Gahlawat, Markus Valtiner* and Christian M. Pichler*

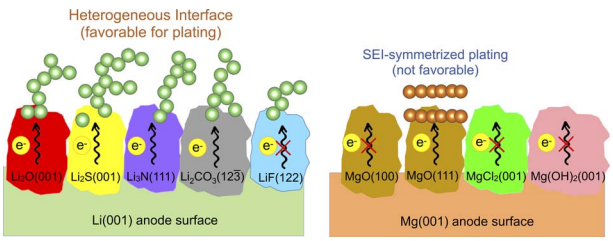
22576



The response of charge transfer properties to electric fields in organic semiconductors: a comprehensive theoretical investigation

Hengyue Zhang, Jie Zhu, Xinxin Niu, Qian Zhang, Yajing Sun* and Weigang Zhu*

22584



Interfacial insights for divergent dendrite formation mechanisms in lithium and magnesium anodes

Hong-Kai Chen and Hong-Kang Tian*

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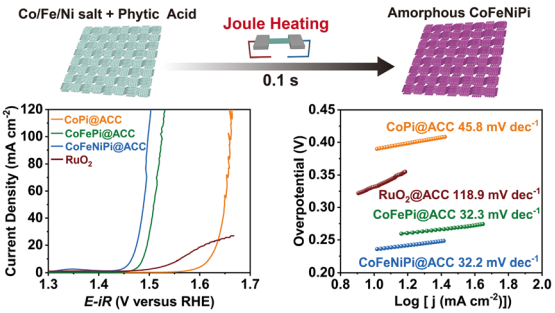
22597

Ultrafast Joule heating-induced formation of amorphous CoFeNi phosphate for efficient and stable oxygen evolution reaction

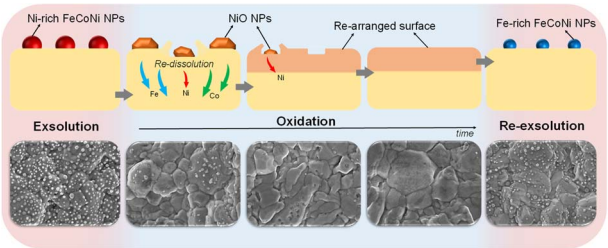
Junhao Ma, Chonghan Xia, Teddy Salim, Yee Yan Tay, Lydia H. Wong and Kwan W. Tan*



22609

Understanding the evolution of ternary alloyed nanoparticles during reversible exsolution from double perovskite oxides

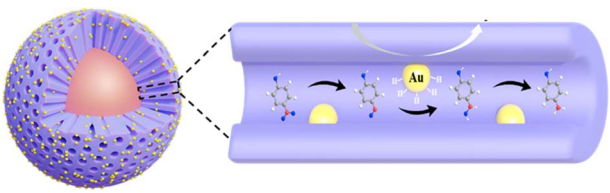
Andrés López-García, Alfonso J. Carrillo,* Catalina Elena Jiménez, Rosario Suarez Anzorena, Raul Garcia-Diez, Virginia Pérez-Dieste, Ignacio J. Villar-Garcia, Ana B. Hungría, Marcus Bär and José M. Serra*



22627

Core–shell magnetic mesoporous 3-aminophenol–formaldehyde resin microspheres with rich functional groups *via* interface co-assembly and polymerization

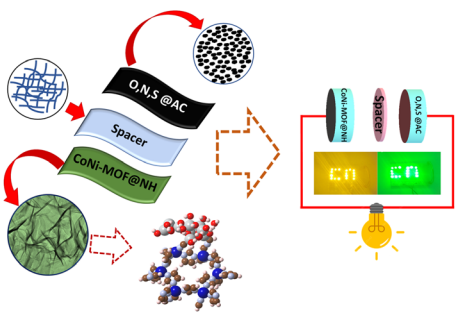
Jiarong Li, Shude Liu, Yuanzhao Xie, Fengluan Jiang, Xinyu Huang, Jianfeng Xia,* Limin Wu* and Yonghui Deng*



22637

Template-directed *in situ* grown bimetallic nanoarchitectures with hydroxide active site enriched multi-charge transfer routes for energy storage

Antonysamy Dennyson Savariraj, Pugalenthiyar Thondaiman, Periyasamy Sivakumar, Ramu Manikandan, John D. Rodney, Byung Chul Kim and Hyun Jung*



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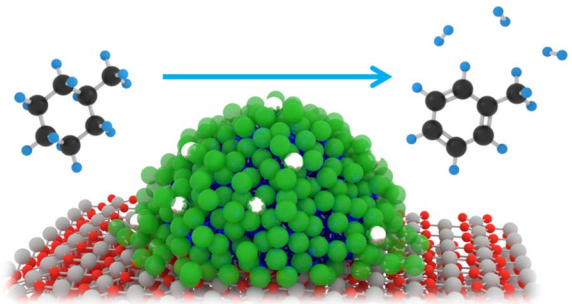
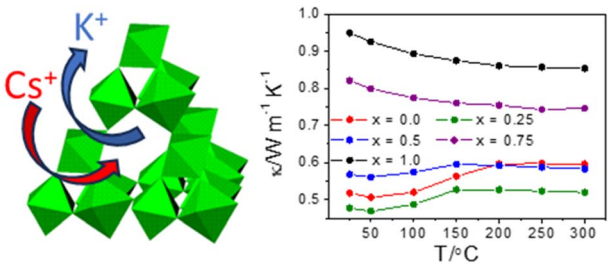


Pt single atom alloyed sub-1 nm thick Fe overlayer on supported Cu nanoparticles for methylcyclohexane dehydrogenation

Akira Oda,* Kosei Ichihashi, Yuta Yamamoto, Takeshi Ohtsu, Wei Shi, Kyoichi Sawabe and Atsushi Satsuma

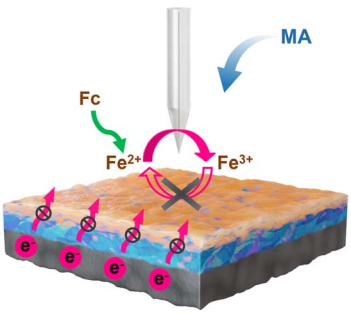
22668



Ultralow thermal conductivity in defect pyrochlores: balancing mass fluctuation scattering and rattling modes

Natasha Ormerod, Anthony V. Powell,* Ricardo Grau-Crespo, Richard K. B. Gover and Christina J. Cox

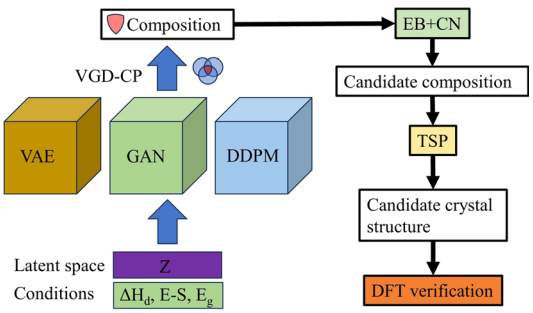
22679



Unraveling the mechanism of methyl acetate additive for reinforcing the solid electrolyte interface on graphite anodes

Jing Hao, Wen Liu, Yao Tian, Junru Wu, Hexin Guo, Guobin Zhang,* Yong Yi, Cuiping Han,* Feiyu Kang and Baohua Li*

22689



Inverse design of semiconductor materials with deep generative models

Chenglong Qin, Jinde Liu, Shiyin Ma, Jiguang Du, Gang Jiang and Liang Zhao*

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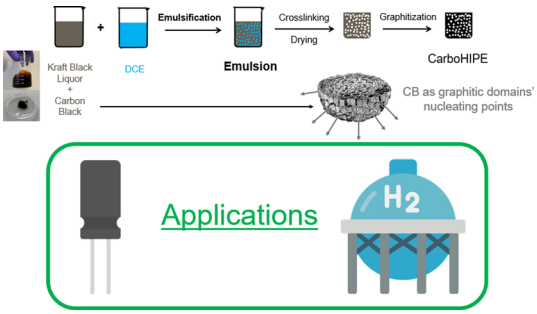
22703

Carbon black structural effect within kraft black liquor-based poly(HIPE): enhanced hydrogen storage and electro-capacitive properties

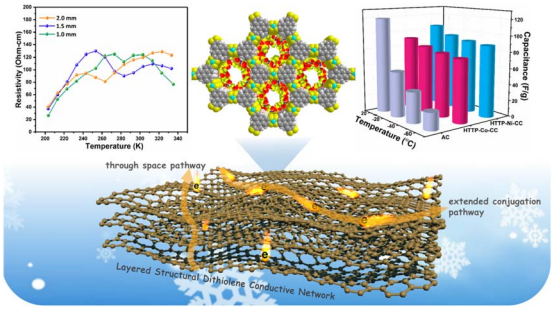
Romain Poupart, Ronan Invernizzi, Hervé Deleuze,* Liliane Guerlou-Demourgues, Jacob Olchowka,* David Talaga, Laurent Servant, Nicolas Penin, Jean-Louis Bobet and Rénal Backov



22715

Conductive 2D dithiolene MOF-based electrodes for low-temperature high-performance energy storage

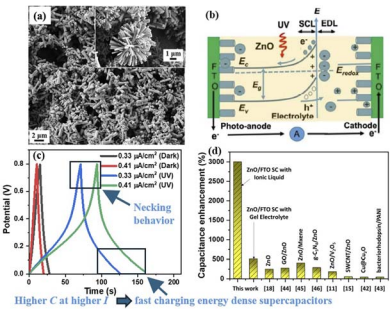
Bing Wang, Wen-Wei Song, Lin Liu, Xue-Jun Gu, Zheng-Bo Han,* Fu-Shun Liang* and Shi-Ming Wang*



22725

Influence of electrolyte on the photo-charging capability of a ZnO–FTO supercapacitor

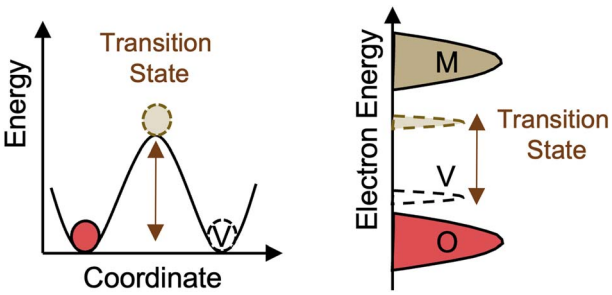
Pankaj Singh Chauhan, Mihir Parekh, Santilata Sahoo, Sumana Kumar, Ayon Das Mahapatra, Pragya Sharma, Vinod Panwar, Apparao M. Rao* and Abha Misra*



22737

Mechanistic insights into the origin of the oxygen migration barrier

Daniele Vivona, Kiarash Gordiz, Randall Meyer, Sumathy Raman and Yang Shao-Horn*



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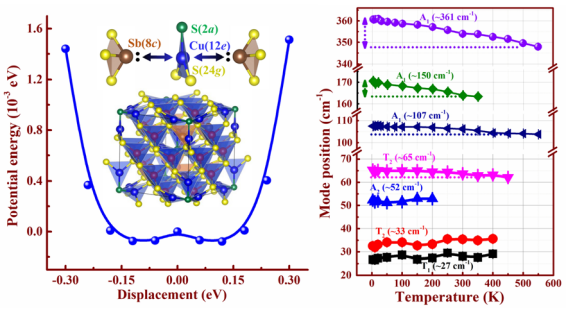
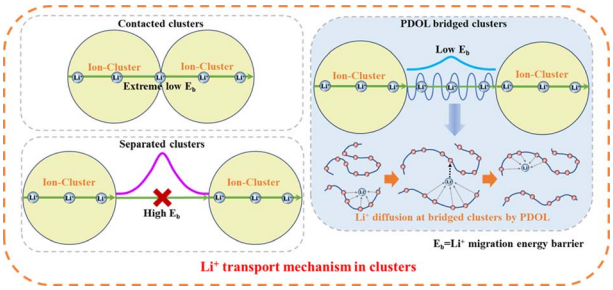


Anharmonic rattling leading to ultra-low lattice thermal conductivity in $Cu_{12}Sb_4S_{13}$ tetrahedrites

Kewal Singh Rana, Nidhi, Chandan Bera, Kanishka Biswas and Ajay Soni*

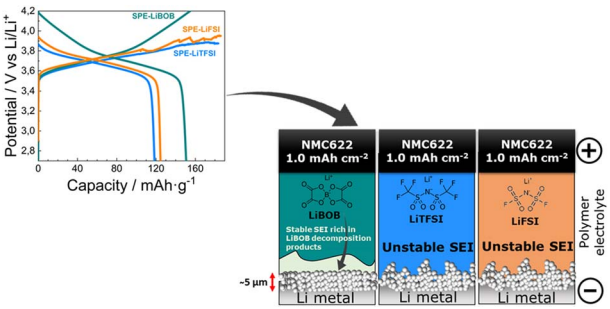
22765



Fast ion-conduction in solid-state Li–S batteries realized by an interfacial-bridge strategy

Jing Yang, Yuxuan Li, Kangshuai Zhu and Qinmin Pan*

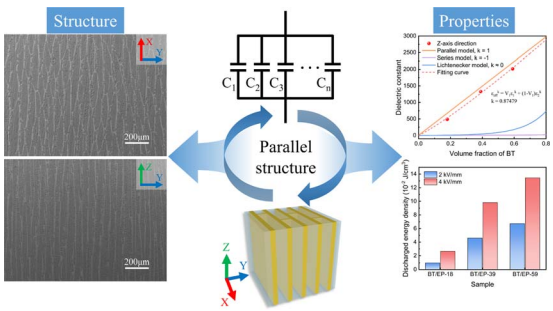
22775



Enhancing high-voltage solid-state lithium-metal battery performance through a stable solid-electrolyte interphase

Ander Orue,* Mikel Arrese-Igor, Uxue Gonzalez, Nuria Gómez, Rosalía Cid and Pedro López-Aranguren

22785



Construction of parallel-structured composites based on a theoretical model to achieve an ultra-high dielectric constant

Ruolin Han, Jiafei Ren, Hui Quan, Xuehe Wang, Wenning Qi, Dali Gao,* Zheng Zhou, Qifang Li and Guang-Xin Chen*

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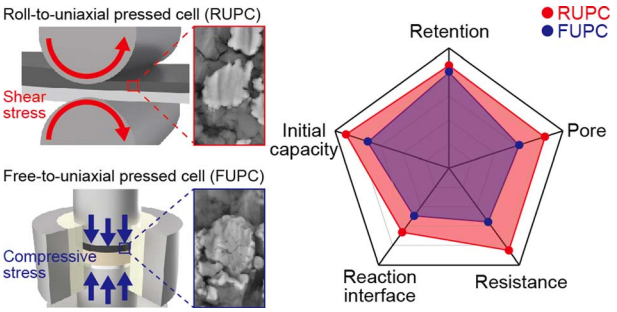
22797

Shear-controlled composite cathodes for all-solid-state batteries combined synergistically with stereology-driven image analysis

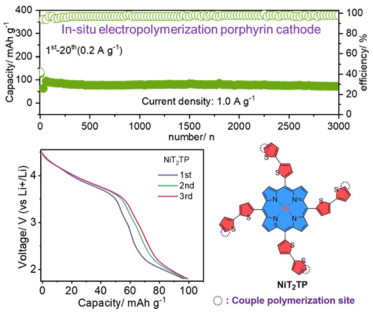
Hyeseong Jeong, Heesu Hwang, Jeong-Won Cho, Dongwook Shin, Jong-Ho Lee, Sung Soo Shin,* Jin-Ha Hwang* and Hyoungchul Kim*



22809

An extended thiophene chain for Ni-based porphyrin derivatives enabling a high potential and long cycle life for electrochemical charge storage

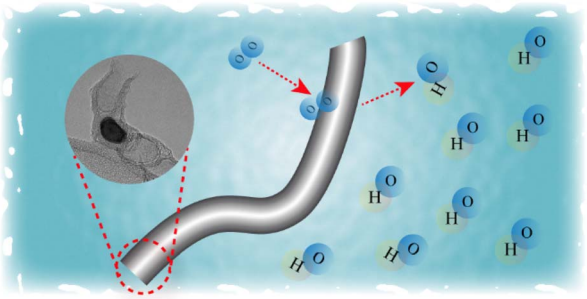
Jiahao Zhang, Chao Ye, Yangmei Zhou, Caihong Sun, Tianfu Li, Xi Peng, Xiujuan Sun, Binhua Chen, Zhi Chen* and Ping Gao*



22820

Substrate-free growth of N-doped bamboo tube morphology on CoNi alloy nanoparticles as an electrocatalyst for anion exchange membrane fuel cells

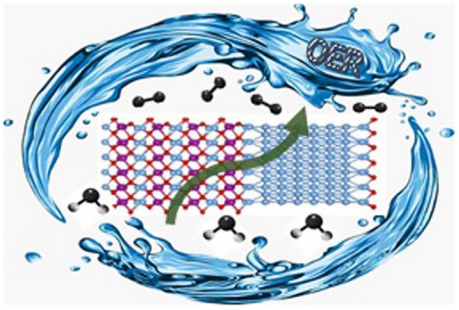
Anil Kumar U. and Vishal M. Dhavale*



22832

Robust nanoporous NiMn oxide electrocatalysts for the oxygen evolution reaction through defect engineering

Arpit Thomas, Ambrish Kumar, Ram K. Sharma, Edgar C. Buck, Bharat Gwalani, Meha Bhogra* and Harpreet Singh Arora*



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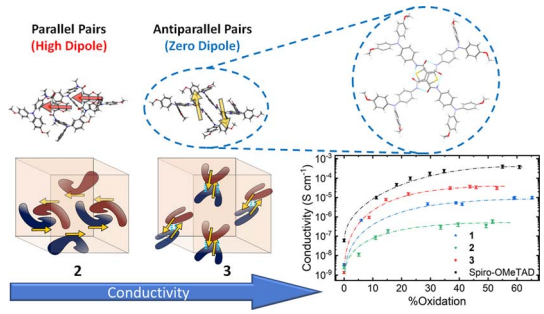
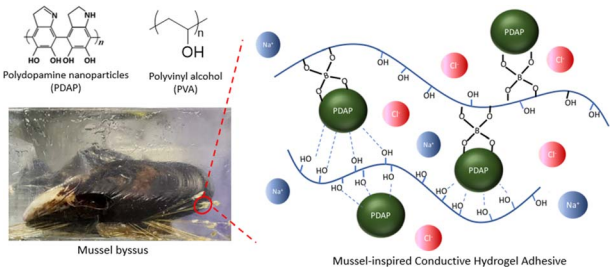
22844



Overcoming the mobility penalty introduced by dipole disorder in small-molecule HTM films

Benjamin Vella, Miriam H. Fsadni, Thomas Pope, Marcin Giza, Fraser J. Angus, Ivan Shmarov, Paula L. Lalaguna, Michele Cariello, Claire Wilson, Malcolm Kadodwala, Thomas J. Penfold,* Pablo Docampo* and Graeme Cooke*

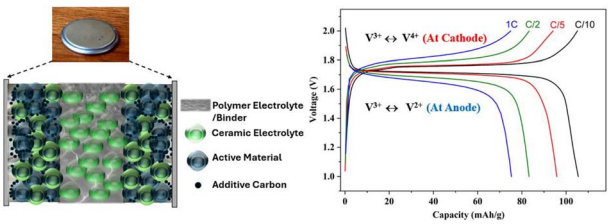
22859



Mussel-inspired sticky self-healing conductive hydrogels composites for physiological electrical sensing

Ming-Lin He, Nai-Feng Chen, Pei Xiang Wang, Hsin-Ya Chen, Wan-Yi Lai, Pei-Tun Liao, Jiashing Yu, Yang Wei, Ren-Jei Chung, Chun-Hsien Hsu, Shiu-Jau Chen,* Ting-Ting Chang* and Wen-Ya Lee*

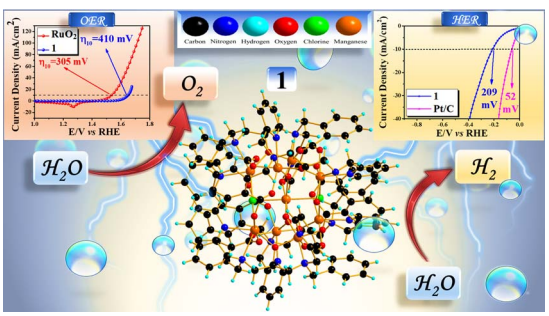
22867



A dual aliovalent ion doped NASICON ceramic filler embedded in the PEO–NaTFSI polymer matrix for high-performance solid-state sodium-ion batteries

Sushmita Dwivedi, Sudharshan Vasudevan and Palani Balaya*

22883



A mixed-valent nonanuclear [$Mn_5^{II}Mn_4^{III}$] molecular cluster with cubic topology of highest symmetry as a bifunctional electrocatalyst for efficient water splitting

Chandan Sarkar, Tapan Sarkar, Aditi De, Nityananda Dutta, Julia Kłak, Allen G. Oliver, Ranjay K. Tiwari, J. N. Behera, Subrata Kundu* and Manindranath Bera*

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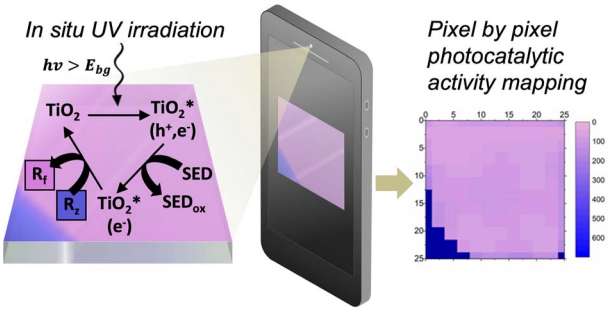
22905

Surface mapping of photocatalytic activity in heterogeneous TiO_2 films

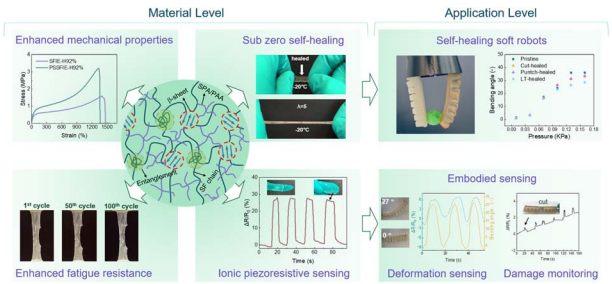
Roxy Lee, Seonghyeok Park, Sanjayan Sathasivam, Andrew Mills, Ivan P. Parkin, Robert G. Palgrave* and Raul Quesada-Cabrera*



22914

Sub-zero self-healable and fatigue-resistant conductive ionoelastomers for sensorized soft pneumatic robots

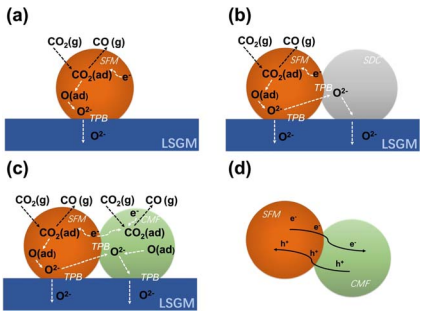
Yang Wang,* Zhanwei Wang, Fatma Demir, Yinxin Cai, Zijin Liu, Jing Ren, Guy Van Assche, Shengjie Ling,* Bram Vanderborght* and Seppe Terryn



22924

Composite of perovskite and fluorite fuel electrodes for efficient carbon dioxide electrolysis in solid oxide electrolyzer cells

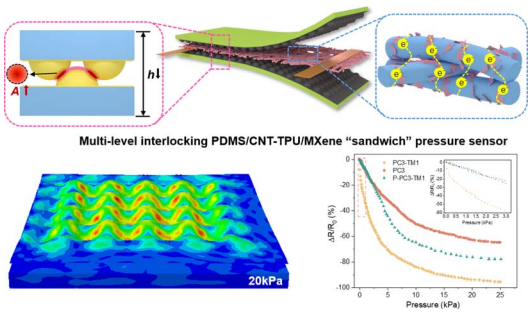
Hao-Yang Li and Pei-Chen Su*



22931

High-performance flexible piezoresistive pressure sensor based on multi-layer interlocking microstructures

Meng Wang,* Gongdong Wang,* Mingyang Zheng, Lei Liu, Chengyang Xu, Zhendong Liu and Long He



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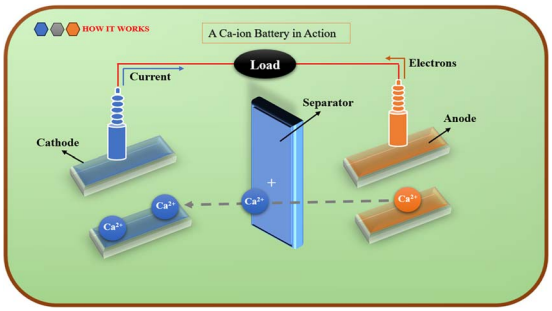
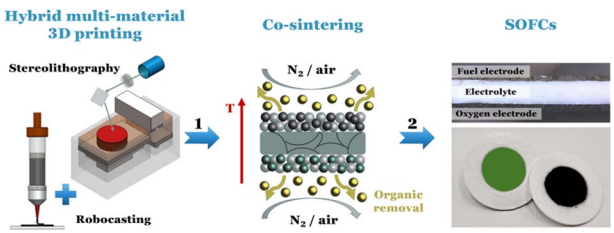
22945



Exploring the potential of MB_4 (M = Cr, Mo, and W) MBenes as high-capacity anode materials for Ca-ion batteries: a DFT approach

M. Kashif Masood, Jing Wang,* Juntao Song and Ying Liu

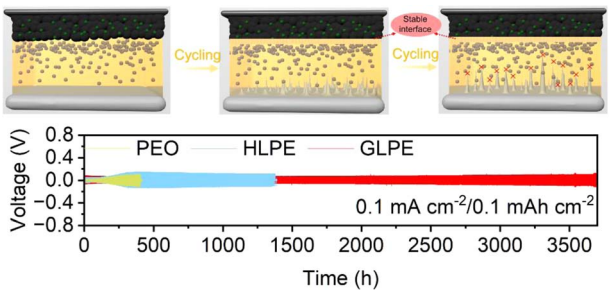
22960



Single-step fully 3D printed and co-sintered solid oxide fuel cells

Natalia Kostretsova, Arianna Pesce, Simone Anelli, Marc Nuñez, Alex Morata, Federico Smeacetto, Marc Torrell and Albert Tarancón*

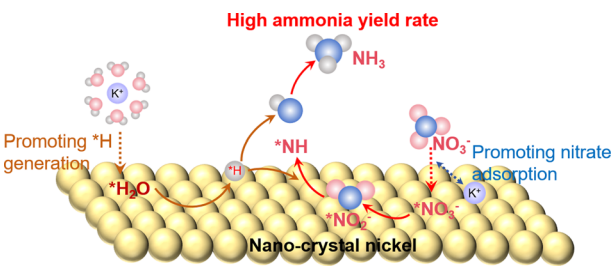
22971



Enabling interfacially compatible and high-voltage-tolerant lithium metal batteries with gradient composited solid-state electrolytes

Honggang He, Jing Shang, Shanshan Li, Chunyan Cao, Haifeng Zhang, Wei Zhang,* Hui Liu, Yu Feng, Ruiqing Li, Shi Chen, Bin Fei* and Mingzheng Ge*

22981



Promoting effects of potassium on ammonia production from electrochemical nitrate reduction over nano-crystal nickel

Chunxia Zhang, Zhengying Xue, Yong Jiang, Yunpu Zhai, Changsen Zhang, Juexiu Li and Panpan Liu*

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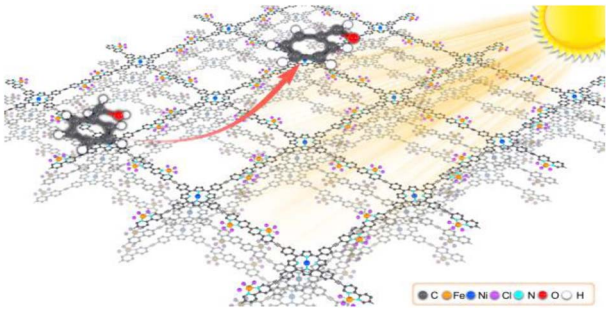
22990

Integrating NiFe bimetal sites into a conjugated microporous polymer for boosting photocatalytic selective aromatic alcohol oxidation

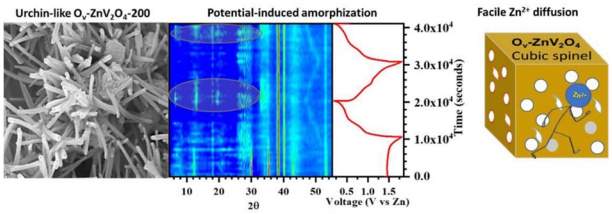
Shien Guo,* Zhen Yu, Chao Xu, Zhipeng Wang, Wei Tao, Qiaoya Tang, Zhenghui Liu and Yuting Xiao*



22998

Carbothermal reduction-induced oxygen vacancies in spinel cathodes for high-performance aqueous zinc-ion batteries

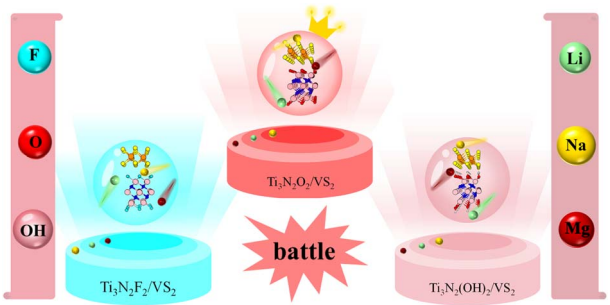
Saheb Bag, Venkata Surya Kumar Choutipalli, Abhirup Bhadra, Kevin L. Shuford, Dipan Kundu and C. Retna Raj*



23008

Insights into $Ti_3N_2T_2/VS_2$ (T = F, O, OH) heterostructures as innovative anode materials for lithium/sodium/magnesium-ion batteries

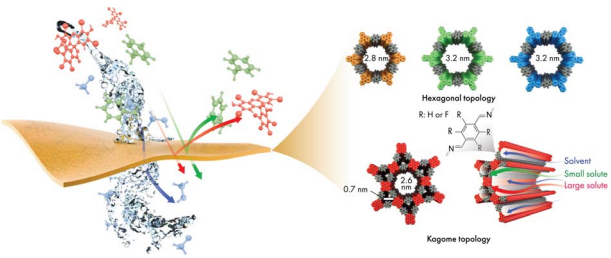
Feng-Ming Ma, Xiao-Meng Zhao, Han-Bai Luo, Chun-Liang Shang, Hui-Min Gao and Xiao-Lin Wang*



23023

Fluorinated 2D conjugated porous organic polymer films with modular structural topology for controlled molecular sieving

Jessica Gayle, Rifan Hardian, Galio Guo, Xu Wang, Muhammad M. Rahman, Rafael Verduzco, Robert Vajtai, Pulickel Ajayan,* Soumyabrata Roy* and Gyorgy Szekely*



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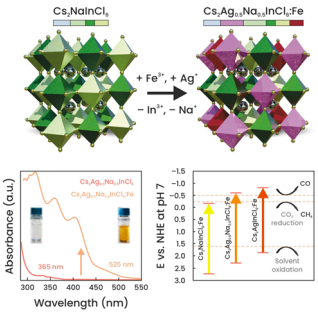
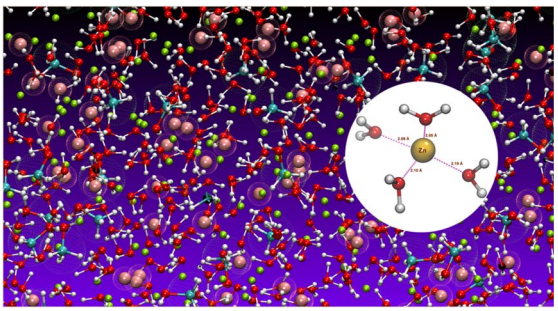
23035



Band engineering in iron and silver co-doped double perovskite nanocrystals for selective photocatalytic CO_2 reduction

Razi Ahmad,* Yu Zhang, Jan Navrátil, Piotr Błoński, Lukáš Zdražil, Sergii Kalytchuk, Alberto Naldoni,* Andrey L. Rogach, Michal Otyepka, Radek Zboril* and Štěpán Kment*

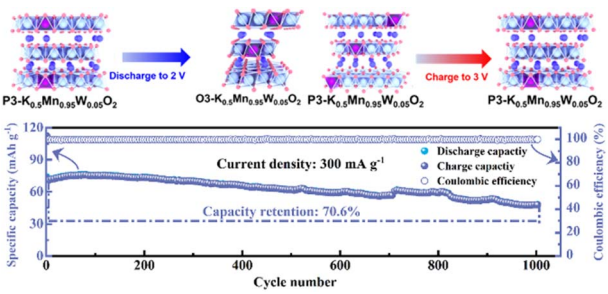
23049



Assessing the impact of an antisolvent-regulated $ZnCl_2$ water-in-salt electrolyte on solvation structure: a multiscale computational validation for aqueous Zn-ion battery application

Asis Sethi, Chaithra Rajeev, Anil Kumar U., Parul Sharma, Anurag Prakash Sunda* and Vishal M. Dhavale*

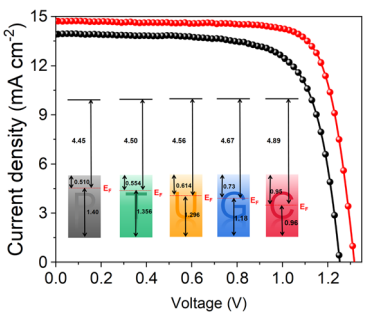
23059



Layer-structured P3-$K_{0.5}Mn_{0.95}W_{0.05}O_2$ for enhanced potassium-ion batteries by mitigating phase transformation

Xuan-Wen Gao, Lu-Kang Zhao, Qi Li, Rui Yang, Zhao-meng Liu and Wen-Bin Luo*

23067



Effective n-type de-doping of perovskite surface *via* defect passivation and improved film crystallization for high-efficiency inorganic solar cells

Hui Li, Jialong Duan,* Naimin Liu, Linzheng Ma,* Jie Dou, Xinyu Zhang, Qiyao Guo, Yuanyuan Zhao, Benlin He and Qunwei Tang*

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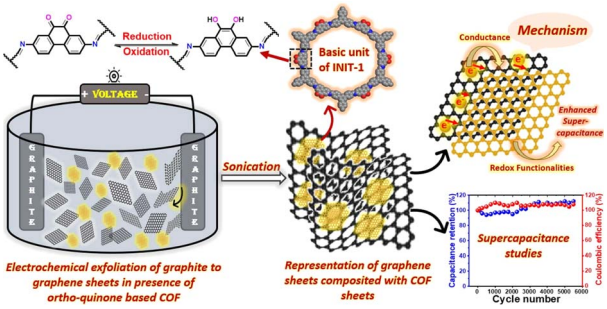
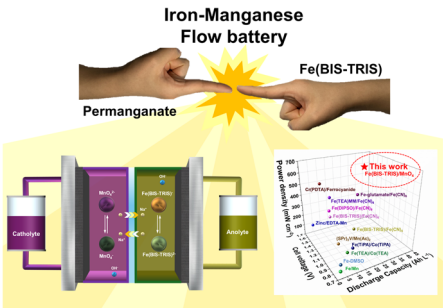
23076

Unveiling the charge storage mechanism of a supercapacitor constructed from an *ortho*-quinone-derived covalent organic framework on electrophoretically exfoliated graphene

Ritika Jaryal, Bharat Bhushan Upreti, Parteek Kumar, Sanjeeb Sutradhar,* Sadhika Khullar,* Ramendra Sundar Dey* and Rakesh Kumar*



23087

Electrochemical performance of permanganate as an active material for catholyte in aqueous alkaline flow batteries

Mingyu Shin, Yejin Lim and Yongchai Kwon*