

Journal of Materials Chemistry A

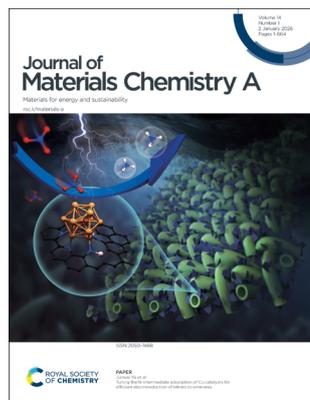
Materials for energy and sustainability

rsc.li/materials-a

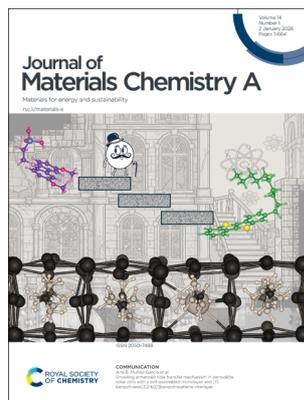
The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

IN THIS ISSUE

ISSN 2050-7488 CODEN JMCAET 14(1) 1–664 (2026)



Cover
See Junwei Ye *et al.*, pp. 394–402. Image reproduced by permission of Junwei Ye from *J. Mater. Chem. A*, 2026, **14**, 394.



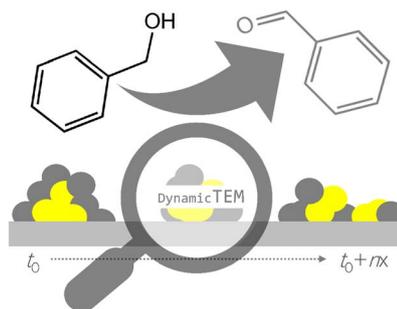
Inside cover
See Ana B. Muñoz-García *et al.*, pp. 313–319. Image reproduced by permission of Ana B. Muñoz-García from *J. Mater. Chem. A*, 2026, **14**, 313. Image generated with AI.

HIGHLIGHT

15

Catalysis in motion: unlocking mechanistic insights with dynamic transmission electron microscopy

Hanggara Sudrajat* and Ari Susanti

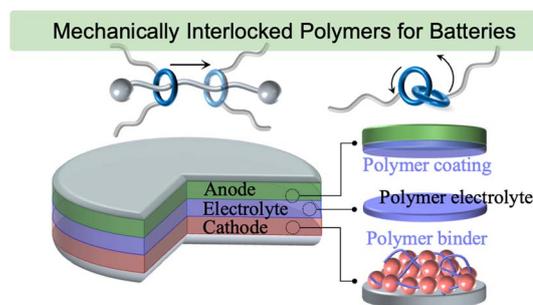


REVIEWS

43

Leveraging battery performance through mechanically interlocked polymers

Yangju Lin,* Mingrui Liang and Ahmed Eldeeb



**GOLD
OPEN
ACCESS**

EES Batteries

**Exceptional research on
batteries and energy storage**

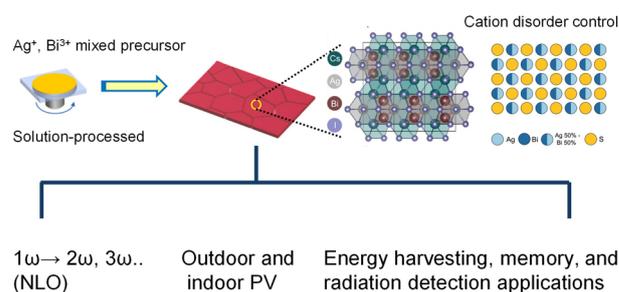
Part of the EES family

**Join
in** | Publish with us
rsc.li/EESBatteries

60

Silver–bismuth perovskite-inspired materials: chemistry, optoelectronic properties, and emerging applications in photovoltaics and beyond

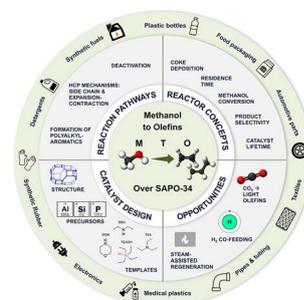
G. Krishnamurthy Grandhi, Noolu. Srinivasa Manikanta Viswanath, Marcello Righetto, Sara Domenici, Mokurala Krishnaiah, Marco Moroni, Adriana Pecoraro, Ana Belén Muñoz-García, Michele Pavone, Lorenzo Malavasi, Teresa Gatti and Paola Vivo*



90

A review of methanol-to-olefins conversion over SAPO-34: catalyst design, mechanisms, and kinetics

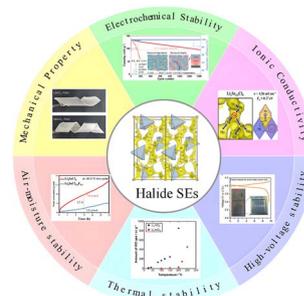
Ralph Al Hussami, Mohammad Ghavipour, Galal Nasser, Chasty Duah, Shaza Yousef and Jan Kopyscinski*



180

Halide solid electrolytes: composition tuning, structural design, and performance optimization for all-solid-state lithium batteries

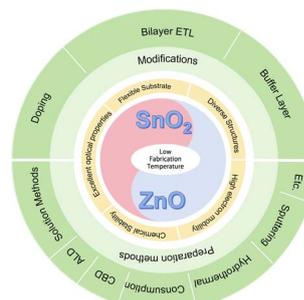
Yinglei Wu,* Guangfu Ge, Sirui Wang, Jinhui Zhu and Xiaodong Zhuang*



221

The application of low-temperature processed metal oxide electron transport layers in flexible perovskite solar cells

Jianghao Tian, Kun Wang, Zhipeng Zhou, Lexiang Zhang, Pu Fan,* Huajing Zheng,* Ding Zheng* and Junsheng Yu*



REVIEWS

255

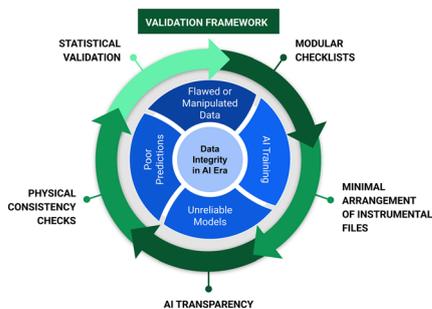


Radiative cooling materials and strategies for suppressing ice melting and enabling passive cold-chain management

Cheng-Yu He, Xu-Yan Xu, Ying-Ying Wu, Ge-Ting Sun, Qi-Sen Wang, Yong-Zhi Zhang, Rui-Ting Gao and Xiang-Hu Gao*

PERSPECTIVES

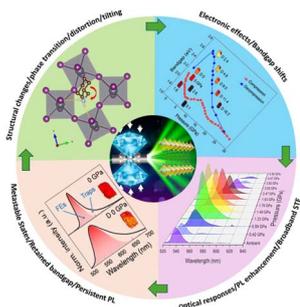
276



Data integrity in materials science in the era of AI: balancing accelerated discovery with responsible science and innovation

Nik Reeves-McLaren* and Sarah Moth-Lund Christensen

284

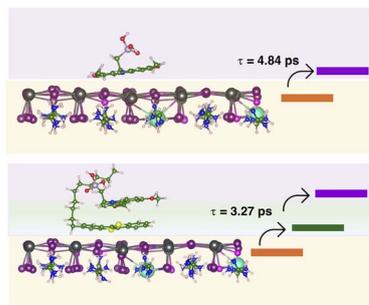


Pressure-tuned 2D hybrid perovskites: emerging insights and future opportunities

Aditya Kutty and Yang Song*

COMMUNICATIONS

313



Unveiling enhanced hole transfer mechanism in perovskite solar cells with a self-assembled monolayer and [1]benzothieno[3,2-b][1]benzothiophene interlayer

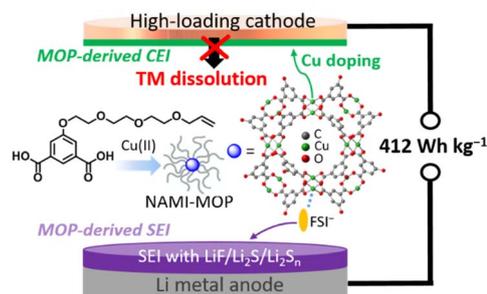
Adriana Pecoraro, Francesca Fasulo, Michele Pavone, Aldo Di Carlo and Ana B. Muñoz-García*



320

Stabilizing electrode–electrolyte interphases using soluble metal–organic polyhedra for high-performance lithium metal batteries

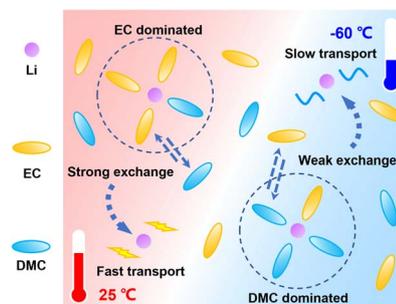
Yan-Lung Wong,^{*} Wei Huang, Cuili Zhang, Lang Wang, Shengbo Lu^{*} and Chenmin Liu^{*}



329

The mechanism of Li-ion transport in carbonate-based electrolytes

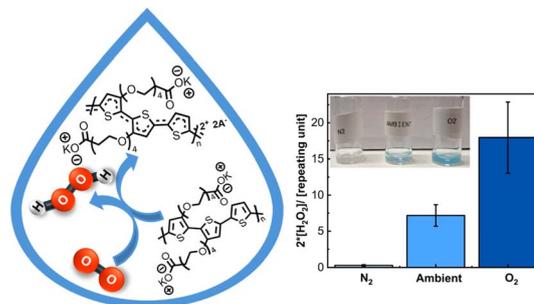
Junyu Huang, Tao Wang, Hongjin Li, Yuechao Wu, Shu Li, Bin Kan and Tianying Yan^{*}



337

Autonomous aqueous H₂O₂ production with a carboxylate-functionalized polythiophene

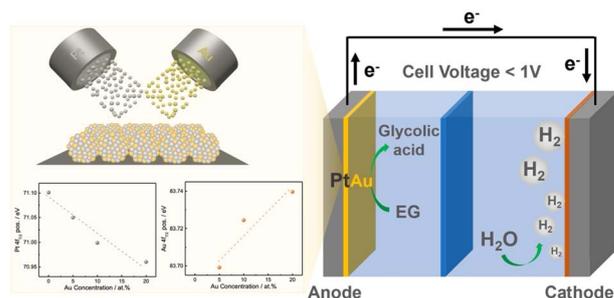
Cecilia Bruschi,^{*} Asaminew Yerango Shimolo, Johanna Heimonen, Qilun Zhang, Mats Fahlman, Mikhail Vagin and Renee Kroon^{*}



343

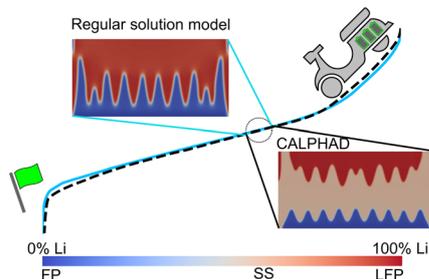
Effective and selective ethylene glycol electrooxidation with compositionally controlled Pt–Au bimetallic electrocatalysts

Hui Luo,^{*} Xianxian Xie, Jiamin Sun, Shaohui Guo and Ivan Khalakhan^{*}



348

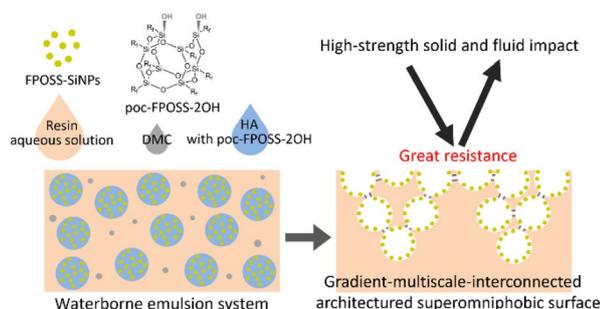
Thermodynamic driving forces stabilize an intermediate phase



Consecutive intra-particle phase transitions in the LiFePO₄ battery electrode material

Souzan Hammadi, Nana Ofori-Opoku, Daniel Brandell and Peter Broqvist*

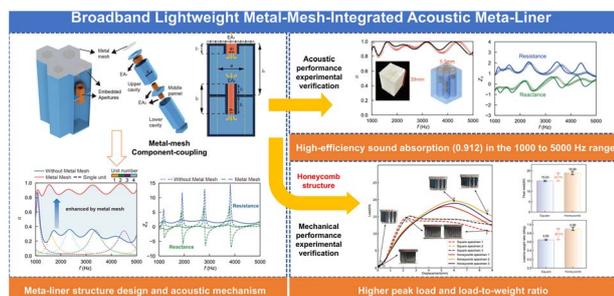
354



Gradient-multiscale-interconnected architectures enable waterborne superomniphobic surfaces to resist the high-strength impact of solids and fluids

Fang Suo, Boxu Chen, Zhenqiang Lin, Xin Yan, Yinglei Zhai, Jinyi Zhong and Jingwen Liao*

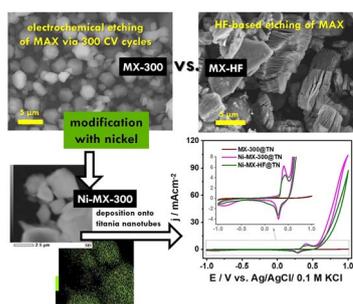
361



Broadband lightweight metal-mesh-integrated acoustic metaliner

Yujie Cheng, Hua Ding, Yilong Yang, Nengyin Wang, Tongwei Lu, Kai Zhang, Yabin Jin* and Yong Li*

372

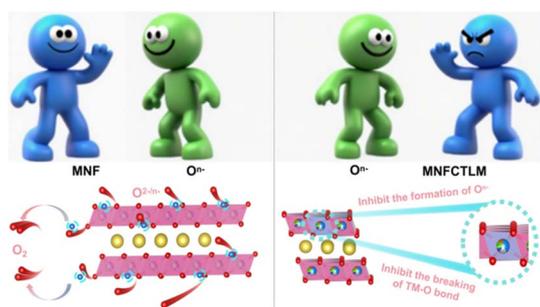


Electrocatalytic activity of 1D/3D TiO₂ tubular layers/ Ni-modified MXene microsphere heterojunction electrodes

Dujearic-Stephane Kouao,* Agnieszka Kramek, Justyna Gumieniak, Karol Załęski, Emerson Coy, Jakub Karczewski, Guowei Li and Katarzyna Siuzdak*



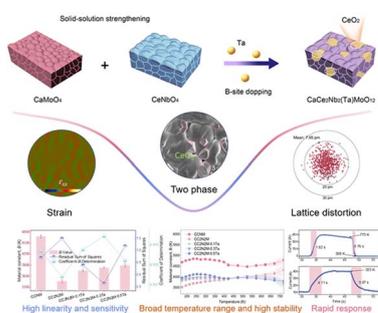
427



Synergistic high-entropy engineering in biphasic layered oxides enables high-rate sodium-ion cathodes

Jing Sun, Cailing Liu,^{*} Hongbo Huang,^{*} Xiaohong Liu, Meilan Xie, Lingling Liu, Juntong Huang, Dui Ma, Huan Liu, Peixun Xiong and Xiao Liang^{*}

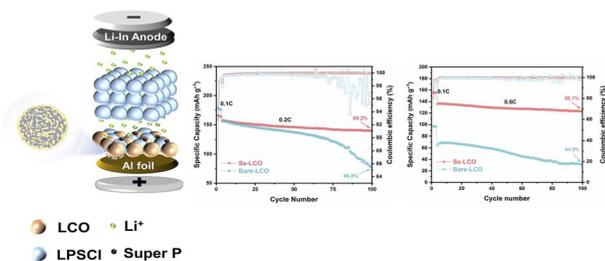
441



Multiscale structural regulation enables ultra-rapid and stable high-temperature sensing in fergusonite ceramics

Hao Sun, Ruifeng Wu, Yafei Liu, Jia Chen, Jianan Xu, Xia Huang, Aimin Chang and Bo Zhang^{*}

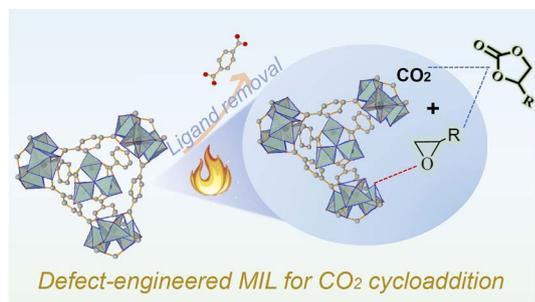
452



Construction of a self-sacrificing selenium interfacial coating and its performance in all-solid-state lithium-ion batteries

Simin You, Minghao Zhang, Jingting Yang,^{*} Zeheng Li,^{*} Zhan Lin and Jun Lu^{*}

460



Defect-engineered MIL-101(Cr) via facile low-temperature calcination for efficient CO₂ cycloaddition under mild conditions

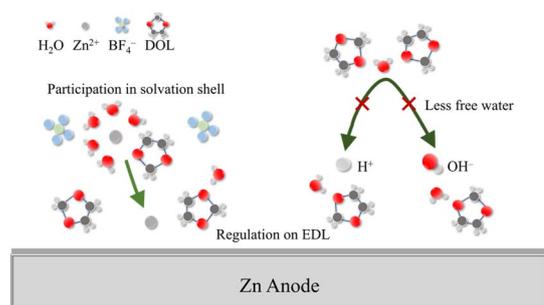
Ziyang Xu, Zicheng Yang, Jiale Ni, Yi Feng^{*} and Jianfeng Yao^{*}



468

Water-modulated electrolyte enables the development of advanced low-temperature Zn-ion batteries

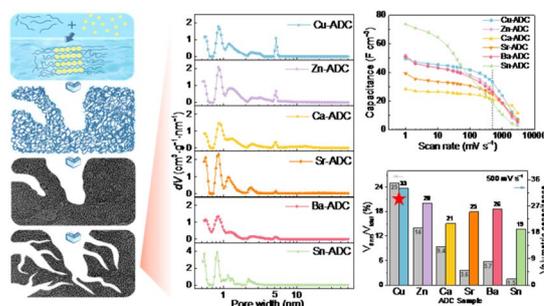
Yilong Zhu, Xun Zhao, Yanzhang Zhao, Qianru Chen, Junnan Hao* and Yan Jiao*



476

Metal-ion mediated mesopore engineering in hierarchical porous carbons for enhanced high-rate volumetric capacitance

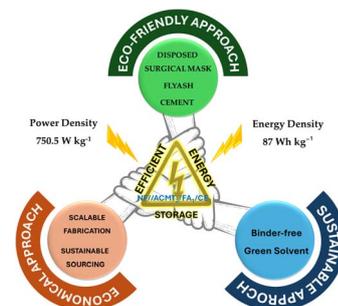
Jie Du, Xinkun Zhao, Xin Chen, Tianxiang Sun, Bona Dai, Jiabin Li, Tangming Mo, Bo Cui,* Qinglei Liu* and Di Zhang



487

Activated carbon microtube electrodes with cement and fly ash for enhanced supercapacitor performance

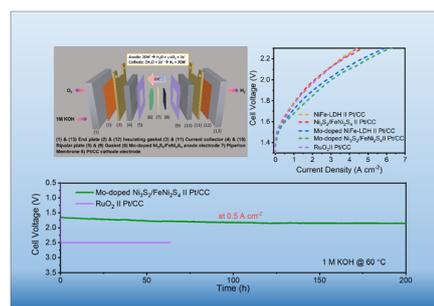
S. Nagarani, Jih-Hsing Chang,* Mohanraj Kumar, Krishnan Vancheeswaran Prasad and Raman Arunpandian



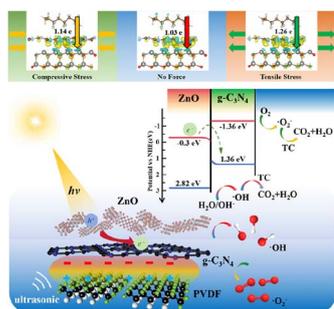
506

Interfacial engineering of Mo-doped Ni₃S₂/FeNi₂S₄ heterostructures for durable industrial level-current-density AEM water electrolysis

Komal Patil, Jiyeon Lee, Daim Choi, Ruturaj Jadhav, Yujin Cho, Sujin Kwon, Nochang Park, Tae Kyung Lee,* Dong-Won Kang* and Jongsung Park*



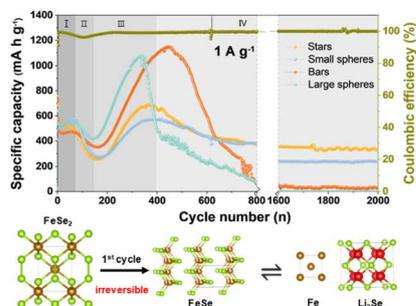
521



Boosting piezo-photocatalytic performance in antibiotic wastewater treatment through graphitic carbon nitride–zinc oxide based heterojunction engineering

Jiajun Li, Bing Yang, Ran Deng, Tingting Yu,* Tao Yang, Wenbin Chen and Jizhou Jiang*

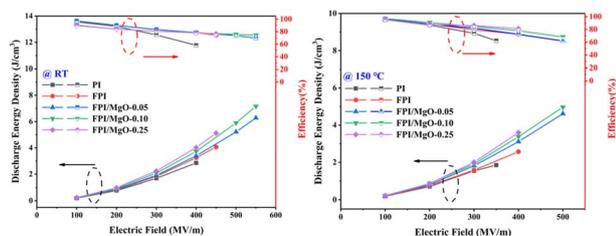
536



Morphology and facet effects on the charge and discharge mechanisms in FeSe₂-based lithium-ion storage

Chih-Hsueh Li, Yu-Bo Hung, Bo-Hao Chen, Vandana Meena, Wei-Cheng Chu, Hsing-Yu Tuan* and Michael H. Huang*

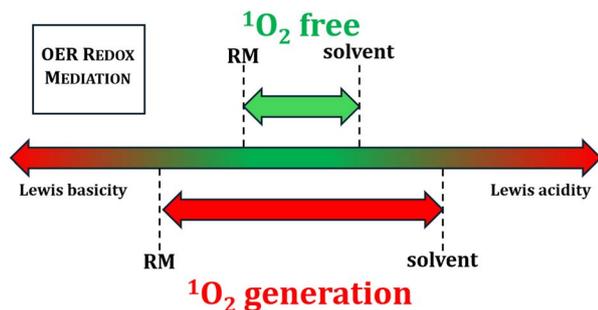
548



Polymer dielectrics enabled by molecular engineering design and charge trap regulation for high-temperature energy storage

Guangyu Duan,* Fengying Hu, Yiran He, Zuming Hu, Ming Tian and Junwei Zha

560



Deciphering the role of LiBr as a redox mediator in Li–O₂ aprotic batteries

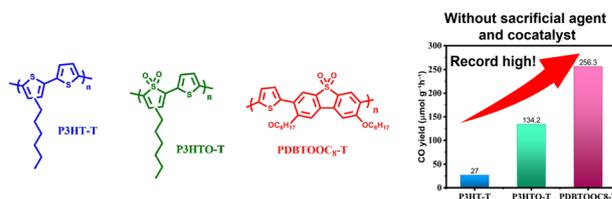
Angelica Petrongari, Lucrezia Desiderio, Adriano Pierini, Enrico Bodo, Mauro Giustini and Sergio Brutti*



570

Novel soluble sulfonyl-containing conjugated polymers as highly efficient photocatalysts for CO₂ reduction reaction

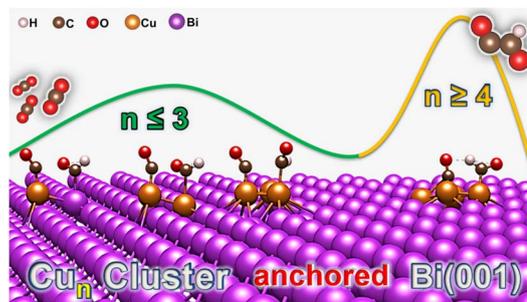
Cai Cheng-Wei, Kuang-Hao Cheng, Palraj Ranganathan, Kuei-Jhong Lin, Ching-I. Huang, Kun-Han Lin, Jyh-Chien Chen and Leeyih Wang*



582

Cu cluster-anchored bismuthene promoting electrocatalytic reduction of CO₂ into C₂ products: a theoretical study

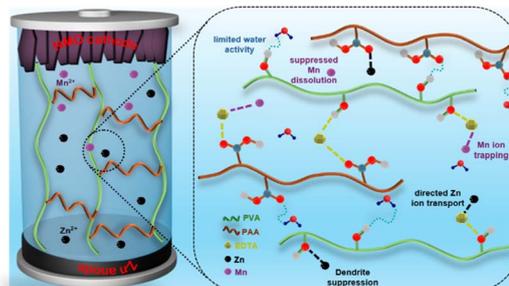
Mengting Zhou, Hongxia Liu, Juntao Yan, Huiping Zhao, Rong Chen* and Lei Liu*



590

Chelating additive enabled dual-action hydrogel polymer electrolyte: suppressing dendrite formation and crosstalk in aqueous rechargeable zinc metal batteries

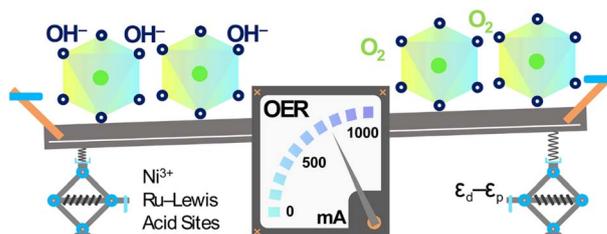
Athira Babu, Fazeela Noushad Femina, Swati Dilwale, Gopinadhanpillai Gopakumar and Sreekumar Kurungot*



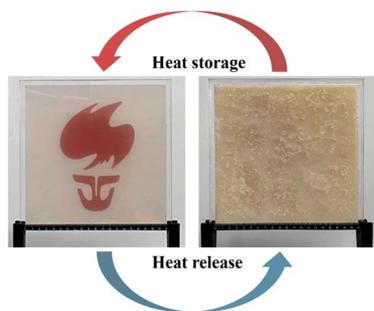
603

Orchestrating the d-band and p-band centroids with local Lewis acid sites accelerates O₂ evolution performance in ultralow Ru-doped NiFe LDH

Suvankar Deka, Manju Kumari Jaiswal, Tanmoy Kalita, Kangkon Saikia, Parasmani Rajput, Som Datta Kaushik, Dhruba Jyoti Kalita and Biswajit Choudhury*



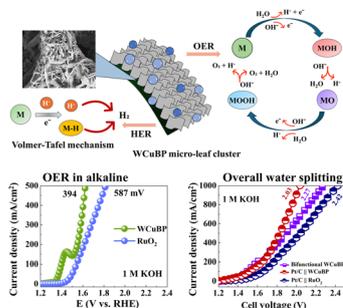
617



Core-ligand modulation alters core–shell coordination to produce stable supercooled phase-change materials for long-term heat storage and release

Yuchen Pan, Tianle Cheng, Rui Hu, Xusheng Zhang, Zeyu Niu, Zeyan Dong, Dong He, Siyuan Tang and Zhubing He*

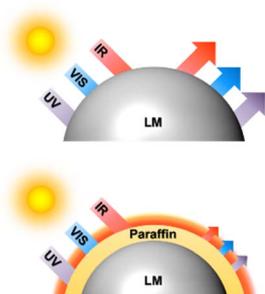
625



An efficient and durable electrocatalyst for electrochemical water splitting: WCuBP micro-leaf-clusters

Sumiya Akter Dristy, Shusen Lin, Shalmali Burse, Md Ahasan Habib, Mehedi Hasan Joni, Md Najibullah and Jihoon Lee*

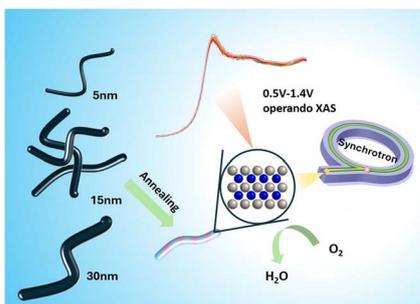
637



Liquid metal eutectic gallium–indium (EGaIn) blended with paraffinic wax for enhanced solar-to-heat conversion

Hyeonmin Jo, Somnath Chowdhury, Chimin Song, Eunju Na, Minjeong Cho, Sung Gu Kang* and Joohyung Lee*

651



Precise diameter control derived intermetallic PtNiCo nanowires: a simple two-step synthesis and operando XAS insight

Kuowei Liao, Weijie Cao, Mukesh Kumar,* Neha Thakur, Mitsuhiro Matsumoto, Toshiki Watanabe, Masashi Matsumoto, Hideto Imai, Tomoya Uruga, Takuma Kaneko, Ryota Sato, Toshiharu Teranishi and Yoshiharu Uchimoto

