

# Journal of Materials Chemistry A

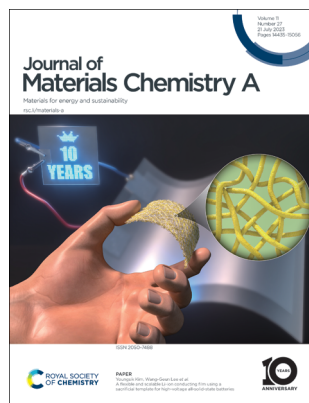
Materials for energy and sustainability

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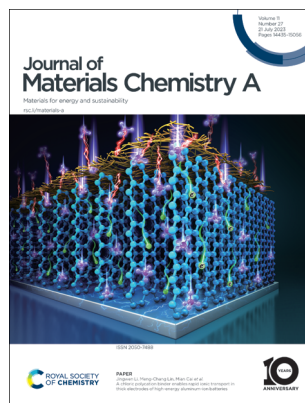
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ISSN 2050-7488 CODEN JMCAET 11(27) 14435–15056 (2023)



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See Youngsik Kim, Wang-Geun Lee *et al.*, pp. 14655–14662. Image reproduced by permission of Wang Geun-Lee from *J. Mater. Chem. A*, 2023, **11**, 14655.



### Inside cover

See Jingwen Li, Meng-Chang Lin, Mian Cai *et al.*, pp. 14646–14654. Image reproduced by permission of Mian Cai from *J. Mater. Chem. A*, 2023, **11**, 14646.

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### Advanced progress of rhenium (Re)-based electrode materials in electrocatalytic hydrogen evolution: a review

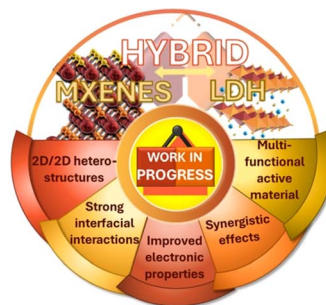
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## Strategic design of covalent organic frameworks (COFs) for photocatalytic hydrogen generation

# Conjugated polymers and small molecules containing the thiophene–vinylene–thiophene (TVT) unit for organic photovoltaic applications

Figure 1. Schematic representation of the primary TVT structure and its derivatives. The diagram shows a central 'TVT' molecule surrounded by four derivatives: FTVT-BI, PCF, Fused-TVT derivatives, and a 'Y'-shaped chain. Each derivative is shown with its chemical structure and a  $PCE_{max}$  value. The entire structure is enclosed in a green oval labeled 'Primary TVT structure'. The background is divided into four quadrants by dashed lines, each containing a legend item: 'Narrow bandgap', 'Tunable molecular packing', 'Strong interactions', and 'High charge transport'.

## Research progress on modified Zn substrates in stabilizing zinc anodes

**Deposition of Zn on metal materials**

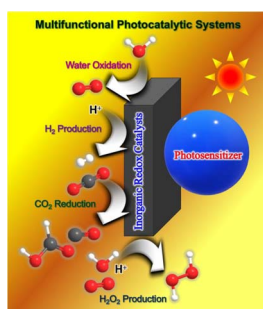
**Zn-based alloying metal materials**

**Construction of protective metal layers on zinc anode surface**

## Transition nickel/cobalt phosphates: an advanced cathode for hybrid supercapacitors

## REVIEWS

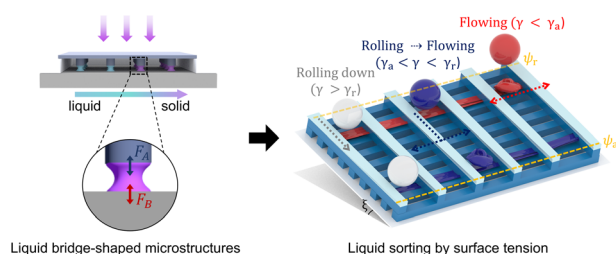
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**Multi-functional photocatalytic systems for solar fuel production**

Young Hyun Hong, Yong-Min Lee,\* Wonwoo Nam\* and Shunichi Fukuzumi\*

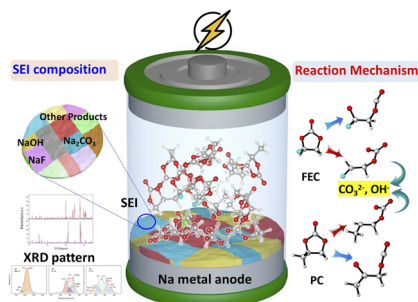
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**Anisotropic wettability manipulation via capturing architected liquid bridge shapes**

Ji Hoon Kim, Jaekyoung Kim, Sohyun Kim, Hyunsik Yoon\* and Won Bo Lee\*

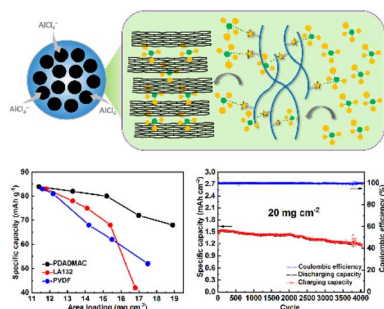
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**Elucidating solid electrolyte interphase formation in sodium-based batteries: key reductive reactions and inorganic composition**

Yue Liu, Qintao Sun, Baitong Yue, Yanyan Zhang and Tao Cheng\*

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**A chloric polycation binder enables rapid ionic transport in thick electrodes of high-energy aluminum-ion batteries**

Jingwen Li,\* Chengyun Ma, Xinle Geng, Yongxiao Tuo, Ruoxuan Sun, Huiping Du, Meng-Chang Lin\* and Mian Cai\*



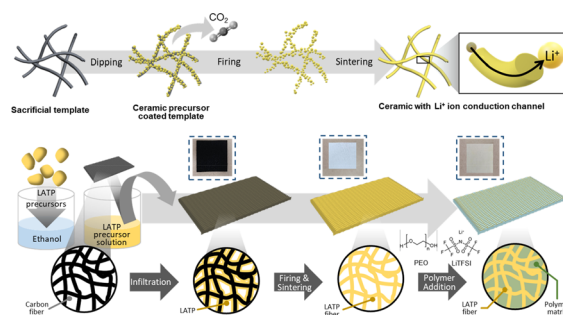


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# A flexible and scalable Li-ion conducting film using a sacrificial template for high-voltage all-solid-state batteries

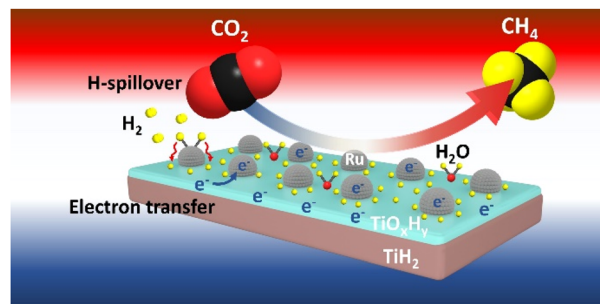
Hyun Woo Kim, Jongwoo Kim, Dowan Kim, Youngsik Kim\* and Wang-Geun Lee\*



14663

# TiH<sub>2</sub>-supported Ru catalyst with unusual electron transfer behaviour for highly efficient carbon dioxide methanation at low temperature

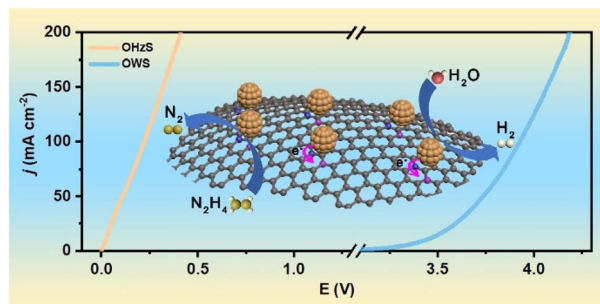
Zhujie He, Huanfeng Huang, Zhuodi Chen, Yuqian Liang, Zhixiang Huang, Shunlian Ning, Lilin Tan, Mihail Barboiu, Dawei Wang\* and Cheng-Yong Su



14674

# Boosting hydrazine oxidation and hydrogen evolution catalysis with anchored Ru clusters by electronically tunable Ru–S–C bonds

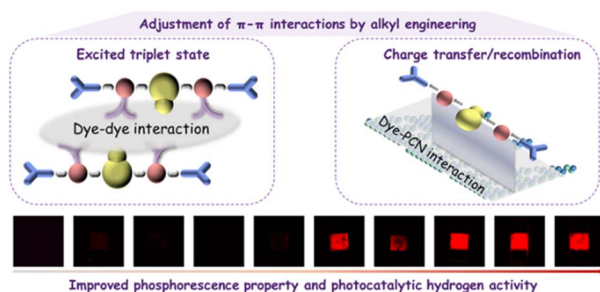
Huakun Zhang, Wentao Wang, Zechuan Dai, Yin Zhu, Mingyu Cheng, Bocheng Zhang, Yafei Feng, Yangyang Zhang and Genqiang Zhang\*



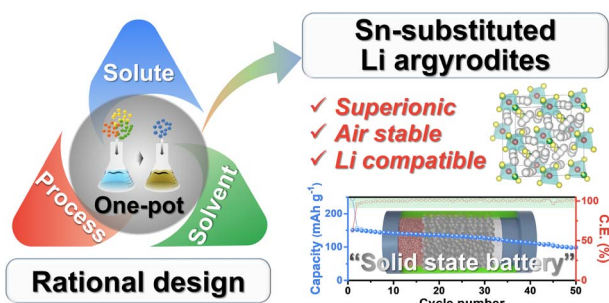
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# Promotion of photocatalytic hydrogen production by utilization of triplet excited states of organic dyes and adjustment of $\pi$ - $\pi$ interactions

Siwei Liu, Qian Chen, YanTing Chen, Peixuan Lin, Hangyu Zhuzhang, Mengmeng Han, Zhi-An Lan,\* Xiong Chen, Xinchun Wang,\* Qianqian Li\* and Zhen Li\*



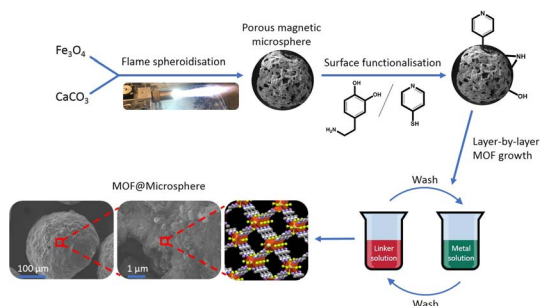
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### Rational design of one-pot solvent-assisted synthesis for multi-functional Sn-substituted superionic Li argyrodite solid electrolytes

Sun Hee Choi, Woong-Ju Kim, Byeong-hyeon Lee, Sung-Chul Kim, Jin Gu Kang\* and Dong-Wan Kim\*

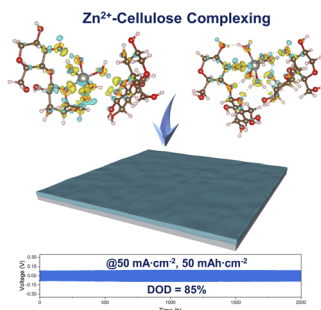
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### Rapid synthesis of magnetic microspheres and the development of new macro-micro hierarchically porous magnetic framework composites

John Luke Woodliffe, Jesús Molinar-Díaz, Md Towhidul Islam, Lee A. Stevens, Matthew D. Wadge, Graham A. Rance, Rebecca Ferrari, Ifty Ahmed and Andrea Laybourn\*

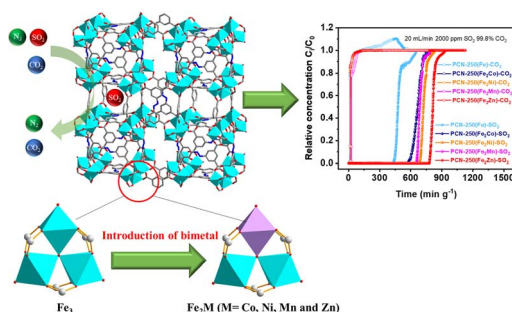
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### Cellulose-complexing strategy induced surface regulation towards ultrahigh utilization rate of Zn

Xin Li, Hong Yao, Yuhang Li, Xiangjie Liu, Du Yuan,\* Yingqian Chen, Ming Wah Wong, Yizhou Zhang\* and Haitao Zhang\*

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### Boosting trace SO<sub>2</sub> adsorption and separation performance by the modulation of the SBU metal component of iron-based bimetal MOFs

Jinze Yao, Zhiwei Zhao, Liang Yu, Jiajin Huang, Shigen Shen, Siyao Zhao, Ying Wu,\* Xiangyang Tian, Jun Wang\* and Qibin Xia\*

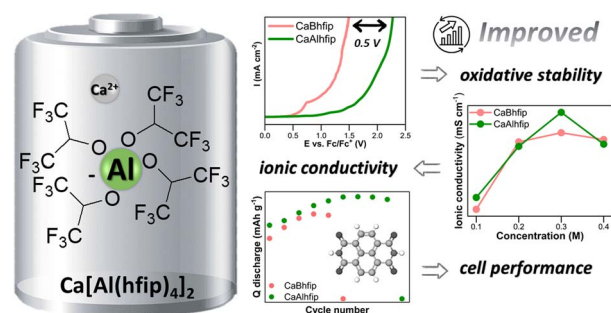


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### A novel calcium fluorinated alkoxyaluminate salt as a next step towards Ca metal anode rechargeable batteries

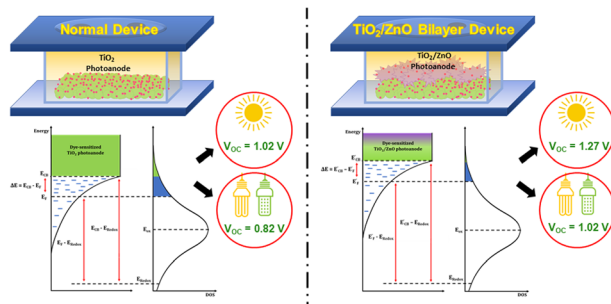
Tjaša Pavčnik, Juan D. Forero-Saboya, Alexandre Ponrouch, Ana Robba, Robert Dominko and Jan Bitenc\*



14748

### Synergetic effect of TiO<sub>2</sub>/ZnO bilayer photoanodes realizing exceptionally high $V_{OC}$ for dye-sensitized solar cells under outdoor and indoor illumination

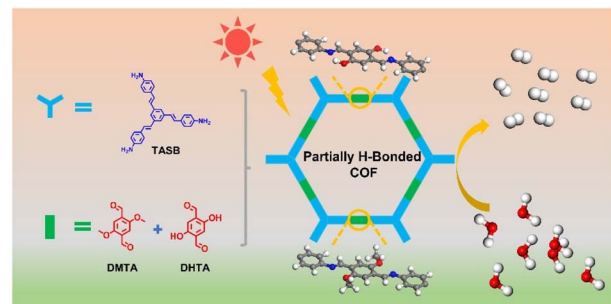
Anooja Jagadeesh, Ganapathy Veerappan, P. Sujatha Devi, K. N. Narayanan Unni and Suraj Soman\*



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### Partially H-bonded covalent organic frameworks for photocatalytic hydrogen evolution

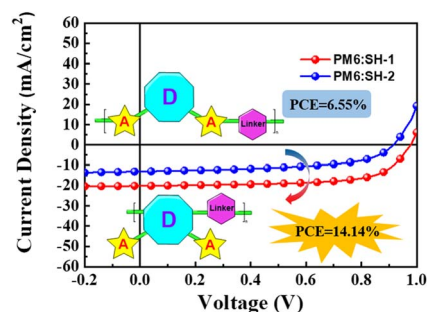
Wenbo Dong, Yueyuan Xiao, Zhiying Qin, Bo Qiao and Longyu Li\*



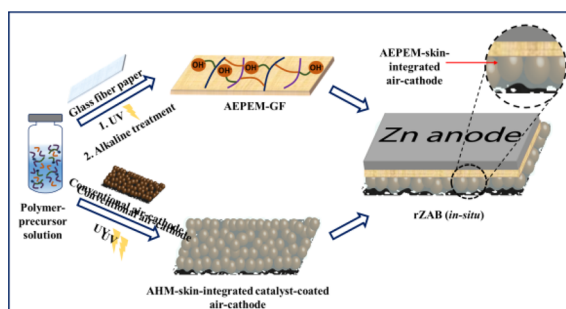
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### A polymer acceptor with grafted small molecule acceptor units for high-efficiency organic solar cells

Yuzhong Huang, Xiaodong Si, Ruohan Wang, Kangqiao Ma, Wendi Shi, Changzun Jiang, Yan Lu,\* Chenxi Li, Xiangjian Wan\* and Yongsheng Chen\*



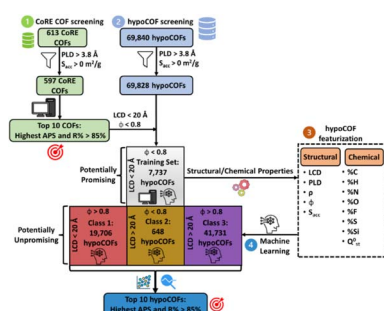
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### Electrode|electrolyte interface enhancement in quasi-solid-state zinc–air batteries through an anion conducting polymer electrolyte interlayer by *in situ* polymerization

Maria Kurian, Vidyanand Vijayakumar, Narugopal Manna, Fayis Kanheerampockil, Suresh Bhat and Sreekumar Kurungot\*

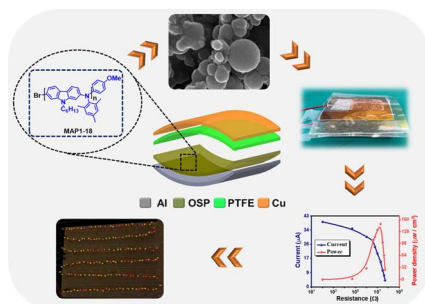
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### Advancing CH<sub>4</sub>/H<sub>2</sub> separation with covalent organic frameworks by combining molecular simulations and machine learning

Gokhan Onder Aksu and Seda Keskin\*

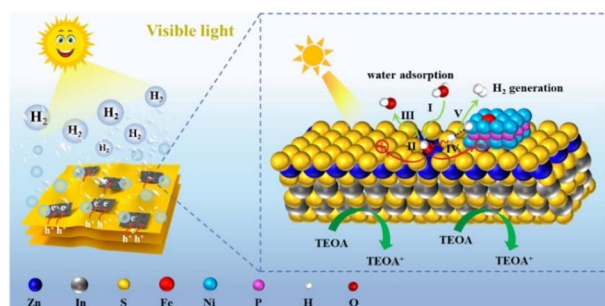
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### Organic semiconductor polymers: a carbazole-based novel tribopositive polymer for energy harvesting with high temperature stability

Rayyan Ali Shaukat, Shahid Ameen, Qazi Muhammad Saqib, Mahesh Y. Chougale, Jungmin Kim, Swapnil R. Patil, Muhammad Noman, Hwan Kyu Kim and Jinho Bae\*

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### Modulating and optimizing 2D/2D Fe–Ni<sub>2</sub>P/ZnIn<sub>2</sub>S<sub>4</sub> with S vacancy through surface engineering for efficient photocatalytic H<sub>2</sub> evolution

Guanqiong Li, Haiou Liang, Xiaoye Fan, Xiaoling Lv, Xingwei Sun,\* Heng-guo Wang\* and Jie Bai\*

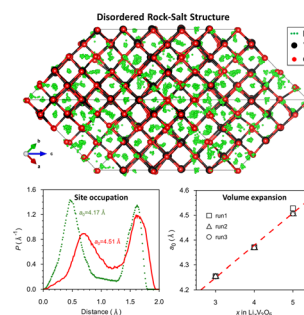




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# First-principles study of the distribution of excess intercalated lithium in $\text{Li}_3\text{V}_2\text{O}_5$ with a disordered rock-salt structure

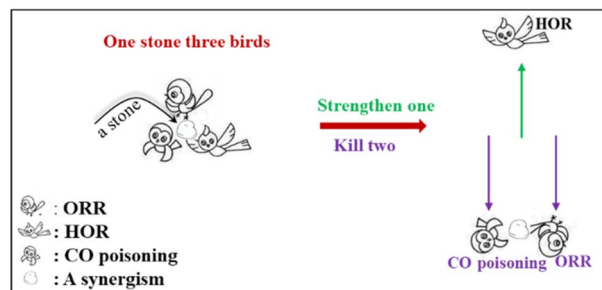
Jing Shi, Aming Lin, Xiaowei Wu, Su-Huai Wei\* and Yi-Yang Sun\*



14826

# "One stone three birds" of a synergetic effect between Pt single atoms and clusters makes an ideal anode catalyst for fuel cells

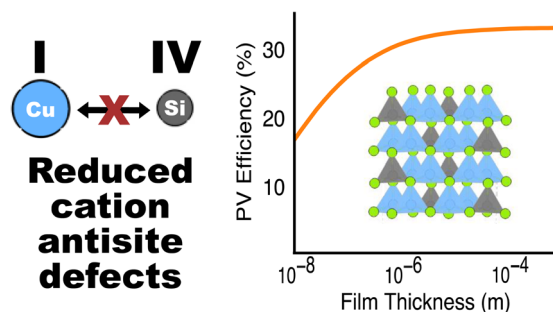
He Li, Xian Wang, Xue Gong, Cong Liu, Junjie Ge, Ping Song\* and Weilin Xu\*



14833

# $\text{Cu}_2\text{SiSe}_3$ as a promising solar absorber: harnessing cation dissimilarity to avoid killer antisites

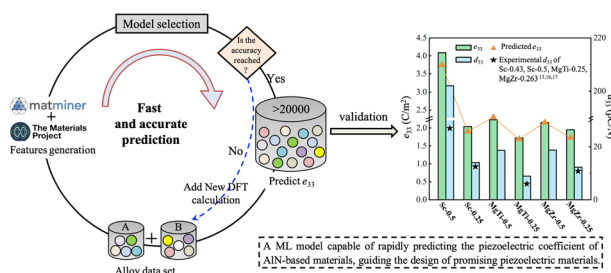
Adair Nicolson, Seán R. Kavanagh, Christopher N. Savory, Graeme W. Watson and David O. Scanlon\*



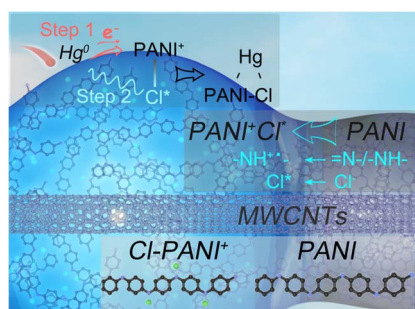
14840

# Machine learning-assisted design of AlN-based high-performance piezoelectric materials

Huirong Jing, Chaohong Guan, Yu Yang and Hong Zhu\*



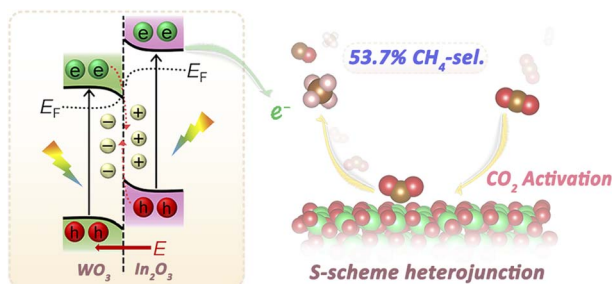
14850



### Spontaneous adsorption–oxidation of gaseous elemental mercury via a conjugated unit $\text{-NH}^+\text{-Cl}^-$ : creation and mechanisms

Zhao Ma, Runlong Hao,\* Tianxin Liu, Hongming Li, Jianping Yang, Zefeng Zeng, Bo Yuan, Meng Qi and Lidong Wang\*

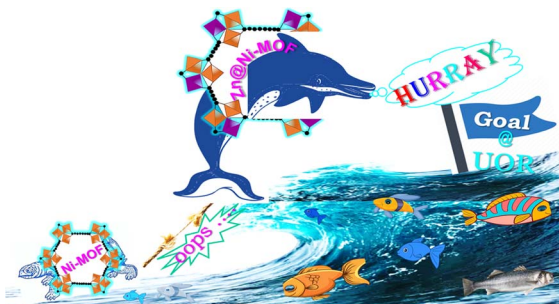
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### Selective conversion of $\text{CO}_2$ to $\text{CH}_4$ enhanced by $\text{WO}_3/\text{In}_2\text{O}_3$ S-scheme heterojunction photocatalysts with efficient $\text{CO}_2$ activation

Ying He, Zhengpeng Yang, Jiaguo Yu, Difa Xu, Chengyuan Liu, Yang Pan, Wojciech Macyk and Feiyan Xu\*

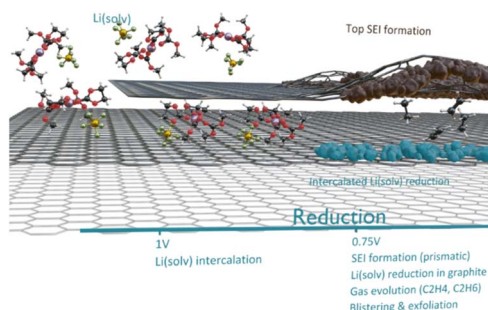
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### Unprecedented urea oxidation on $\text{Zn@Ni-MOF}$ with an ultra-high current density: understanding the competition between UOR and OER, catalytic activity limitation and reaction selectivity

Nabeen K. Shrestha,\* Supriya A. Patil, Amol S. Salunke, Akbar I. Inamdar and Hyunsik Im\*

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### A transient component of the solid electrolyte interphase in the Li-ion battery

Sergey Yu. Luchkin\* and Egor M. Pazhetnov

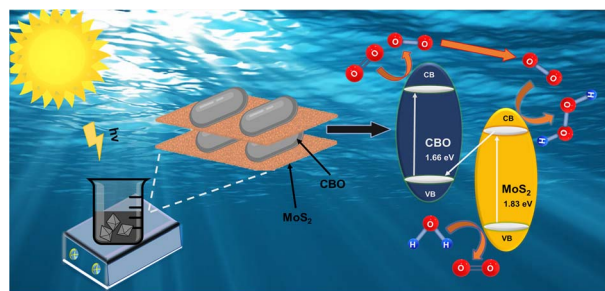


## PAPERS

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# Mechanistic insights into enhanced photocatalytic H<sub>2</sub>O<sub>2</sub> production induced by a Z-scheme heterojunction of copper bismuth oxide and molybdenum sulfide

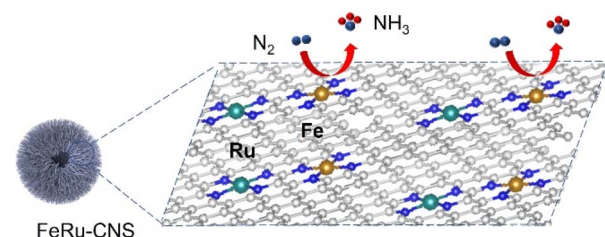
Akshay Tikoo, Nikitha Lohia, Sri Surya Charan Kondeti and Praveen Meduri\*



14900

# An isolated bimetallic Fe–Ru single-atom catalyst for efficient electrochemical nitrogen reduction

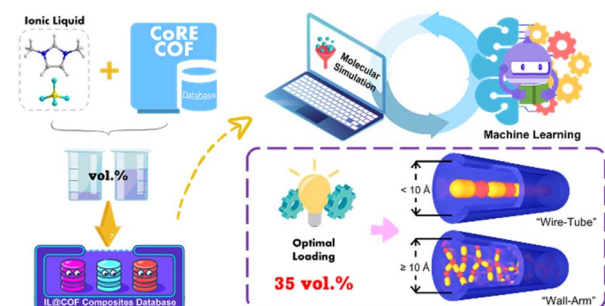
Mengdi Liu, Sai Zhang, Min Chen, Shuxue Zhou and Limin Wu\*



14911

# Machine learning-assisted computational exploration of the optimal loading of IL in IL/COF composites for carbon dioxide capture

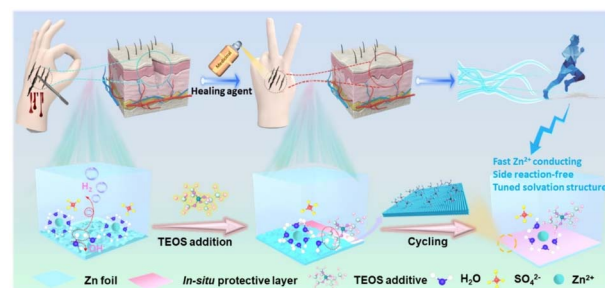
Tongan Yan, Minman Tong,\* Dahuan Liu,\* Qingyuan Yang\* and Chongli Zhong



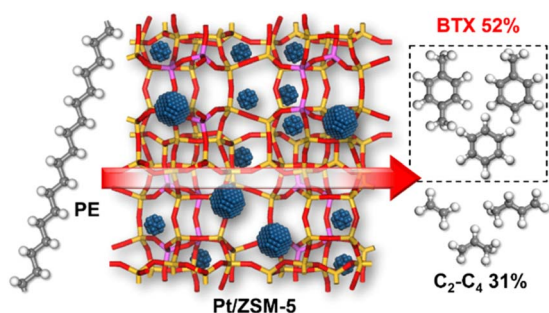
14921

# A bio-inspired electrolyte with *in situ* repair of Zn surface cracks and regulation of Zn ion solvation chemistry to enable long life and deep-cycling zinc metal batteries

Nan Hu, Wensong Lv, Huan Tang, Hongyu Qin, Yuhang Zhou, Li Yi, Dan Huang, Zhenrui Wu, Jian Liu, Zhengjun Chen, Jing Xu\* and Huibing He\*



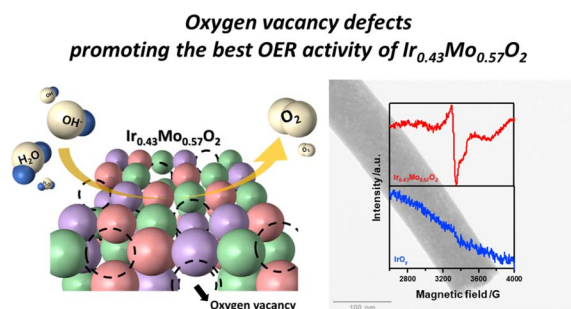
14933



### Catalytic conversion of polyethylene into aromatics with Pt/ZSM-5: insights into reaction pathways and rate-controlling step regulation

Wenjie Wang, Chang Yao, Xiaohu Ge, Xin Pu, Jiangchun Yuan, Weixiao Sun, Wenyao Chen, Xiang Feng, Gang Qian, Xuezhi Duan, Yueqiang Cao,\* Zhirong Yang,\* Xinggui Zhou and Jing Zhang\*

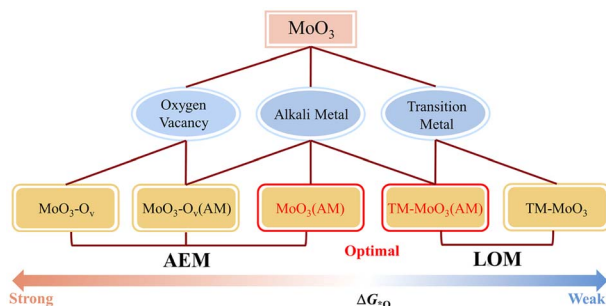
14941



### Oxygen-vacancy rich Ir<sub>x</sub>Mo<sub>1-x</sub>O<sub>y</sub> nanofibers for oxygen evolution reaction: excellent pH-universal and electrolyte-concentration-independent catalytic activity

Sung Hwa Ahn, Dasol Jin, Chongmok Lee and Youngmi Lee\*

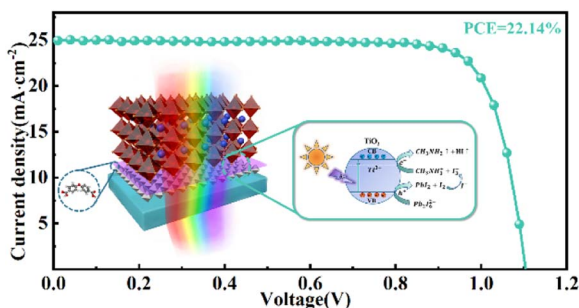
14952



### Structure engineering of MoO<sub>3</sub> breaks the scaling relationship and achieves high electrocatalytic oxygen evolution activity in acidic conditions

Shuhua Wang, Zebin Ren, Shiqiang Yu, Baibiao Huang, Ying Dai\* and Wei Wei\*

14959



### UV-robust and efficient perovskite solar cells enabled by interfacial photocatalysis suppression and defect passivation

Jingwei Zhu, Xumeng Hu, Zhuoyan Liu, Minghuang Guo, Ying Zhang, Yafeng Li,\* Junming Li and Mingdeng Wei\*



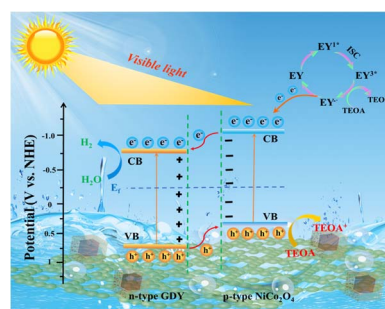


## PAPERS

14971

# Enwrapping graphdiyne ( $g-C_nH_{2n-2}$ ) on hollow $NiCo_2O_4$ nanocages derived from a Prussian blue analogue as a p–n heterojunction for highly efficient photocatalytic hydrogen evolution

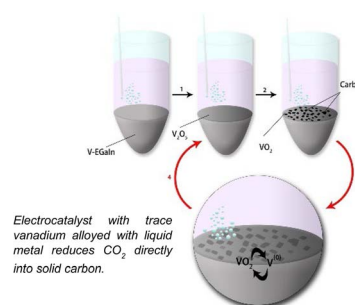
Haiyan Xie, Kai Wang,\* Dingzhou Xiang, Songling Li and Zhiliang Jin\*



14990

# Liquid metal-based catalysts for the electroreduction of carbon dioxide into solid carbon

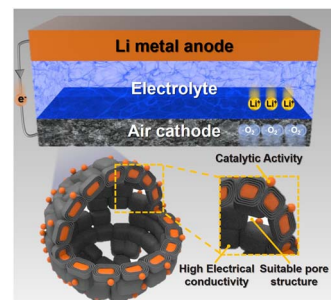
Mehmood Irfan, Karma Zuraiqi, Chung Kim Nguyen, Tu C. Le, Fahad Jabbar, Mariam Ameen, Caiden J. Parker, Ken Chiang, Lathe A. Jones, Aaron Elbourne, Christopher F. McConville, Dan Yang\* and Torben Daeneke\*



14997

# A synthetic strategy for graphitized carbon hollow nanospheres with nano-punched holes decorated with bimetallic selenide as efficient bifunctional electrocatalysts for rechargeable Li–O<sub>2</sub> batteries

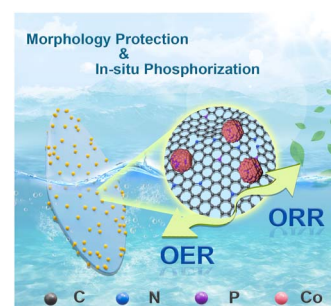
Jeong Hoo Hong, Jin Koo Kim, Dae Soo Jung\* and Yun Chan Kang\*



15006

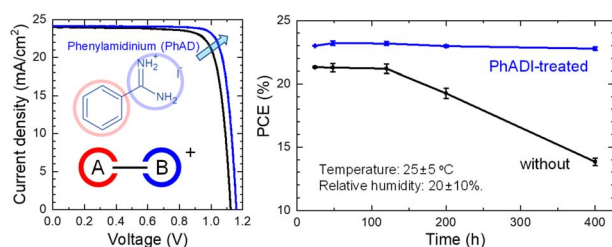
# A one-stone-two-birds strategy to construct metal–organic framework-derived cobalt phosphide as an efficient bifunctional electrocatalyst for oxygen electrode reactions

Hao Pan, Xiao-Li Wang,\* Fayan Li and Qiang Xu\*



## PAPERS

15014



### Effect of functional groups in passivating materials on stability and performance of perovskite solar cells

Jeong-Hyeon Kim, Dong-Ho Kang, Dong-Nam Lee and Nam-Gyu Park\*

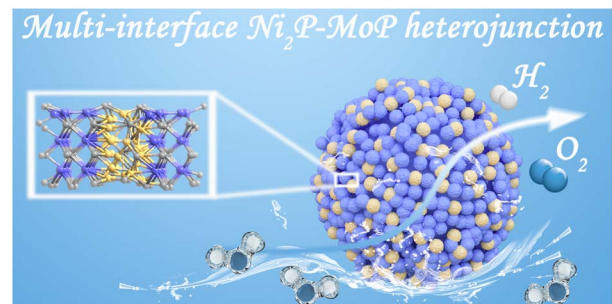
15022



### Tunable thiophene-based conjugated microporous polymers for the disposal of toxic hexavalent chromium

Mohammed G. Kotp, Nagy L. Torad,\* Hiroki Nara, Watcharop Chaikittisilp, Jungmok You, Yusuke Yamauchi,\* Ahmed F. M. EL-Mahdy\* and Shiao-Wei Kuo\*

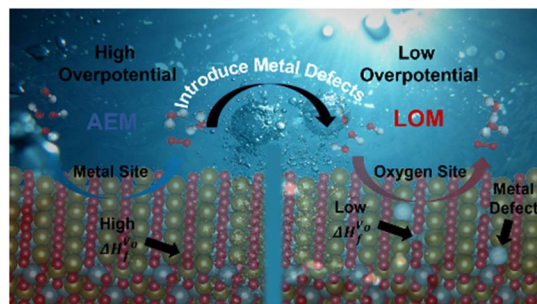
15033



### Multi-interfacial engineering of an interlinked Ni<sub>2</sub>P-MoP heterojunction to modulate the electronic structure for efficient overall water splitting

Wei Zhang, Haijing Yan, Yue Liu, Dongxu Wang, Yanqing Jiao,\* Aiping Wu, Xiuwen Wang,\* Ruihong Wang and Chungui Tian\*

15044



### Boosting oxygen evolution reaction performance via metal defect-induced lattice oxygen redox reactions on spinel oxides

Jingxuan Zheng, Rui Sun, DaPeng Meng, Junxin Guo and Zhao Wang\*

