

# Energy & Environmental Science

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## IN THIS ISSUE

ISSN 1754–5706 CODEN EESNBY 16(7) 2709–3168 (2023)



### Cover

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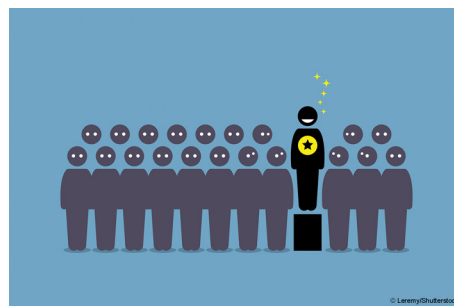
### Inside cover

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## EDITORIAL

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### Outstanding Reviewers for *Energy & Environmental Science* in 2022

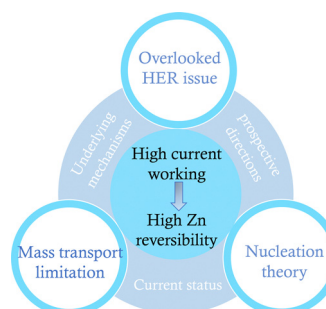


## OPINION

2723

### High reversibility at high current density: the zinc electrodeposition principle behind the “trick”

Yang Yang, Huijun Yang,\* Ruijie Zhu and Haoshen Zhou\*



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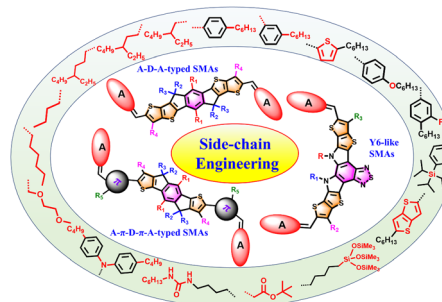


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## Side-chain engineering of nonfullerene small-molecule acceptors for organic solar cells

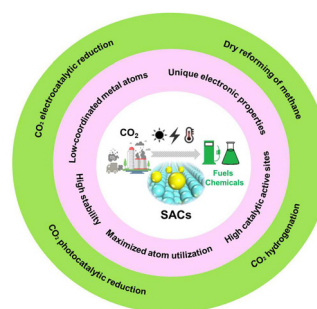
Zhenghui Luo,\* Tongle Xu, Cai'e Zhang and Chuluo Yang\*



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Recent advances of single-atom catalysts in CO<sub>2</sub> conversion

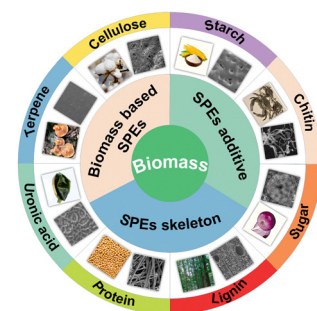
Shunwu Wang, Ligang Wang, Dingsheng Wang and Yadong Li\*



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## Designing biomass-integrated solid polymer electrolytes for safe and energy-dense lithium metal batteries

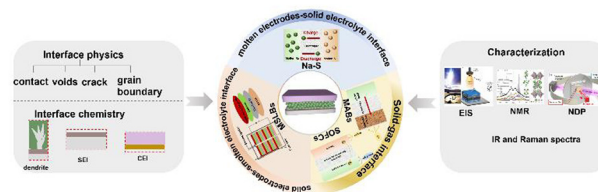
Ouwei Sheng,\* Chengbin Jin,\* Tao Yang, Zhijin Ju, Jianmin Luo and Xinyong Tao\*



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## Electrode/electrolyte interphases in high-temperature batteries: a review

Yanli Zhu, Wei Li, Lan Zhang, Wenhao Fang, Qingin Ruan, Jin Li, Fengjie Zhang, Haitao Zhang, Ting Quan\* and Suojang Zhang\*



## PERSPECTIVE

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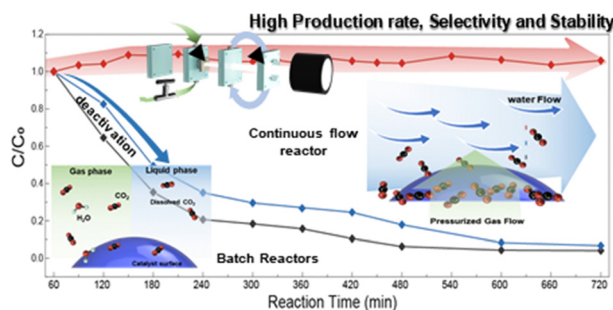


## Cathode regeneration and upcycling of spent LIBs: toward sustainability

Xiang Xiao, Li Wang,\* Yingqiang Wu, Youzhi Song, Zonghai Chen\* and Xiangming He\*

## COMMUNICATION

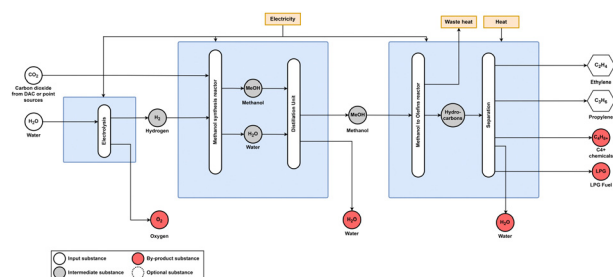
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Continuous-flow reactor with superior production rate and stability for CO<sub>2</sub> reduction using semiconductor photocatalysts

Hyunju Jung, Chansol Kim, Hae-Wook Yoo, Jei You, Jin Seog Kim, Aqil Jamal, Issam Gereige, Joel W. Ager\* and Hee-Tae Jung\*

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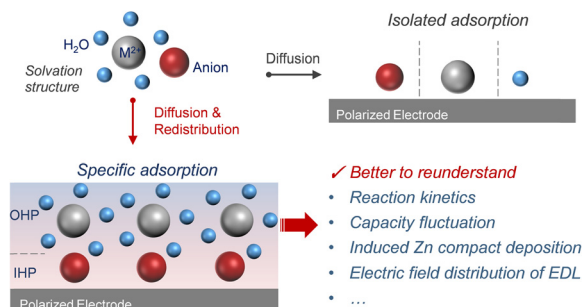
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## From fossil to green chemicals: sustainable pathways and new carbon feedstocks for the global chemical industry

Gabriel Lopez,\* Dominik Keiner, Mahdi Fasihi, Tuomas Koironen and Christian Breyer

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## Reunderstanding aqueous Zn electrochemistry from interfacial specific adsorption of solvation structures

Hang Yang, Duo Chen,\* Ruizheng Zhao, Gaoyang Li, Hao Xu, Li Li, Xin Liu, Guangshe Li, Dongliang Chao and Wei Han\*

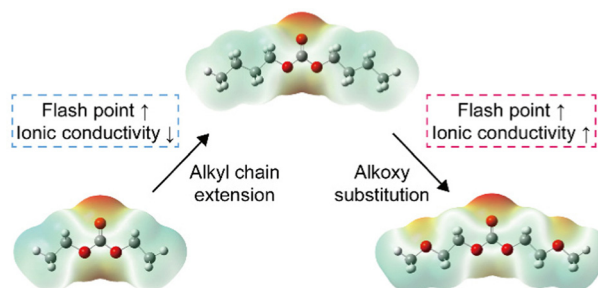


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### Molecularly engineered linear organic carbonates as practically viable nonflammable electrolytes for safe Li-ion batteries

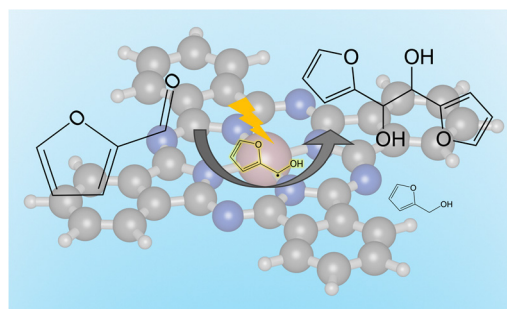
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### Furfural electrovalorisation using single-atom molecular catalysts

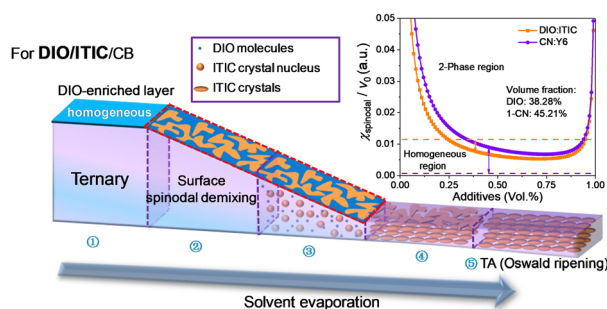
Zamaan Mukadam, Sihang Liu, Angus Pedersen, Jesús Barrio, Sarah Fearn, Saurav Ch. Sarma, Maria-Magdalena Titirici, Soren B. Scott,\* Ifan E. L. Stephens,\* Karen Chan and Stefano Mezzavilla\*



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### Surface crystallinity enhancement in organic solar cells induced by spinodal demixing of acceptors and additives

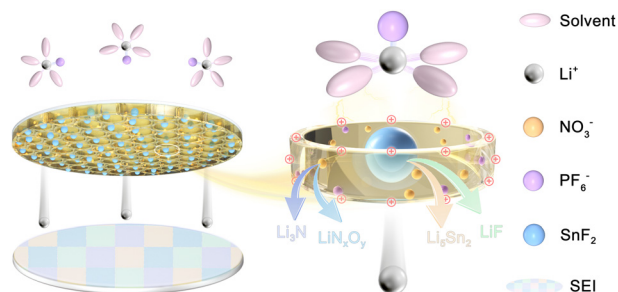
Zichao Shen, Jinde Yu,\* Guanyu Lu, Keming Wu, Qingyu Wang, Laju Bu, Xinfeng Liu, Yuanwei Zhu\* and Guanghao Lu\*



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### A separator rich in $\text{SnF}_2$ and $\text{NO}_3^-$ directs an ultra-stable interface toward high performance Li metal batteries

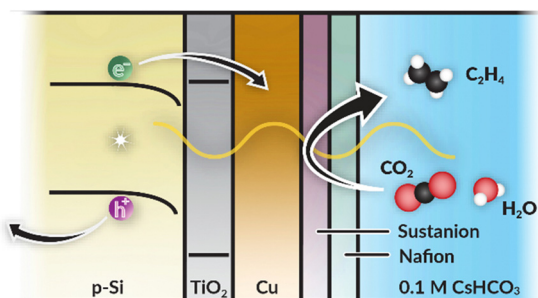
Yucheng Wen, Jieying Ding, Jun Liu, Min Zhu and Renzong Hu\*





## PAPERS

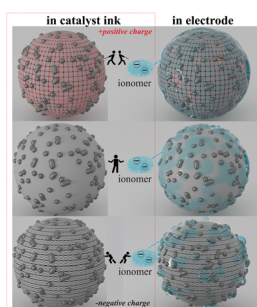
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### Codesign of an integrated metal–insulator–semiconductor photocathode for photoelectrochemical reduction of CO<sub>2</sub> to ethylene

Chanyeon Kim, Alex J. King, Shaul Aloni, Francesca M. Toma, Adam Z. Weber and Alexis T. Bell\*

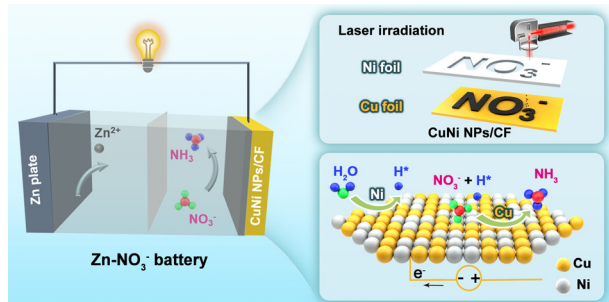
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### Unraveling the core of fuel cell performance: engineering the ionomer/catalyst interface

Chenzhao Li, Kang Yu, Ashley Bird, Fei Guo, Jan Ilavsky, Yadong Liu, David A. Cullen, Ahmet Kusoglu, Adam Z. Weber, Paulo J. Ferreira and Jian Xie\*

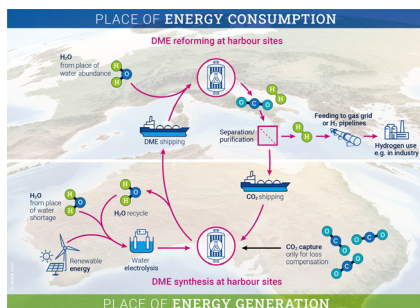
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### Laser-controlled tandem catalytic sites of CuNi alloys with ampere-level electrocatalytic nitrate-to-ammonia reduction activities for Zn–nitrate batteries

Wanqiang Yu, Jiayuan Yu, Man Huang, Yujie Wang, Yijie Wang, Jiawei Li, Hong Liu and Weijia Zhou\*

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### Dimethyl ether/CO<sub>2</sub> – a hitherto underestimated H<sub>2</sub> storage cycle

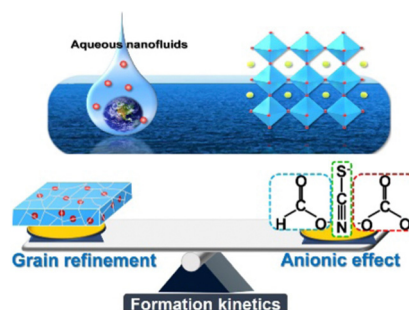
P. Schühle, R. Stöber, M. Semmel, A. Schaadt, R. Szolak, S. Thill, M. Alders, C. Hebling, P. Wasserscheid\* and O. Salem\*



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### Performance-limiting formation kinetics in green water-processed perovskite solar cells

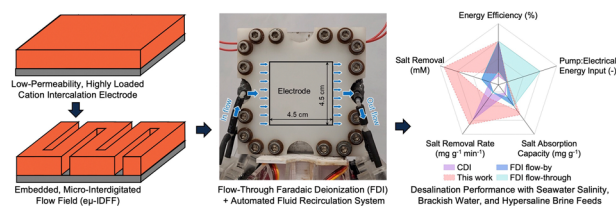
Peng Zhai,\* Lixia Ren,\* Yanrui Zhang, Zhuo Xu, Yin Wu, Kui Zhao, Lu Zhang and Shengzhong (Frank) Liu\*



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### Embedded, micro-interdigitated flow fields in high areal-loading intercalation electrodes towards seawater desalination and beyond

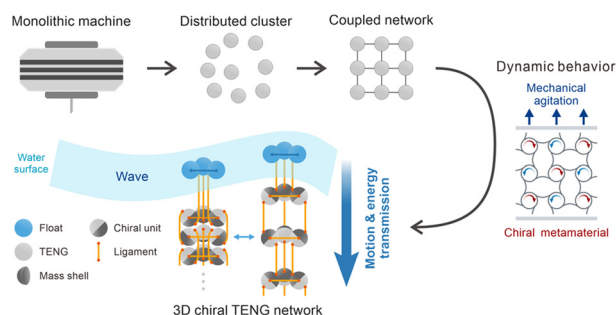
Vu Q. Do, Erik R. Reale, Irwin C. Loud IV, Paul G. Rozzi, Haosen Tan, David A. Willis and Kyle C. Smith\*



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### Three-dimensional chiral networks of triboelectric nanogenerators inspired by metamaterial's structure

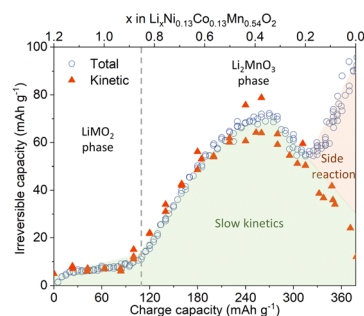
Xianye Li, Liang Xu,\* Pei Lin,\* Xiaodan Yang, Huamei Wang, Huaifang Qin and Zhong Lin Wang\*



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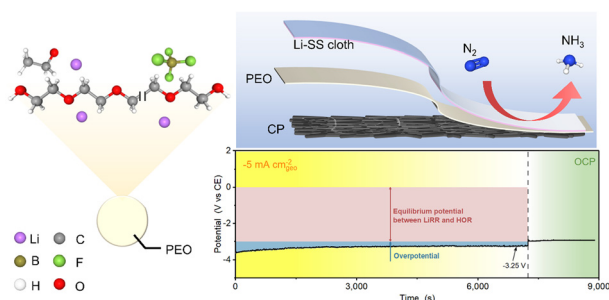
### Non-monotonic first-cycle irreversible capacity governed by delithiation depth in Li-rich layered cathodes

Liang Fang, Daseul Han, Seongkoo Kang, Un-Seon Heo, Kyung-Wan Nam\* and Yong-Mook Kang\*



## PAPERS

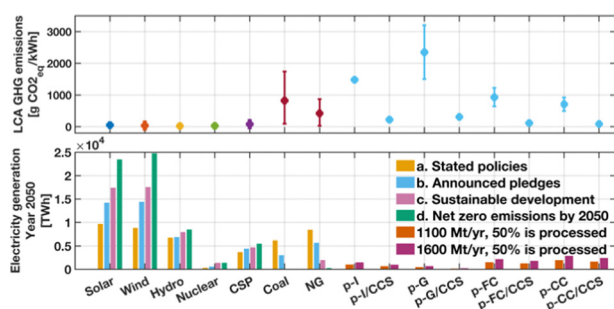
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### Membrane electrode assembly design for lithium-mediated electrochemical nitrogen reduction

Xiyang Cai, Zulipiya Shadike, Xinyin Cai, Xingdian Li, Liuxuan Luo, Lu An, Jiewei Yin, Guanghua Wei, Fan Yang, Shuiyun Shen\* and Junliang Zhang\*

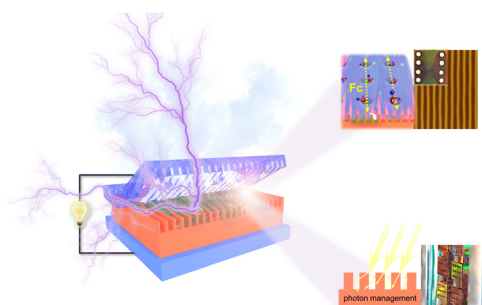
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### Nonviable carbon neutrality with plastic waste-to-energy

Serang Kwon, Jieun Kang, Beomhui Lee, Soonwook Hong, Yongseok Jeon, Moonsoo Bak and Seong-kyun Im\*

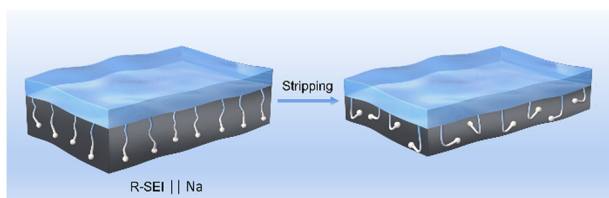
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### Self-induced interface enhanced moisture-harvesting and light-trapping toward high performance electric power generation

Jiaxin Bai, Qihua Liao, Houze Yao, Tianlei Guang, Tiancheng He, Huhu Cheng and Liangti Qu\*

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### A rooted interphase on sodium *via in situ* pre-implantation of fluorine atoms for high-performance sodium metal batteries

Chutao Wang, Zongqiang Sun, Lin Liu, Hongbin Ni, Qing Hou, Jingmin Fan, Ruming Yuan, Mingsen Zheng\* and Quanfeng Dong\*



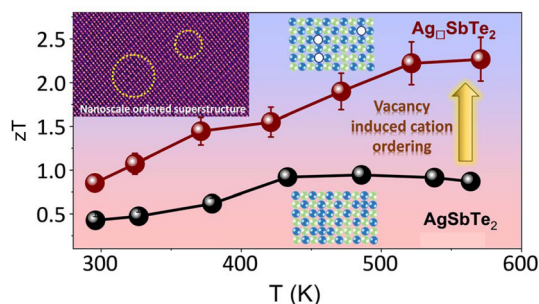


## PAPERS

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### Vacancy controlled nanoscale cation ordering leads to high thermoelectric performance

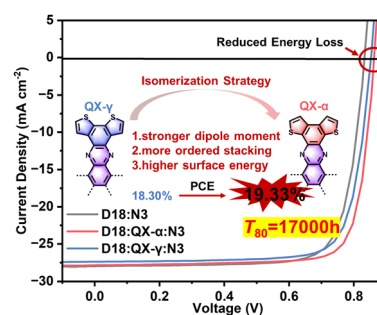
Riddhimoy Pathak, Lin Xie, Subarna Das, Tanmoy Ghosh, Animesh Bhui, Kapildeb Dolui, Dirtha Sanyal, Jiaqing He and Kanishka Biswas\*



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### Isomerization strategy on a non-fullerene guest acceptor for stable organic solar cells with over 19% efficiency

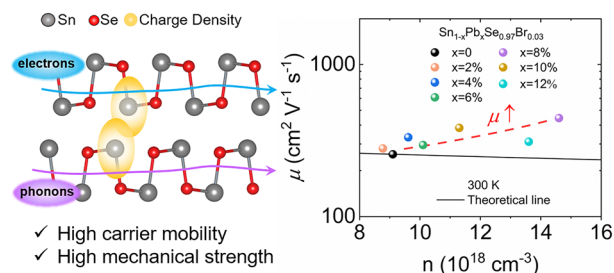
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### Realizing high in-plane carrier mobility in n-type SnSe crystals through deformation potential modification

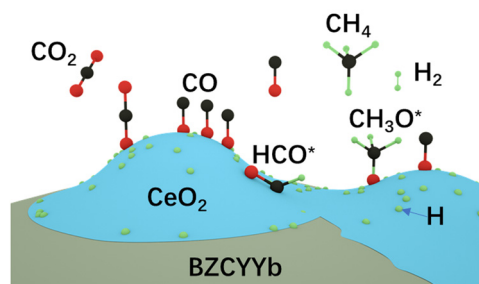
Haonan Shi, Lizhong Su, Shulin Bai, Bingchao Qin, Yuping Wang, Shan Liu, Cheng Chang\* and Li-Dong Zhao\*



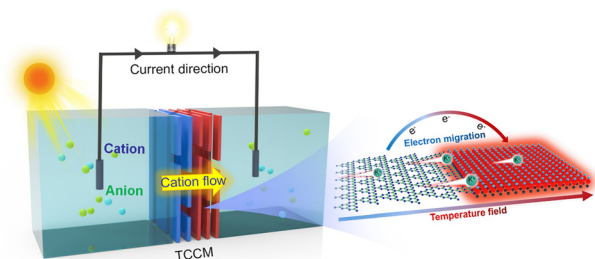
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### Tuning the product selectivity of CO<sub>2</sub>/H<sub>2</sub>O co-electrolysis using CeO<sub>2</sub>-modified proton-conducting electrolysis cells

Yongjian Ye, WonJun Lee, Junxian Pan, Xiang Sun, Mengzhen Zhou, Jiahui Li, Nian Zhang, Jeong Woo Han\* and Yan Chen\*



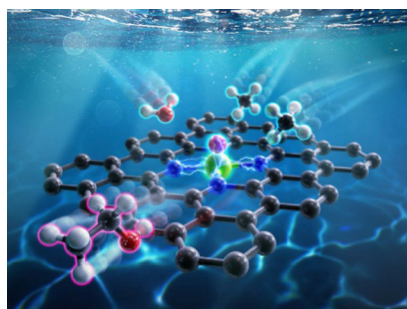
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**Efficient solar energy conversion via bionic sunlight-driven ion transport boosted by synergistic photo-electric/thermal effects**

Jin Wang,\* Di Wang, Zeyuan Song, Na Jiang, Shangzhen Li, Yufei Zhang,\* Bo Huang, Huijiao Zhou, Zheng Cui and Lei Wang\*

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**Boosting electrochemical methane conversion by oxygen evolution reactions on Fe–N–C single atom catalysts**

Cheolho Kim, Heewon Min, Junmin Kim and Jun Hyuk Moon\*



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