

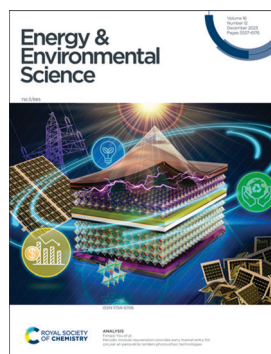
# Energy & Environmental Science

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ISSN 1754–5706 CODEN EESNBY 16(12) 5537–6176 (2023)



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### Inside cover

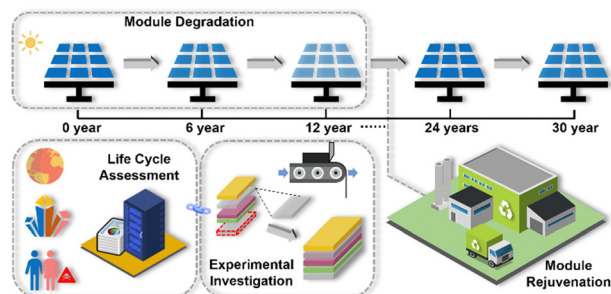
See Jiajiu Ye, Xu Pan et al., pp. 5792–5804. Image reproduced by permission of Xu Pan from *Energy Environ. Sci.*, 2023, 16, 5792.

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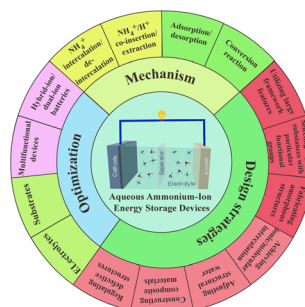


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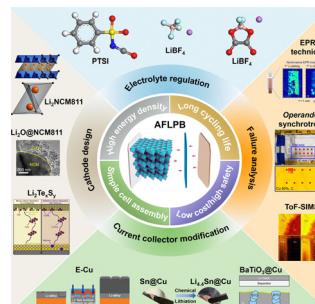


## REVIEWS

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## Toward practical anode-free lithium pouch batteries

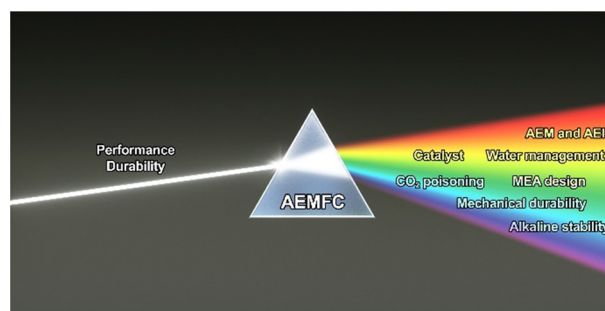
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## Powering the hydrogen future: current status and challenges of anion exchange membrane fuel cells

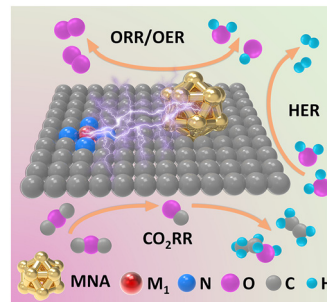
Jonghyun Hyun and Hee-Tak Kim\*



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## Single-atom sites combined with metal nano-aggregates for efficient electrocatalysis

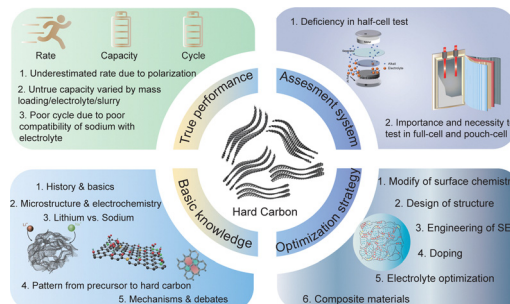
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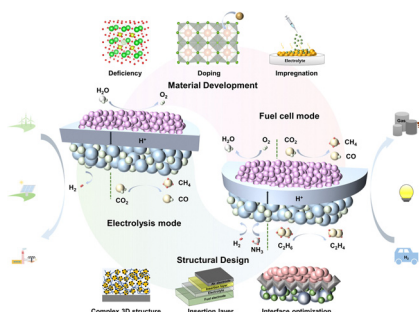
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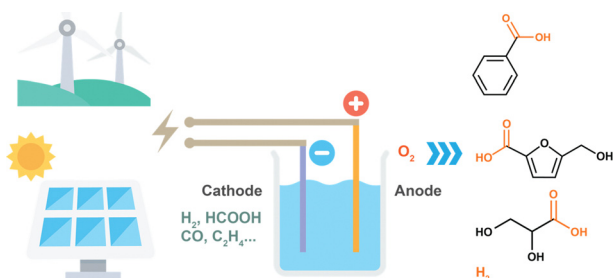


### A review of progress in proton ceramic electrochemical cells: material and structural design, coupled with value-added chemical production

Yakun Wang, Yeqing Ling, Bin Wang, Guowei Zhai, Guangming Yang,\* Zongping Shao,\* Rui Xiao\* and Tao Li\*

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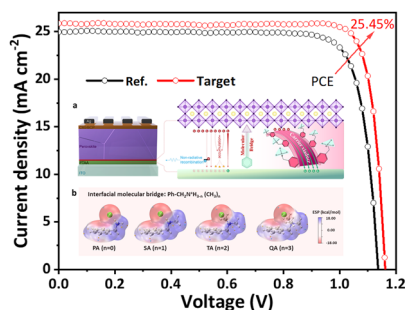


### Screening potential anodic chemistry in lieu of the oxygen evolution reaction in electrolysis systems: the road to practical application

Hongwu Chen, Zhifang Liu, Hua Zhou, Xue Yang\* and Wei Lin\*

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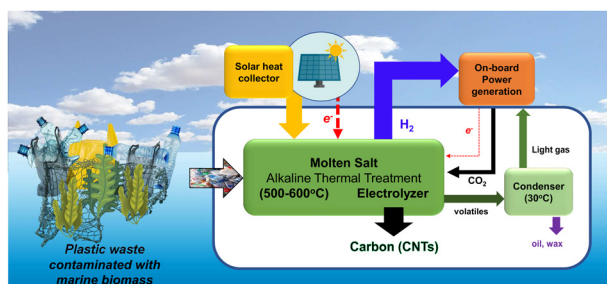
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### Constructing robust heterointerfaces for carrier viaduct via interfacial molecular bridges enables efficient and stable inverted perovskite solar cells

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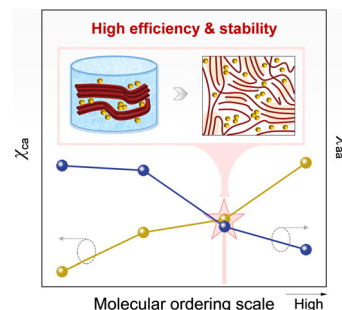
Jonah M. Williams, Michael P. Nitzsche, Lev Bromberg, Zifeng Qu, Aaron J. Moment, T. Alan Hatton and Ah-Hyung Alissa Park\*



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### Tuning the solution aggregation and molecular order for efficient and thermally stable polymer solar cells

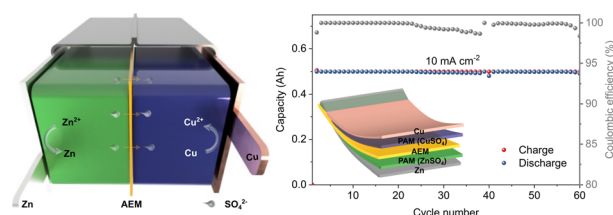
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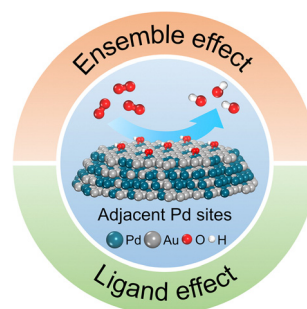
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### Regulating and identifying the structures of PdAu alloys with splendid oxygen reduction activity for rechargeable zinc–air batteries

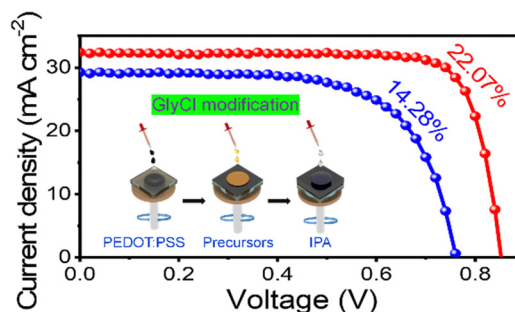
Sicong Qiao, Hongwei Shou, Wenjie Xu,\* Yuyang Cao, Yuzhu Zhou, Zhouxin Wang, Xiaojun Wu, Qun He\* and Li Song\*



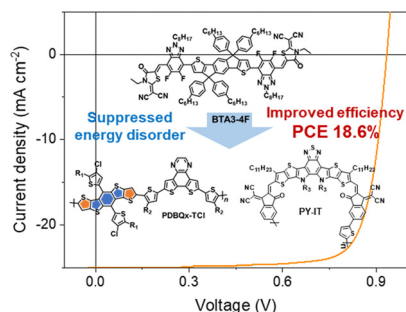
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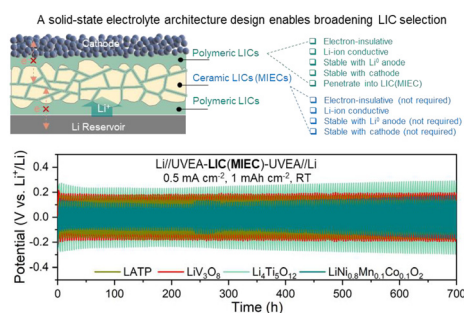
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Ye Xu, Jingwen Wang, Tao Zhang, Zhihao Chen, Kaihui Xian, Zi Li, Yang-Hui Luo, Long Ye, Xiaotao Hao, Huifeng Yao\* and Jianhui Hou\*

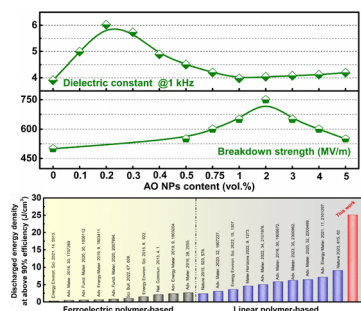
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Peichao Zou, Chunyang Wang, Yubin He and Huolin L. Xin\*

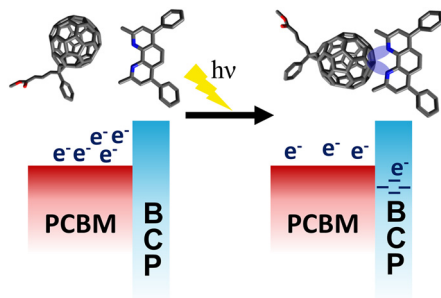
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### Multilayer nanocomposites with ultralow loadings of nanofillers exhibiting superb capacitive energy storage performance

Yu Cheng, Yu Feng, Zhongbin Pan,\* Peng Wang,\* Jinjun Liu, Liang Liang, Jinhong Yu, Jiwei Zhai and Qing Wang\*

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### Charge transfer complex formation between organic interlayers drives light-soaking in large area perovskite solar cells

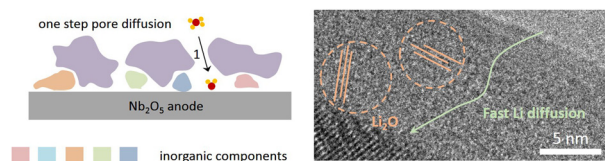
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## Kinetic pathways of fast lithium transport in solid electrolyte interphases with discrete inorganic components

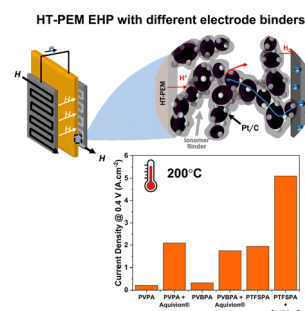
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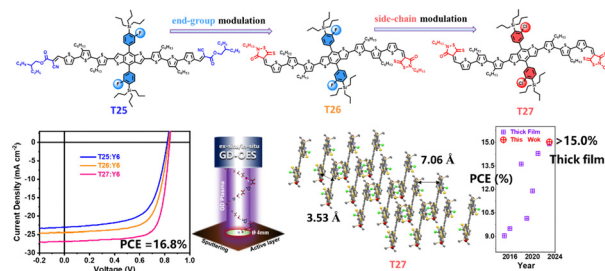
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## Regulating the reorganization energy and crystal packing of small-molecule donors enables the high performance of binary all-small-molecule organic solar cells with a slow film growth rate

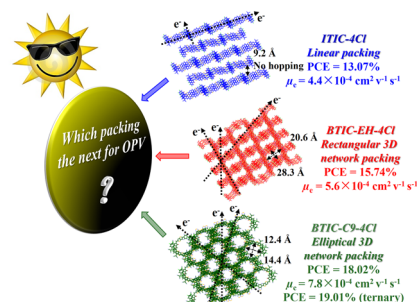
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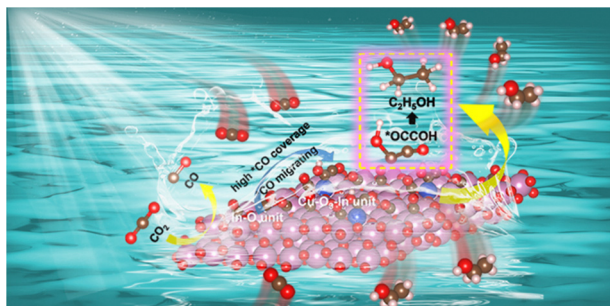
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Hanjian Lai, Hui Chen, Zi-Yi Chen, Yongwen Lang, Yulin Zhu, Shi-Tong Zhang, Xue Lai, Pu Tan, Yuanzhu Zhang, Bing Yang, Gang Li and Feng He\*



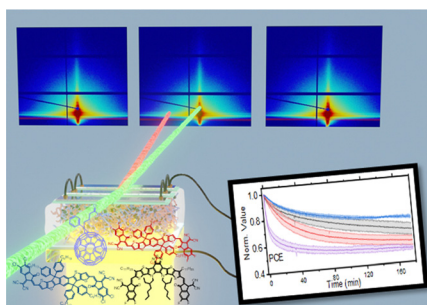
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### Electronic modulation of a single-atom-based tandem catalyst boosts CO<sub>2</sub> photoreduction to ethanol

Shuaiqi Gong, Baoxin Ni, Xiaoyang He, Jianying Wang, Kun Jiang, Deli Wu, Yulin Min, Hexing Li\* and Zuofeng Chen\*

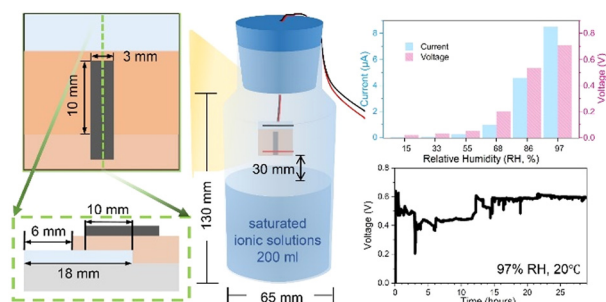
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### Operando study of the influence of small molecule acceptors on the morphology induced device degradation of organic solar cells with different degrees of $\pi$ - $\pi$ stacking

Xinyu Jiang, Alexander J. Gillett, Tianle Zheng, Xin Song, Julian E. Heger, Kun Sun, Lukas V. Spanier, Renjun Guo, Suzhe Liang, Sigrid Bernstorff and Peter Müller-Buschbaum\*

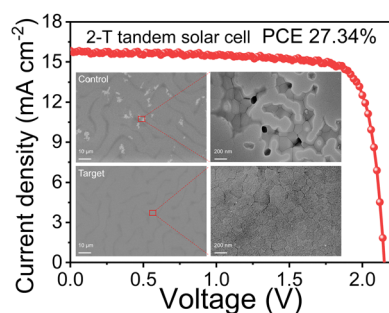
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### Moisturized 2-dimensional halide perovskite generates a power density of 30 mW cm<sup>-3</sup>

Chunqing Ma, Yeon-Woo Choi, Donghyeon Kang, Bosung Kim, Seung-Gu Choi, Jin-Wook Lee, Sang-Woo Kim\* and Nam-Gyu Park\*

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### Lead halide coordination competition at buried interfaces for low $V_{OC}$ -deficits in wide-bandgap perovskite solar cells

Hongsen Cui, Lishuai Huang, Shun Zhou, Chen Wang, Xuzhi Hu, Hongling Guan, Shuxin Wang, Wenlong Shao, Dexin Pu, Kailian Dong, Jin Zhou, Peng Jia, Weizhong Wang,\* Chen Tao,\* Weijun Ke\* and Guojia Fang\*

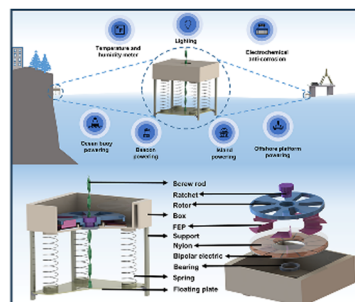


## PAPERS

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# Design of triboelectric nanogenerators featuring motion form conversion, motion rectification, and frequency multiplication for low-frequency ocean energy harvesting

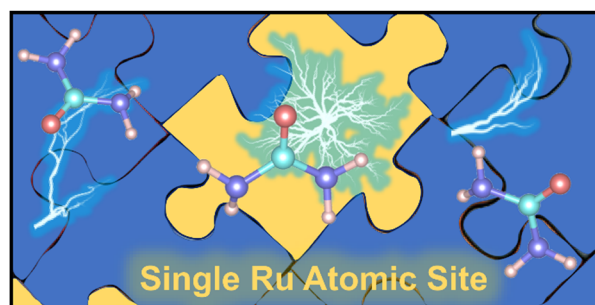
Wenyong Jiang, Chengjun Chen,\* Congyu Wang, Jiawei Li, Maomi Zhao, Tengfei Xiang and Peng Wang\*



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# Balancing dynamic evolution of active sites for urea oxidation in practical scenarios

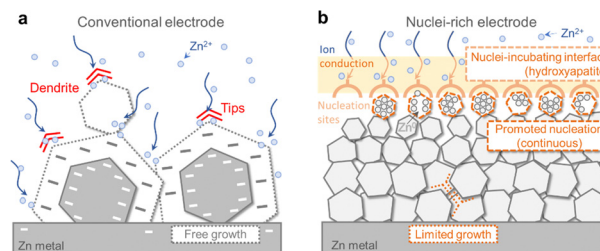
Jichao Zhang, Jiexin Zhu, Liqun Kang, Qing Zhang, Longxiang Liu, Fei Guo, Kaiqi Li, Jianrui Feng, Lixue Xia, Lei Lv, Wei Zong, Paul R. Shearing, Dan J. L. Brett, Ivan P. Parkin,\* Xuedan Song,\* Liqiang Mai\* and Guanjie He\*



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# A nuclei-rich strategy for highly reversible dendrite-free zinc metal anodes

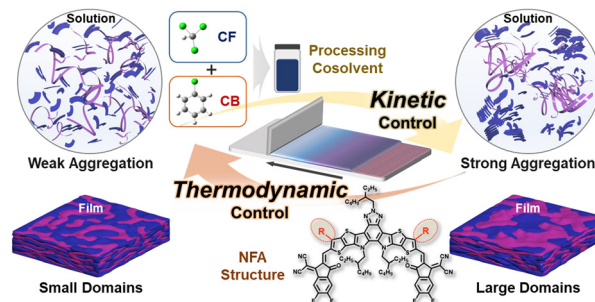
Qingli Zou, Zhuojian Liang, Wanwan Wang, Dejian Dong and Yi-Chun Lu\*



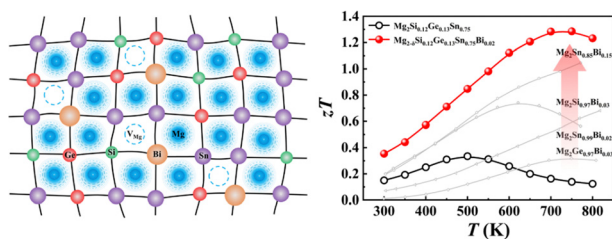
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# Role of simultaneous thermodynamic and kinetic variables in optimizing blade-coated organic solar cells

Yongjoon Cho, Byoungkyu Lee, Sungwoo Jung, Seonghun Jeong, Jeewon Park, Geunhyung Park, Sangjin Yang and Changduk Yang\*



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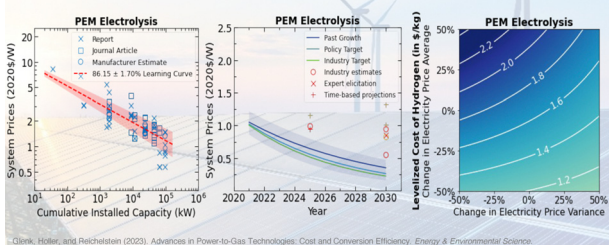
### Adaptable sublattice stabilized high-entropy materials with superior thermoelectric performance

Haotian Gao, Kunpeng Zhao,\* Hexige Wuliji,\* Min Zhu, Beibei Xu, He Lin, Liting Fei, Hongyao Zhang, Zhengyang Zhou, Jingdan Lei, Heyang Chen, Shun Wan, Tian-Ran Wei and Xun Shi\*

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### Electrolyzers become much cheaper and more energy efficient

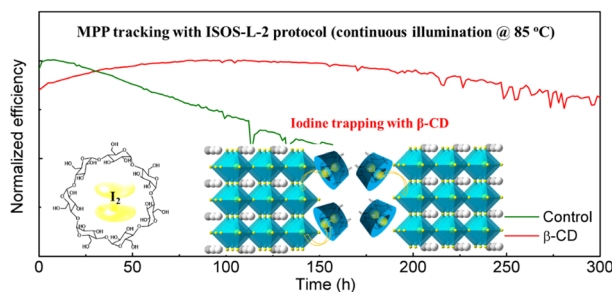
Life-cycle cost of electrolytic hydrogen production will likely approach but not reach \$1.0/kg by 2030



### Advances in power-to-gas technologies: cost and conversion efficiency

Gunther Glenk,\* Philip Holler and Stefan Reichelstein

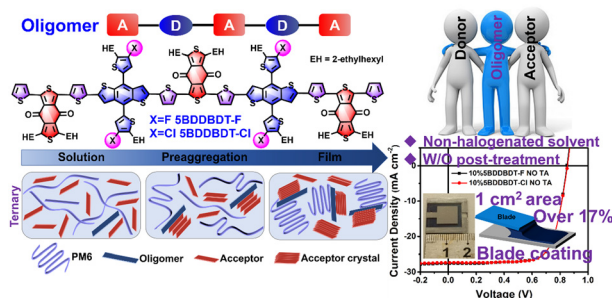
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### Iodine-trapping strategy for light-heat stable inverted perovskite solar cells under ISOS protocols

Xiaodong Li,\* Hui Yang, Acan Liu, Chunyan Lu, Haobo Yuan, Wenxiao Zhang and Junfeng Fang\*

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### Oligomeric semiconductors enable high efficiency open air processed organic solar cells by modulating pre-aggregation and crystallization kinetics

Hao Xia, Ying Zhang,\* Kuan Liu, Wanyuan Deng, Mengbing Zhu, Hua Tan, Patrick W. K. Fong, Heng Liu, Xinxin Xia, Miao Zhang, Top Archie Dela Peña, Ruijie Ma, Mingjie Li, Jiaying Wu, Yongwen Lang, Jiehao Fu, Wai-Yeung Wong, Xinhui Lu, Weiguo Zhu\* and Gang Li\*

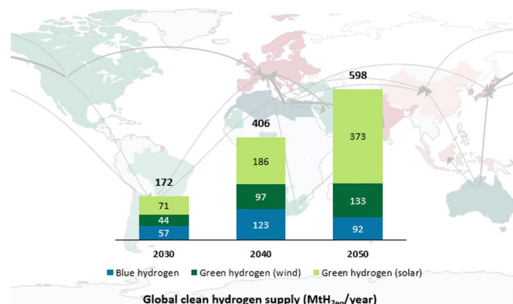


## PAPERS

6094

## Towards a resilient and cost-competitive clean hydrogen economy: the future is green

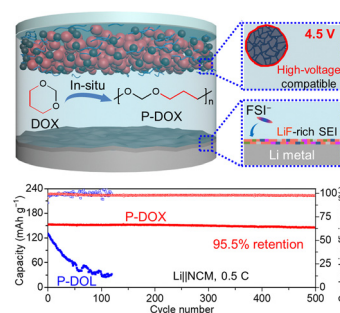
Behrang Shirizadeh,\* Aurelien Ailleret, Augustin Guillon, Emmanuel Bovari, Nazem El Khatib, Sebastien Douguet, Charbel Bou Issa, Johannes Brauer and Johannes Trüby



6110

## In situ polymerization of 1,3-dioxane as a highly compatible polymer electrolyte to enable the stable operation of 4.5 V Li-metal batteries

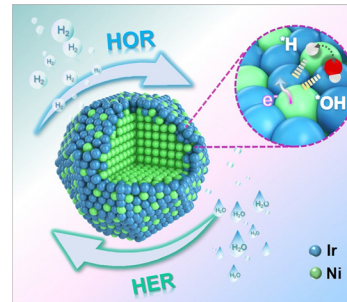
Yang Liu, Hanqin Zou, Zili Huang, Qiuxia Wen, Jiawei Lai, Yuping Zhang, Jinghao Li,\* Kui Ding,\* Jian Wang, Ya-Qian Lan and Qifeng Zheng\*



6120

## Prominent electronic effect in iridium-alloy-skinned nickel nanoparticles boosts alkaline hydrogen electrocatalysis

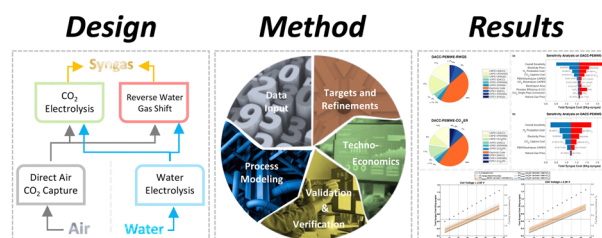
Jie Xu, Xuyan Wang, Xinnan Mao, Kun Feng, Jiabin Xu, Jun Zhong,\* Lu Wang,\* Na Han\* and Yanguang Li\*



6127

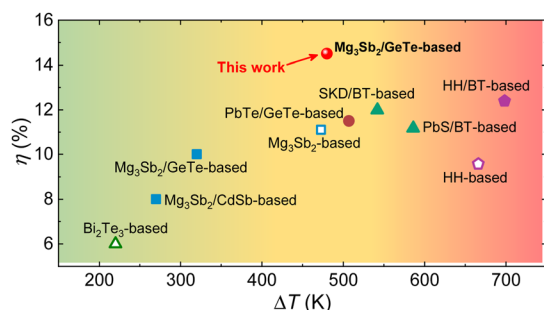
## Evaluating the techno-economic potential of defossilized air-to-syngas pathways

Hussain M. Almajed, Omar J. Guerra, Wilson A. Smith, Bri-Mathias Hodge\* and Ana Somoza-Tornos\*



## PAPERS

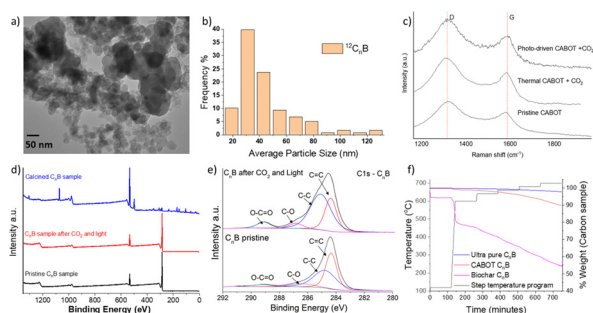
6147



### Realizing an excellent conversion efficiency of 14.5% in the $\text{Mg}_3\text{Sb}_2/\text{GeTe}$ -based thermoelectric module for waste heat recovery

Xiaofang Li, Chen Chen,\* Li Yin, Xinyu Wang, Jun Mao, Feng Cao\* and Qian Zhang\*

6155



### Carbon photochemistry: towards a solar reverse boudouard refinery

Camilo J. Viasus Pérez,\* Juan Manuel Restrepo-Florez, Jessica Ye, Nhat Truong Nguyen, Athanasios A. Tountas, Rui Song, Chengliang Mao, Andrew Wang, Abdelaziz Gouda, Samantha Corapi, Shufang Ji, Hamish MacLeod, Jiaze Wu, Alán Aspuru-Guzik, Christos T. Maravelias and Geoffrey A. Ozin\*

## CORRECTIONS

6168

### Correction: Solid-state cooling: thermoelectrics

Yongxin Qin, Bingchao Qin,\* Dongyang Wang, Cheng Chang and Li-Dong Zhao\*

6170

### Correction: From the Birkeland–Eyde process towards energy-efficient plasma-based $\text{NO}_x$ synthesis: a techno-economic analysis

Kevin H. R. Rouwenhorst,\* Fatme Jardali,\* Annemie Bogaerts\* and Leon Lefferts\*

