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IN THIS ISSUE

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Cover
See Xueliang Sun, Jian Peng *et al.*, pp. 6874–6898. Image reproduced by permission of Xueliang Sun and Jian Peng from *Energy Environ. Sci.*, 2025, **18**, 6874.

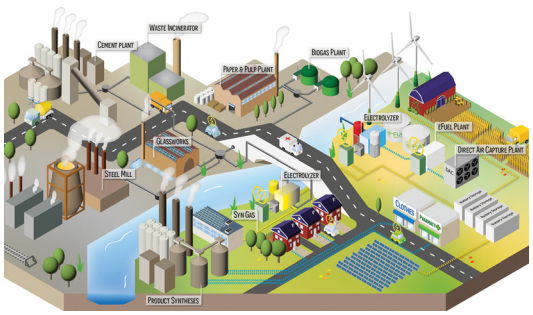
Inside cover
See Erwin Reisner *et al.*, pp. 7023–7033. Image reproduced by permission of Yongpeng Liu from *Energy Environ. Sci.*, 2025, **18**, 7023.

ANALYSIS

6854

Closing the carbon cycle: challenges and opportunities of CO_2 electrolyser designs in light of cross-industrial CO_2 source-sink matching in the European landscape

Muhammad Tayyab, Maximiliane Dreis, Dennis Blaudszun, Kevinjeorjios Pellumbi, Urbain Nzotcha, Hermann Tempel, Muhammad Qaiser Masood, Henning Weinrich, Sebastian Stießel, Kai junge Puring, Rüdiger-A. Eichel* and Ulf-Peter Apfel*

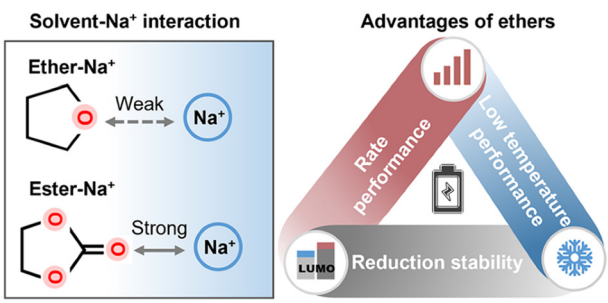


REVIEWS

6874

Reviving ether-based electrolytes for sodium-ion batteries

Fangyuan Cheng, Jun Hu, Wen Zhang, Baiyu Guo, Peng Yu, Xueliang Sun* and Jian Peng*



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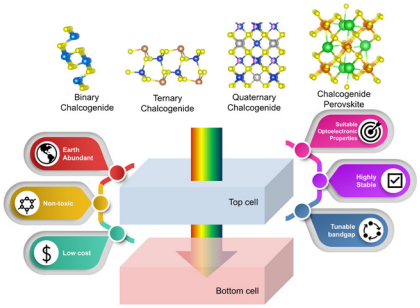
REVIEWS

6899

Opportunities and challenges for emerging inorganic chalcogenide–silicon tandem solar cells

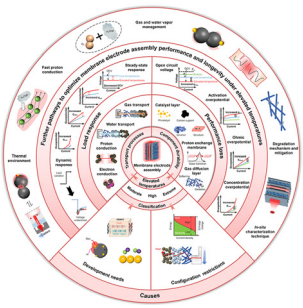
Vijay C. Karade, Mingrui He, Zhaoning Song, Abasi Abudulimu, Yeonwoo Park, Donghoon Song, Yanfa Yan, Jin Hyeok Kim, Randy J. Ellingson, Jae Ho Yun,* Xiaojing Hao, Seung Wook Shin* and Mahesh P. Suryawanshi*



6934

Challenges in membrane electrode assemblies at elevated temperatures for proton exchange membrane fuel cells: a review

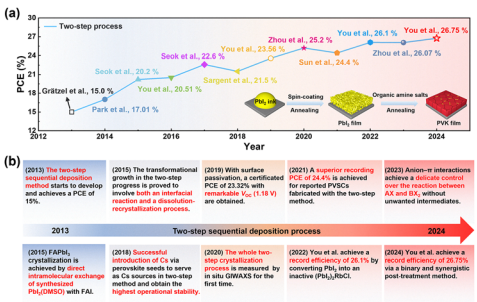
Caizheng Yue, Weibo Zheng,* Qiuya Wang, Zhendong Wang, Bing Li, Cunman Zhang and Pingwen Ming*



6983

Unraveling the reaction dynamics mechanism and thermodynamic pathway of lead iodide and organic cations in the two-step sequential deposition process

Jiacheng He, Wangping Sheng, Kaikai Liu, Qianqian Cai, Yang Zhong, Licheng Tan* and Yiwang Chen*

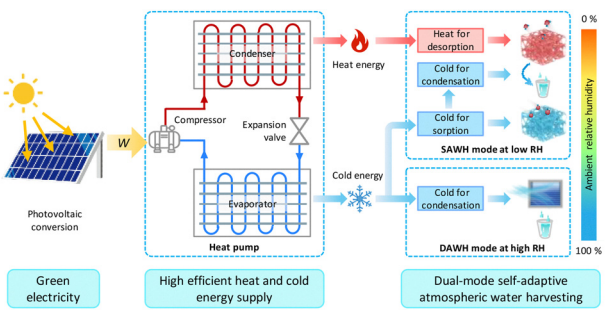


PERSPECTIVE

7005

Designing next-generation all-weather and efficient atmospheric water harvesting powered by solar energy

Pengfei Wang, Jiaxing Xu, Zhaoyuan Bai, Ruzhu Wang and Tingxian Li*



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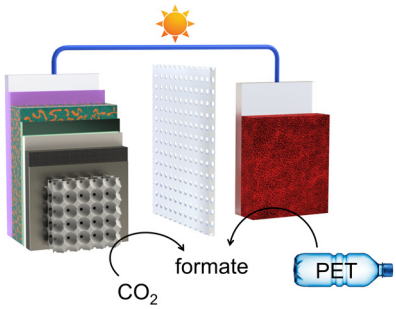
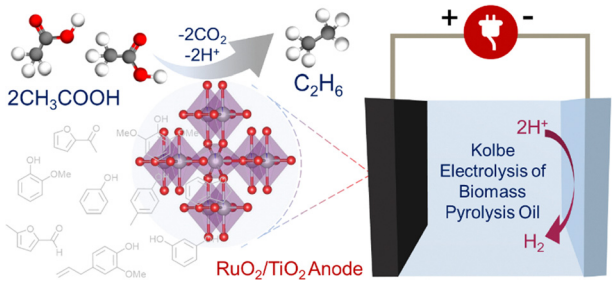


Photoelectrochemical comproportionation of pre-treated PET plastics and CO_2 to formate

Yongpeng Liu, Celine Wing See Yeung and Erwin Reisner*

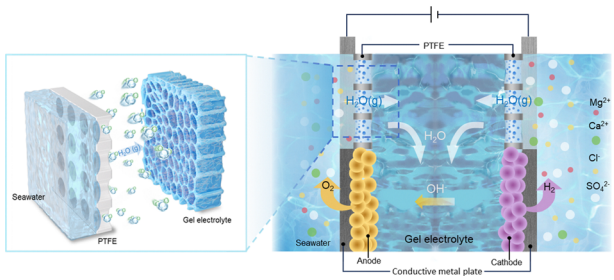
7034



Low-temperature highly selective Kolbe electrolysis of acetic acid in bio-oil on a stable *in situ* grown RuO_2/TiO_2 at industrial-level current

Yangxin Jin, Shengqin Liu, Zhe Wang, Qi Zhu, Qingguo Le, Shan Shao, Sam H.-Y. Hsu, Anqing Zheng, Jun Zhao and Jason Chun-Ho Lam*

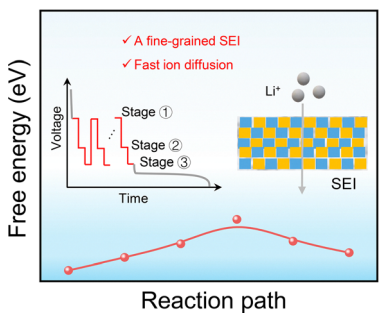
7048



A gel electrolyte-based direct seawater electrolysis

Wenbin Tang, Zhiyu Zhao,* Dongsheng Yang, YanHao Liu, Liangyu Zhu, Yue Wu, Cheng Lan, Wenchuan Jiang, Yifan Wu, Tao Liu* and Heping Xie*

7060



Tailoring a multilayer fine-grained solid electrolyte interphase by pulse electrochemical activation maneuver for stable Si/C anodes

Changhaoyue Xu, Peng Jing, Pengfei Xia, Ye Jia, Jianan Peng, Qiujie He, Qingqing Liu, Zimo Song, Xuemei Zhang, Fanglin Wu, Xianyu Liu, Kaipeng Wu, Yun Zhang* and Wenlong Cai*

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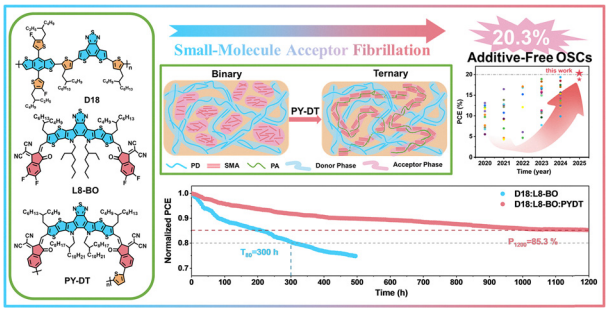
7071

Constructing continuous acceptor fibrillar networks and achieving uniform phase separation *via* polymer-assisted morphology control for 20.3% efficiency additive-free organic solar cells

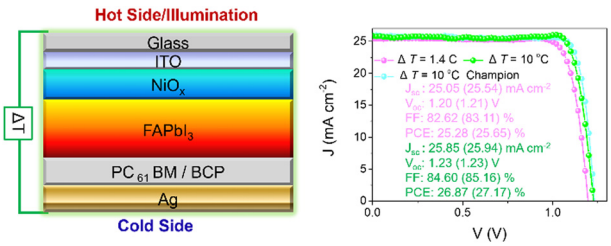
Fengbo Sun, Jingnan Wu, Bo Cheng, Lixuan Kan, Feng Hua, Wei Sun, Hao Wang, Yumiao Huo, Sixuan Chen, Xinxin Xia, Xiaoyan Du, Feng Liu, Ergang Wang, Xia Guo,* Yongfang Li and Maojie Zhang*



7082

Synergistic cooperation between photovoltaic and thermoelectric effects in solar cells

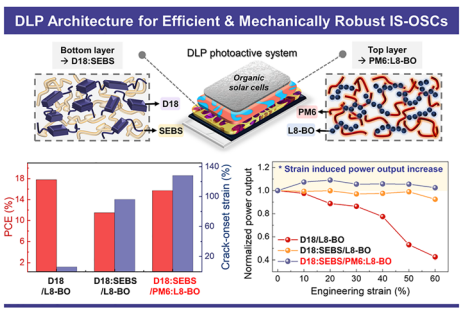
Ping Fu, Dong Yang, Yihua Chen, Ruixue Lu, Md Azimul Haque, Yucheng Liu, Yaoyao Han, Hui Li, Ruotian Chen, Jieqiong Liu, Wei Qin, Luis Huerta Hernandez, Fengtao Fan, Kaifeng Wu, Derya Baran, Huanping Zhou and Can Li*



7089

Dual-layered percolative networks of photoactive materials and elastomers for highly-stretchable, efficient organic photovoltaics with strain-induced power enhancement up to 60% strain

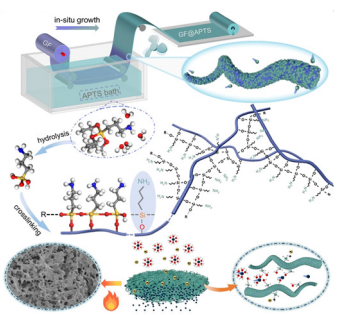
Jin-Woo Lee, Jongmin Oh, Won Jung Kang, Eun Sung Oh, Seungbok Lee, Inwoo Lee, Jimin Park, Jung-Yong Lee, Taek-Soo Kim* and Bumjoon J. Kim*



7103

Interfacial ionic and thermal regulation for highly reversible and ultra-reliable zinc-ion batteries

Mengcheng Huang, Yaojie Lei, Yajun Hu, Wei-Hong Lai, Yun-Xiao Wang, Chunyu Liu, Shengli Zhai* and Guoxiu Wang*



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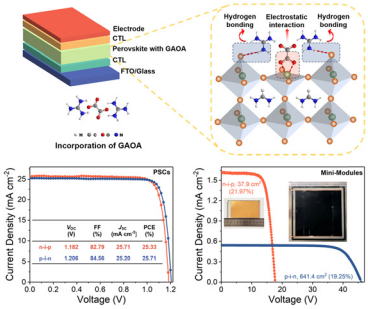
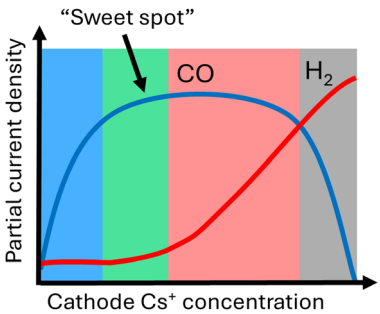


Intermolecular interactions triggered crystallization phase transition regulation for efficient and stable perovskite photovoltaics

Haodan Guo, Yang Wang,* Kun Zhang, Mingquan Tao, Lutong Guo, Xiwen Zhang, Zhaofei Song, Jinxu Wen, Tian Hou, Yuelong Huang* and Yanlin Song*

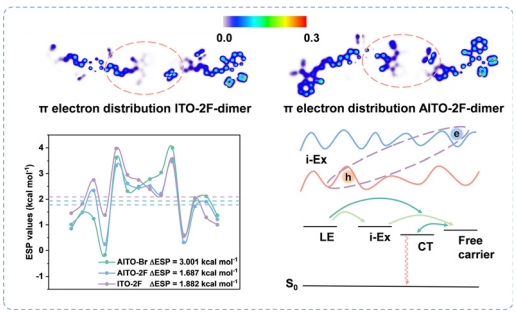
7124



Flooding revisited: electrolyte management ensures robust electrochemical CO_2 reduction

Péter Gyenes, Angelika A. Samu, Dorottya Hursán, Viktor Józó, Andrea Serfőző, Balázs Endrődi and Csaba Janáky*

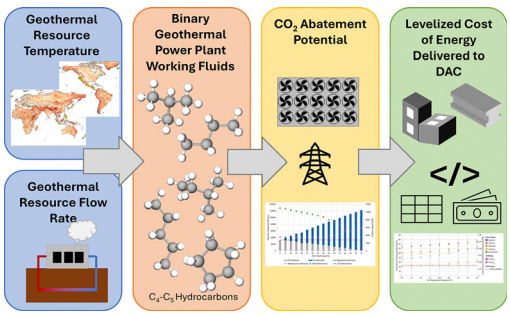
7136



Suppressing electrostatic potential fluctuations to achieve high-efficiency organic photovoltaic cells for laser wireless energy transfer

Yang Xiao, Yong Cui,* Haoyu Yuan, Jingwen Wang, Zhihao Chen, GuanLin Wang, Wei Fu, Zhen Fu, Yafei Wang, Tao Zhang, Yue Yu, Runnan Yu, Guangzheng Zuo, Maojie Zhang, Xiaotao Hao and Jianhui Hou*

7146



Advancing geothermal energy utilization opportunities: potential and strategies for integrating direct air capture

Maxwell Pisciotta, Hélène Pilorgé, Likhwa Ndlovu, Madeleine Siegel, Joe Huyett, Todd Bandhauer, Peter Psarras and Jennifer Wilcox*

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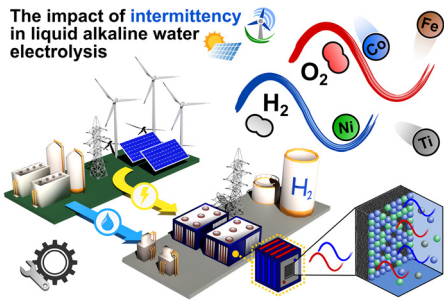
7170

Insights into catalyst degradation during alkaline water electrolysis under variable operation

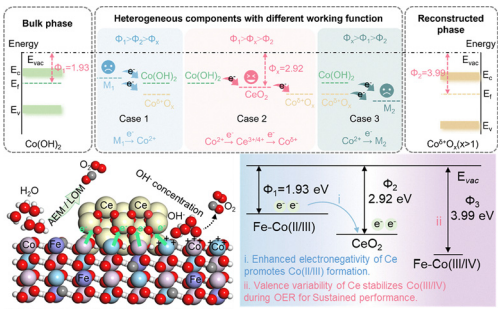
Raul A. Marquez, Jay T. Bender, Ashton M. Aleman, Emma Kalokowski, Thuy Vy Le, Chloe L. Williamson, Morten Linding Frederiksen, Kenta Kawashima, Chikaodili E. Chukwuneke, Andrei Dolocan, Delia J. Milliron, Joaquin Resasco, Thomas F. Jaramillo and C. Buddie Mullins*



7188

Dynamic trade-off of electronic structures to activate and stabilize lattice oxygen *via* a $Ce^{\delta+}$–O/Co–Fe hydroxide interface for industrial level water oxidation

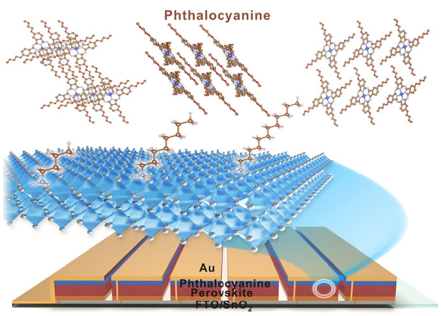
Zhimin Li, Jianhong Yi,* Yu Tang,* Zhengfu Zhang, Chengping Li, Rui Bao and Jinsong Wang*



7203

Interfacial engineering of dopant-free phthalocyanine hole transporters for >22% efficiency perovskite solar modules

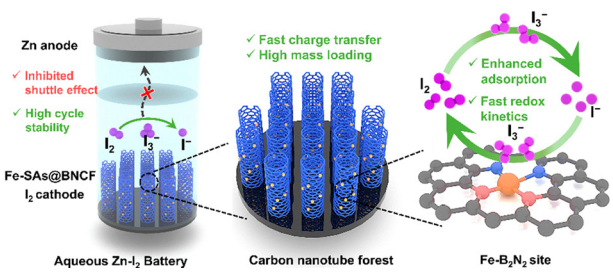
Zhen-Yang Suo, Xijiao Mu, Chong Chen, Guo-Bin Xiao and Jing Cao*



7213

Nano-carbon supported B/N-coordinated Fe single atoms with a tuned electronic structure for long lifespan zinc–iodine batteries

Yong Li, Aoyang Zhu, Guodong Peng, Jun He, Hongqiang Li, Dedong Jia, Guanjie He,* Jieshan Qiu* and Xiaojun He*



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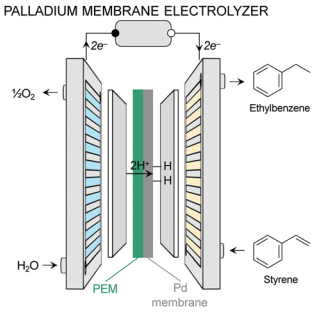
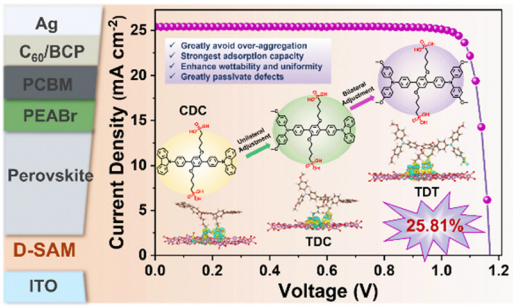


Electrolytic hydrogenation at 100 mA cm^{-2} and 1.6 volts

Yunzhou Wen, Mia D. Stankovic, Arijit Singha Hazari, Marvin L. Frisch, Siwei Ma and Curtis P. Berlinguette*

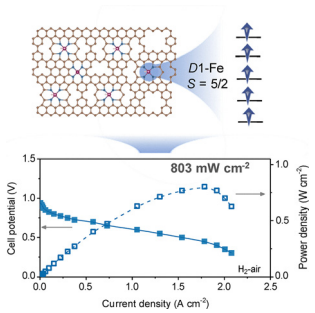
7231



A spatial structure regulation strategy modulated the solubility and compactness of novel face-on oriented bisphosphonate-anchored SAMs for efficient inverted perovskite solar cells

Weixu Duan, Kai Chen,* Bingxue Pi, Shaojian Li, Zedong Lin, Cong Liu,* Yuehua Pan, Haiqian Ling, Desheng Li, Liwei Zhou, Tao Liu,* Fan Wu, Xiangwen Guo, Bingsuo Zou and Xiaotian Hu*

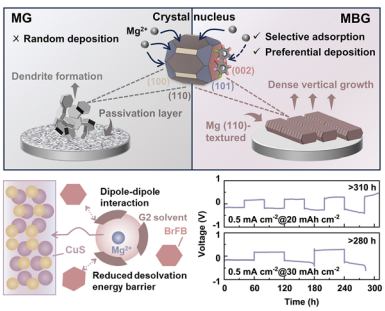
7245



Selective synthesis of dense high-spin D1 active sites *via* engineered less-graphitized carbon environments

Xuan Luo, Jia-Bao Nie, Huang Liang, Yu-Yang Li, You-Heng Wang, Qi-Kang Que, Jean-Pol Dodelet* and Yu-Cheng Wang*

7254



Customizing vertical electrodeposition orientation and interfacial solvation to endow magnesium metal anodes with ultrahigh areal capacity

Guyue Li, Liu Cao, Meng Lei, Keyi Chen and Chilin Li*

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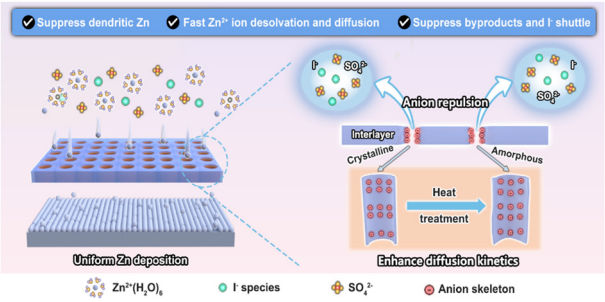
7267

Amorphous anion skeletons induce rapid and cation-selective ion flux towards stable aqueous zinc–iodine batteries

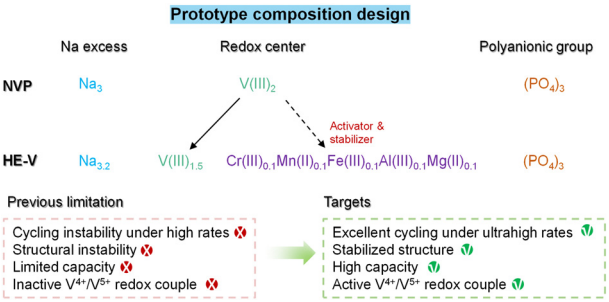
Zhenjing Jiang, Zijuan Du, Kailin Luo, Yanfei Zhang, Hang Yang, Wei Zhang, Ruwei Chen, Jie Chen, Zhe Cui, Fuhan Cui, Rui Pan, Guoju Zhang, Shuangying Lei, Litao Sun, Kuibo Yin* and Guanjie He*



7278

Configurational entropy-tailored NASICON cathode redox chemistry for capacity-dense and ultralong cyclability

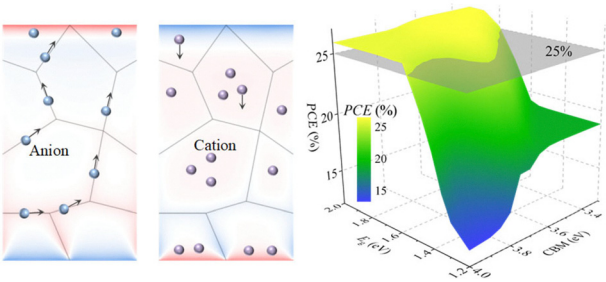
Wei Zhang,* Liang He, Jiantao Li, Ruohan Yu, Zhenming Xu, Yulun Wu, Haotian Qu, Qi Zhang, Jianwei Li, Xian Wu, Qingjin Fu, Yanqing Lai,* Guangmin Zhou,* Guanjie He* and Ivan P. Parkin



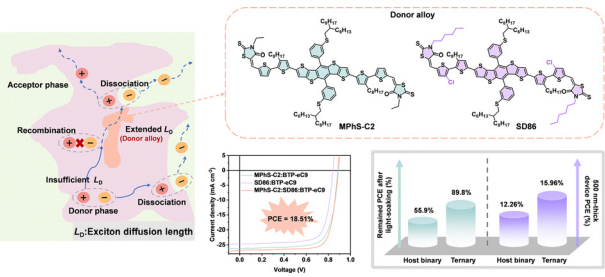
7291

Multi-physics mechanisms and regulation of perovskite grain boundaries: insights into carrier dynamics, ion migration, thermodynamics, and thermal stress

Luolei Shi, Xirui Liu, Yuqi Zhang, Yining Bao, Tianshu Ma, Linling Qin, Guoyang Cao,* Changlei Wang, Chuanxiao Xiao,* Xiaofeng Li* and Zhenhai Yang*



7302

Highly efficient all-small-molecule organic solar cells with excellent operational stability and blend-thickness tolerance

Yuan Gao, Lin-Yong Xu, Xingyu Chen, Biao Xiao,* Wei Gao, Jianlong Xia, Rui Sun* and Jie Min*