

Energy & Environmental Science

rsc.li/ees

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 1754–5706 CODEN EESNBY 17(11) 3673–3948 (2024)



Cover

See Dong-Hwa Seo, Jinhyuk Lee *et al.*, pp. 3753–3764. Image reproduced by permission of Dong-Hwa Seo, Jinhyuk Lee from *Energy Environ. Sci.*, 2024, 17, 3753.



Inside cover

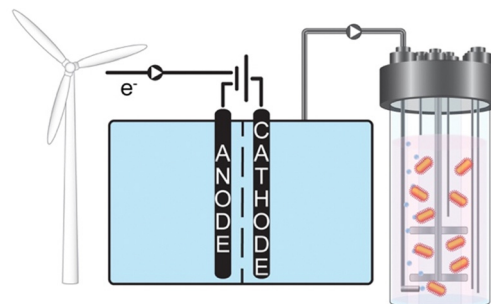
See Largus T. Angenent *et al.*, pp. 3682–3699. Image reproduced by permission of Largus T. Angenent from *Energy Environ. Sci.*, 2024, 17, 3682.

REVIEWS

3682

Electrical-energy storage into chemical-energy carriers by combining or integrating electrochemistry and biology

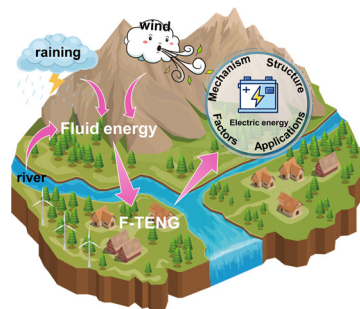
Largus T. Angenent,* Isabella Casini, Uwe Schröder, Falk Harnisch and Bastian Molitor



3700

Fluid-based triboelectric nanogenerators: unveiling the prolific landscape of renewable energy harvesting and beyond

Lihong Jiang, Xinlin Liu, Junling Lv, Gaojie Li, Peiyuan Yang, Yumeng Ma, Haiyang Zou* and Zhong Lin Wang*



RSC Advances

At the heart of open access for
the global chemistry community

Editor-in-chief

Russell J Cox

Leibniz Universität Hannover, Germany

We stand for:



Breadth We publish work in all areas of chemistry and reach a global readership



Affordability Low APCs, discounts and waivers make publishing open access achievable and sustainable



Quality Research to advance the chemical sciences undergoes rigorous peer review for a trusted, society-run journal



Community Led by active researchers, we publish quality work from scientists at every career stage, and all countries

Submit your work now

rsc.li/rsc-advances

@RSC_Adv

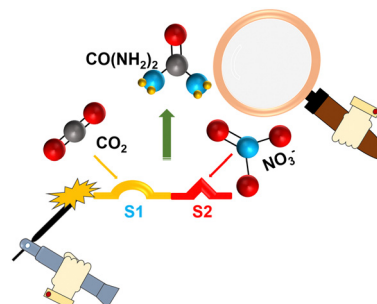


MINIREVIEW

3739

Electrochemical urea production using carbon dioxide and nitrate: state of the art and perspectives

Mohsin Muhyuddin, Giovanni Zuccante, Piercarlo Mustarelli, Jonathan Filippi, Alessandro Lavacchi, Lior Elbaz, Yu-Han Chen, Plamen Atanassov and Carlo Santoro*

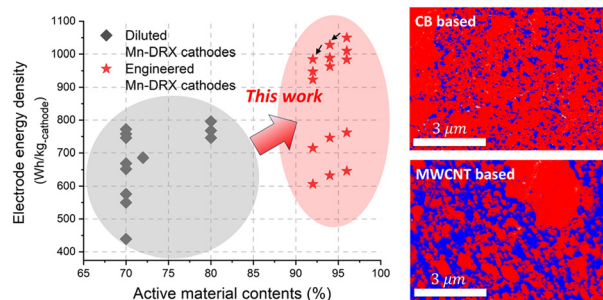


PAPERS

3753

Nearly all-active-material cathodes free of nickel and cobalt for Li-ion batteries

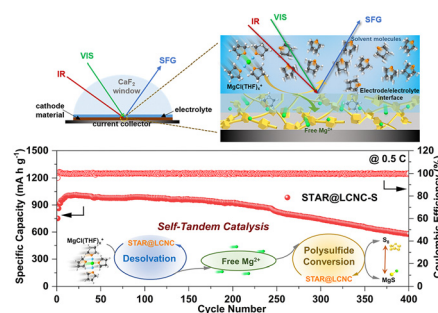
Eunryeol Lee, Dae-Hyung Lee, Stéphanie Bessette, Sang-Wook Park, Nicolas Brodusch, Gregory Lazaris, Hojoon Kim, Rahul Malik, Raynald Gauvin, Dong-Hwa Seo* and Jinhyuk Lee*



3765

Self-tandem catalysis of fast Mg^{2+} desolvation and sulfur conversions for ultrahigh-performance Mg-S batteries *via* serially-assembled atomic reactors

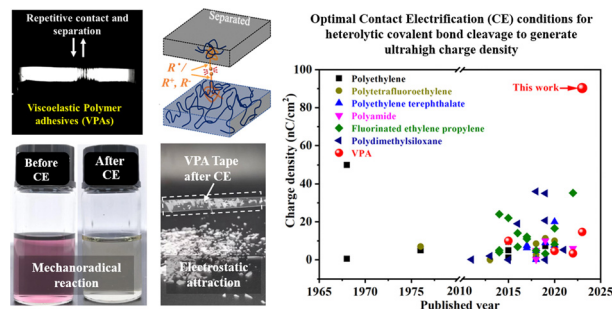
Qinghua Guan, Jian Wang,* Quan Zhuang, Jing Zhang, Linge Li, Lujie Jia, Yongzheng Zhang, Hongfei Hu, Huimin Hu, Shuang Cheng, Huang Zhang, Huihua Li, Meinan Liu, Shuangyin Wang* and Hongzhen Lin*



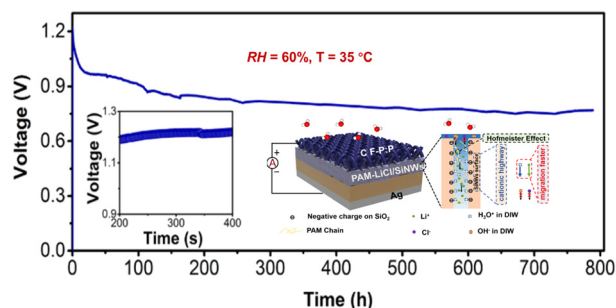
3776

Understanding contact electrification *via* direct covalent bond cleavage of polymer chains for ultrahigh electrostatic charge density

Haiyan Fu, Jianliang Gong,* Junhao Cao, Zehua Zhang, Zuchang Long, Bao Yang, Jianzhuang Chen, Yiwang Chen* and Xiaoming Tao



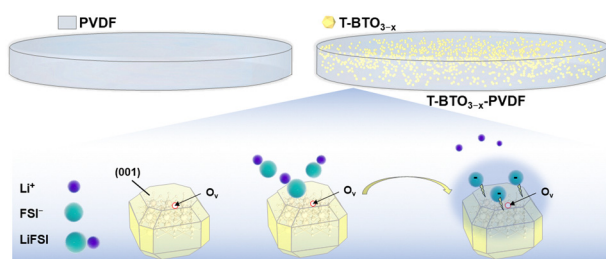
3788



Silicon nanowire/ionic hydrogel-based hybrid moist-electric generators with enhanced voltage output and operational stability

Wenjing Duan, Beibei Shao, Zhiqi Wang, Kun Ni, Shanfei Liu, Xianrong Yuan, Yusheng Wang, Baoquan Sun, Xiaohong Zhang and Ruiyuan Liu*

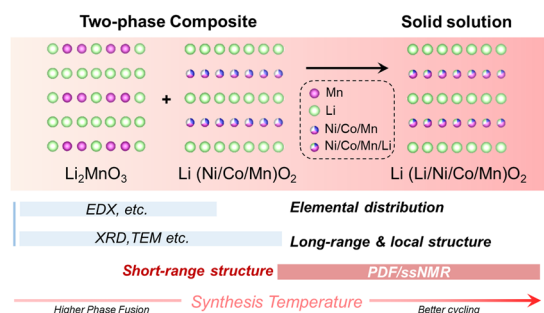
3797



Dissociation mechanism of lithium salt by BaTiO₃ with spontaneous polarization

Shaoke Guo, Shendong Tan, Jiabin Ma, Likun Chen, Ke Yang, Qiannan Zhu, Yuetao Ma, Peiran Shi, Yinping Wei, Xufei An, Qingkang Ren, Yanfei Huang, Yingman Zhu, Ye Cheng, Wei Lv, Tingzheng Hou,* Ming Liu,* Yan-Bing He,* Quan-Hong Yang and Feiyu Kang*

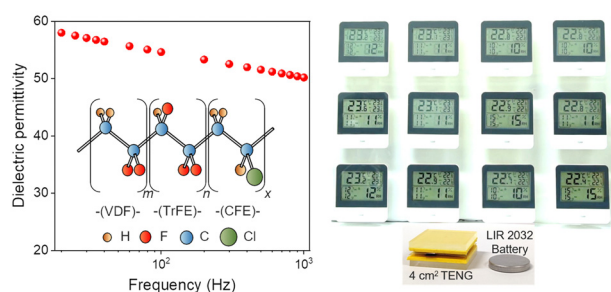
3807



Multi-angle tracking synthetic kinetics of phase evolution in Li-rich Mn-based cathodes

Shenyang Xu, Zhefeng Chen, Wenguang Zhao, Wenju Ren, Chenxin Hou, Jiajie Liu, Wu Wang, Chong Yin, Xinghua Tan, Xiaobing Lou, Xiangming Yao, Zhihai Gao, Hao Liu, Lu Wang, Zuwei Yin, Bao Qiu, Bingwen Hu,* Tianyi Li,* Cheng Dong, Feng Pan* and Mingjian Zhang*

3819



Triboelectric nanogenerators exhibiting ultrahigh charge density and energy density

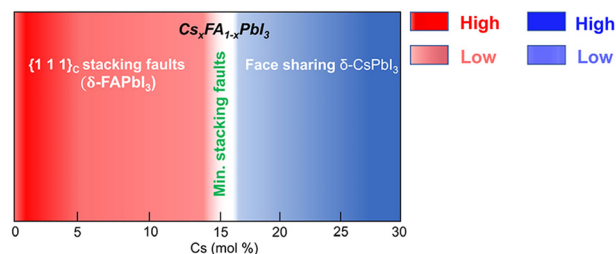
Xiaoru Liu, Zhihao Zhao,* Yikui Gao, Yang Nan, Yuexiao Hu, Ziting Guo, Wenyan Qiao, Jing Wang, Linglin Zhou, Zhong Lin Wang* and Jie Wang*



3832

Alleviating nanostructural phase impurities enhances the optoelectronic properties, device performance and stability of cesium-formamidinium metal–halide perovskites

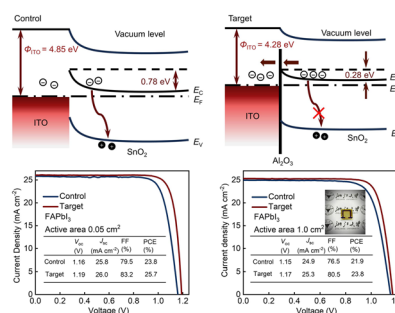
Mostafa Othman,* Quentin Jeangros, Daniel A. Jacobs, Moritz H. Futscher, Stefan Zeiske, Ardan Armin, Anaël Jaffrès, Austin G. Kuba, Dmitry Chernyshov, Sandra Jenatsch, Simon Züfle, Beat Ruhstaller, Saba Tabean, Tom Wirtz, Santhana Eswara, Jiashang Zhao, Tom J. Savenije, Christophe Ballif, Christian M. Wolff* and Aïcha Hessler-Wyser*



3848

Mitigated front contact energy barrier for efficient and stable perovskite solar cells

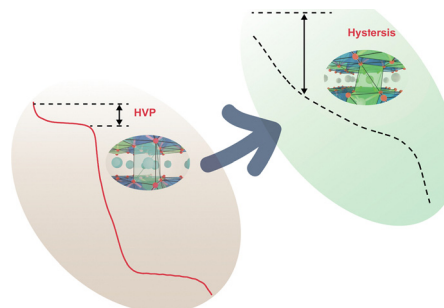
Daoyong Zhang, Biao Li, Pengjie Hang, Jiangsheng Xie, Yuxin Yao, Chenxia Kan, Xuegong Yu,* Yiqiang Zhang and Deren Yang*



3855

A prismatic alkali-ion environment suppresses plateau hysteresis in lattice oxygen redox reactions

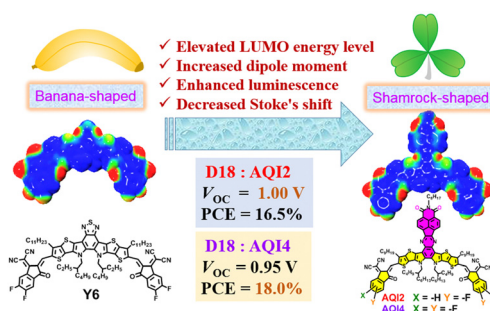
Hao Yu, Ang Gao, Xiaohui Rong,* Shipeng Shen, Xinqi Zheng, Liqin Yan, Haibo Wang, Dan Su, Zilin Hu, Wang Hay Kan, Huaican Chen, Wen Yin, Yaxiang Lu, Qinghua Zhang,* Lin Gu, Claude Delmas, Liqian Chen, Shouguo Wang* and Yong-Sheng Hu*



3868

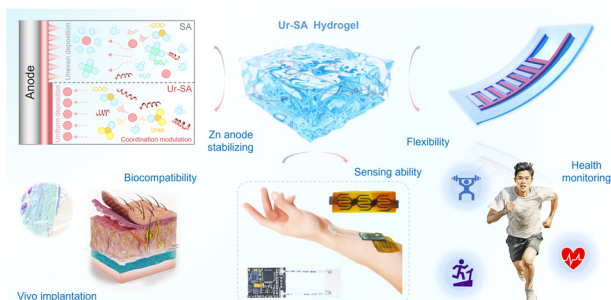
Shamrock-shaped non-fullerene acceptors enable high-efficiency and high-voltage organic photovoltaics

Zongtao Wang, Mengwei Ji, Ailing Tang, Mengzhen Du, Chenyu Mu, Yingliang Liu, Ergang Wang and Erjun Zhou*



PAPERS

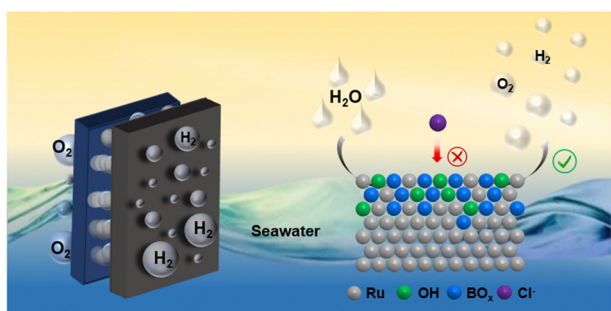
3878



Biocompatible and stable quasi-solid-state zinc-ion batteries for real-time responsive wireless wearable electronics

Bingyao Zhang, Xinze Cai, Jingjing Li, Hao Zhang, Dongmin Li, Haoyang Ge, Shuquan Liang, Bingan Lu, Jiangqi Zhao* and Jiang Zhou*

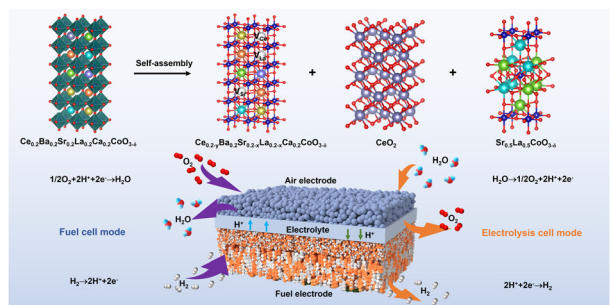
3888



Ruthenium nanoparticles decorated with surface hydroxyl and borate species boost overall seawater splitting via increased hydrophilicity

Le-Wei Shen, Yong Wang, Ling Shen, Jiang-Bo Chen, Yu Liu, Ming-Xia Hu, Wen-Ying Zhao, Kang-Yi Xiong, Si-Ming Wu, Yi Lu, Jie Ying, Maria Magdalena Titirici, Christoph Janiak, Ge Tian* and Xiao-Yu Yang*

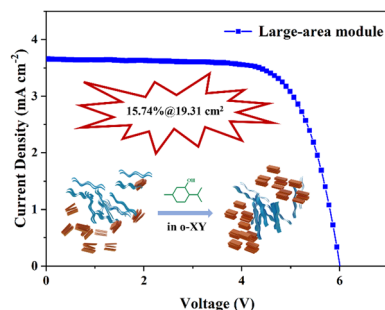
3898



Phase segregation of a composite air electrode unlocks the high performance of reversible protonic ceramic electrochemical cells

Fan He, Mingyang Hou, Dongliang Liu, Yong Ding, Kotaro Sasaki, YongMan Choi,* Shihang Guo, Donglin Han, Ying Liu, Meilin Liu and Yu Chen*

3908



Eco-friendly volatile additive enabling efficient large-area organic photovoltaic module processed with non-halogenated solvent

Ziyan Jia, Jiannan Pan, Xu Chen, Yaohui Li, Tianyu Liu, Hanbo Zhu, Jizhong Yao, Buyi Yan and Yang (Michael) Yang*

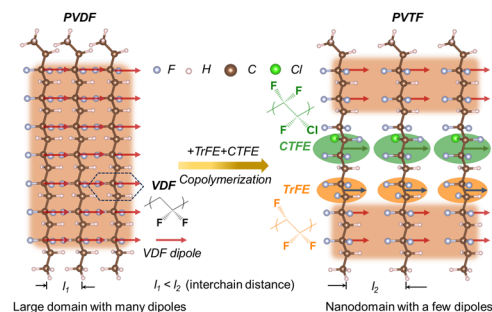


PAPERS

3917

Regulating dielectricity of a polymer electrolyte to promote cation mobility for high-performance solid zinc hybrid batteries

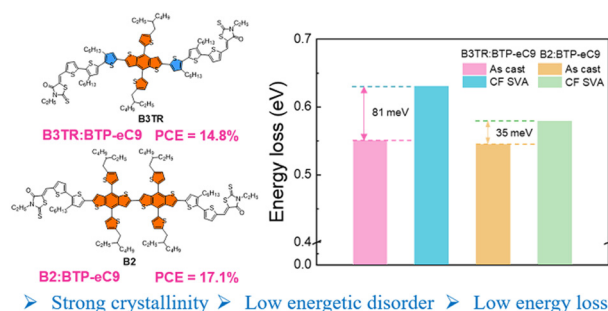
Yue Hou, Zhiqian Wei, Zhuoxi Wu, Yiqiao Wang, Zhaodong Huang, Qing Li, Ze Chen, Xinliang Li, Pei Li, Huilin Cui, Guojin Liang* and Chunyi Zhi*



3927

A highly crystalline donor enables over 17% efficiency for small-molecule organic solar cells

Tao Zhang, Cunbin An,* Pengqing Bi, Kaihu Xian, Zhihao Chen, Jingwen Wang, Ye Xu, Jiangbo Dai, Lijiao Ma, Guanlin Wang, Xiaotao Hao, Long Ye, Shaoqing Zhang and Jianhui Hou*



3937

Hole-transporting alternating copolymers for perovskite solar cells: thia[5]helicene comonomer outperforms planar peryloothiophene analog

Lifei He, Yuyan Zhang,* Bing Zhang, Tianyu Li, Yaohang Cai, Ming Ren, Jing Zhang, Peng Wang* and Yi Yuan*

