

# Green Chemistry

Cutting-edge research for a greener sustainable future

[rsc.li/greenchem](https://rsc.li/greenchem)

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 1463-9262 CODEN GRCHFJ 27(24) 6909–7392 (2025)



### Cover

See Tom Breugelmans et al., pp. 7137–7146.

Image reproduced by permission of Siebe De Ley, Kevin Van Daele, Tom Breugelmans from *Green Chem.*, 2025, **27**, 7137.



### Inside cover

See Giacomo Trapasso and Fabio Aricò, pp. 6925–6966.

Image reproduced by permission of Fabio Aricò from *Green Chem.*, 2025, **27**, 6925.

The authors would like to thank Davide Brunelli for creating this cover art.

## EDITORIAL

6922

### Introduction to 'Exploring the frontiers: unveiling new horizons in carbon efficient biomass utilization'

Zhi-Hua Liu, Bing-Zhi Li, Joshua S. Yuan, James Clark, Vânia Zuin Zeidler, Lieve Laurens, Arthur J. Ragauskas, João A. P. Coutinho and Buxing Han

### Exploring the Frontiers: Unveiling New Horizons in Carbon Efficient Biomass Utilization



## CRITICAL REVIEWS

6925

### Organic carbonates as green media: from laboratory syntheses to industrial applications

Giacomo Trapasso\* and Fabio Aricò\*



# RSC Applied Interfaces

GOLD  
OPEN  
ACCESS

Interfacial and surface research  
with an applied focus

Interdisciplinary and open access

[rsc.li/RSCApplInter](http://rsc.li/RSCApplInter)

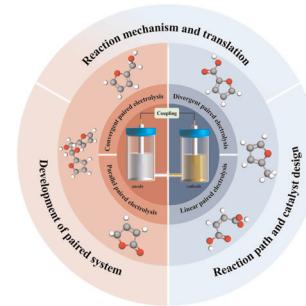
Fundamental questions  
Elemental answers

## CRITICAL REVIEWS

6967

## Advances in paired electrolysis for furfural conversion: from design principle, mechanisms to perspectives

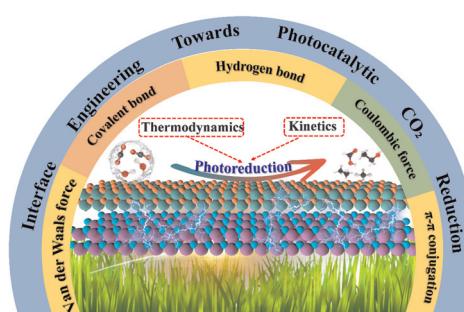
Zhikang Zhang, Jianan Li, Shuyi Yang, Tao E\* and Chong Peng\*



6989

## Advances in molecular interfacial engineering of heterojunctions for photocatalytic CO<sub>2</sub> reduction

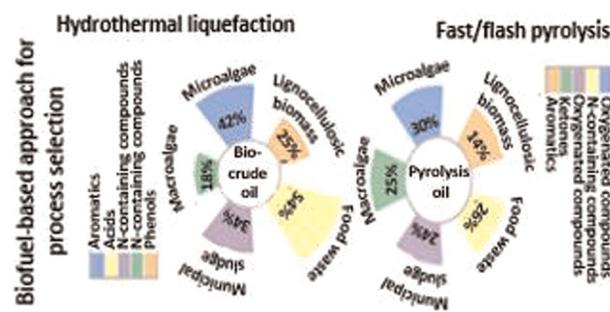
Haopeng Jiang, Jun Shen,\* Lijuan Sun, Jinhe Li, Weikang Wang, Lele Wang and Qinjin Liu\*



7009

## Hydrothermal liquefaction vs. fast/flash pyrolysis for biomass-to-biofuel conversion: new insights and comparative review of liquid biofuel yield, composition, and properties

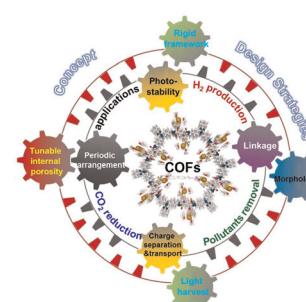
Farid Alizad Oghyanous and Cigdem Eskicioglu\*



7042

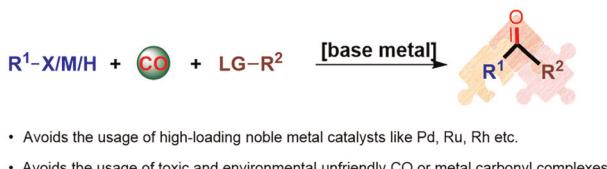
## Shedding light on covalent organic framework photocatalysts: concept, design strategies, and applications-a review

Irshad Ahamd, Gao Li,\* Marwan M. Abduljawad, Mohammed Qasem Alfaifi, Yousef I. Alrashed and Fahad M. Albaqi



## TUTORIAL REVIEWS

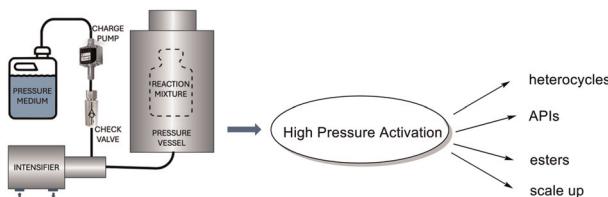
7082



## Developments in CO surrogates for base-metal-catalyzed carbonylation

Wenjing Li, Shentong Xie and Renyi Shi\*

7096

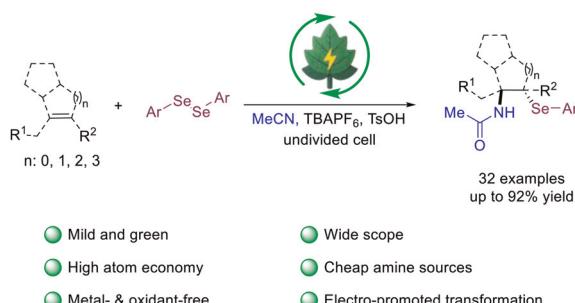


## Green synthesis of building blocks, drug candidates and fine chemicals by barochemistry: application of high pressure in organic synthesis

Guoshu Xie, Valerie Wright, Alexander Lazarev, Gary Smejkal, Vera Gross and Béla Török\*

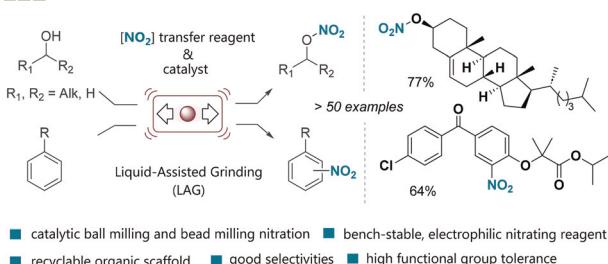
## COMMUNICATIONS

7114

Electrochemical vicinal amidoselenation of unactivated olefins *via* a tandem Ritter reaction

Wei Xu, Nana Zhang, Chenyu Li, Haodong Ma, Bin Wang, Ziren Chen, Yu Xia, Shaofeng Wu, Weiwei Jin,\* Penji Yan,\* Chenjiang Liu\* and Yonghong Zhang\*

7122



## Mechanochemical nitration of arenes and alcohols using a bench-stable organic nitrating reagent

Vasiliki Valsamidou, Subrata Patra, Besa Kadriu, Michel Gaspard Metzger, Ludovic Gremaud and Dmitry Katayev\*

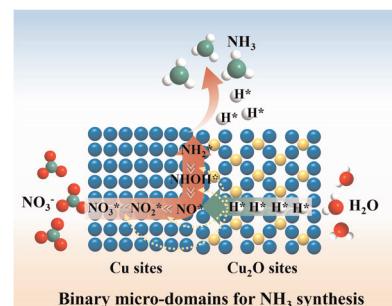


## COMMUNICATIONS

7129

**NaBH<sub>4</sub>-assisted reconstruction of binary micro-domains on a Cu electrode for the selective production of green ammonia**

Jincheng Zhang, Chengyong Xing, Shanna An, Fanshi Meng, Zhanning Liu, Ruixiang Ge, Min Ma,\* Jiali Ren\* and Jian Tian\*

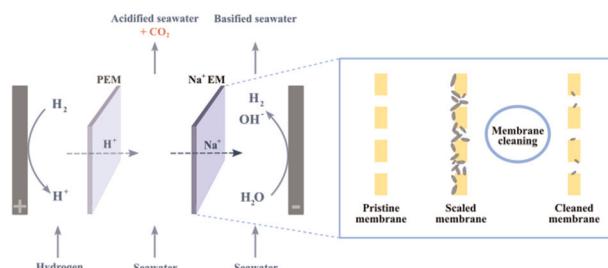


## PAPERS

7137

**Feasibility study of an electrochemical hydrogen looping system for indirect ocean capture**

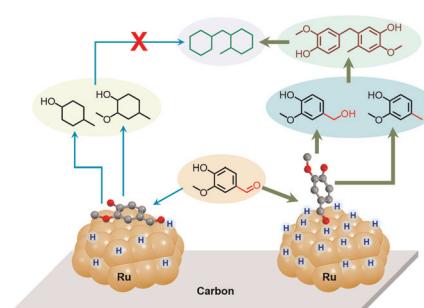
Siebe De Ley, Sven Arnouts, Kevin Van Daele, Jonas Hereijgers and Tom Breugelmans\*



7147

**Production of high-carbon-number hydrocarbon bio-aviation fuels via catalytic hydrogenation of vanillin and non-catalytic condensation: a mechanistic study with DFT and experimental insights**

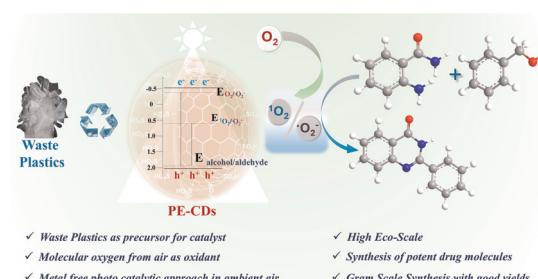
Jina Eun, Jeonghun Kim, Han Byeol Kim, Do Heui Kim, Jae-Wook Choi, Kwang Ho Kim, Chun-Jae Yoo, Seongmin Jin, Kyeongsu Kim, Hyunjoo Lee, Chang Soo Kim, Kwan-Young Lee, Jong Suk Yoo,\* Seo-Jung Han,\* Keunhong Jeong\* and Jeong-Myeong Ha\*



7160

**Oxygen-harvesting carbon dot photocatalysts for ambient tandem oxidative synthesis of quinazolin-4(3H)-ones**

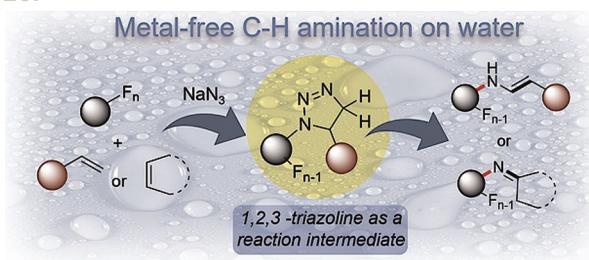
Bidyutjyoti Dutta, Bramhaiah Kommula, Kiran Kanwar, Ankur K. Guha, Ujjal K. Gautam\* and Diganta Sarma\*



## PAPERS

7167

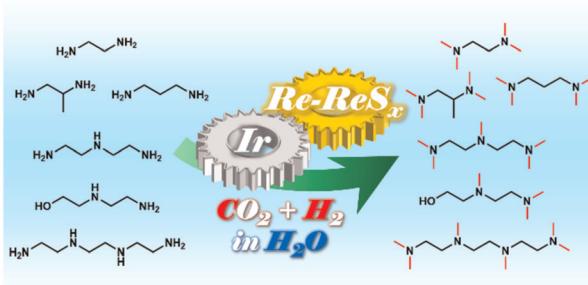
## Metal-free C–H amination on water



**“On water” metal-free direct C–H amination and imination of olefins *via* tandem  $\text{S}_{\text{N}}\text{Ar}$ , click chemistry, and molecular nitrogen release**

Sudripet Sharma, Seyedesahar Miraghaei and Sachin Handa\*

7174



**Highly efficient sulfurized Re–Ir catalysts for multiple *N*-methylation of ethylenediamine and its homologous series with  $\text{CO}_2$  and  $\text{H}_2$  in water solvent**

Min Wang, Mizuho Yabushita,\* Kazuki Okuma, Tomohiro Shono, Yoshinao Nakagawa and Keiichi Tomishige\*

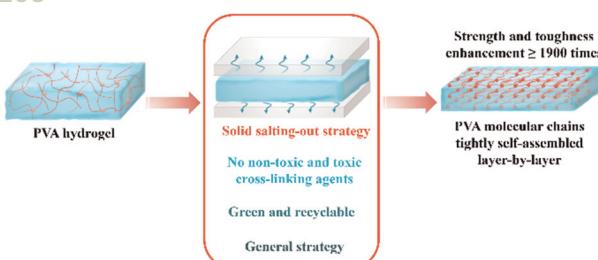
7191



**A green route for producing high-purity nano- $\text{SiO}_2$  from silicon containing waste**

Jiabao Deng, Dawei Luo,\* Ke Rong, Zijie Gao, Jianghua Chen, Ke Zhao and Zhongxiang Yu

7208



**A general strategy for strengthening and toughening physical hydrogels *via* anti-Hofmeister sequence solid salting-out**

En-Jiang Liu, Ding-Ding Lü, Bai-Chuan Lu, Run-Ze Hu, Shi-Wen Guo, Chen-Man Zong, Xiao-Hui Yao, Xue-Yang Wang, Tao Chen, Ai-Jun Wan and Dong-Yang Zhang\*

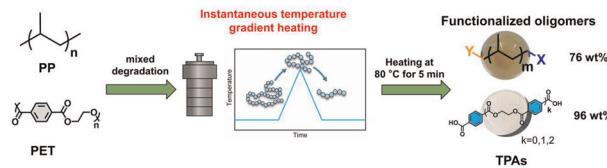


## PAPERS

7220

**Co-upcycling of mixed polypropylene and polyesters**

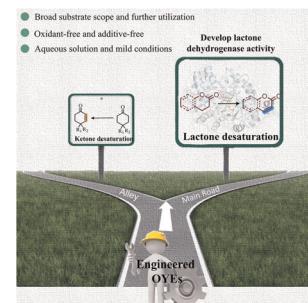
Xiangyue Wei, Qiang Zhang, Chengfeng Shen, Pengbo Ye, Jiaying Xu, Xuehui Liu, Zhishan Su, Shimei Xu\* and Yu-Zhong Wang\*



7229

**Enabling desaturation of lactones by reversible catalytic activity of 'ene'-reductases**

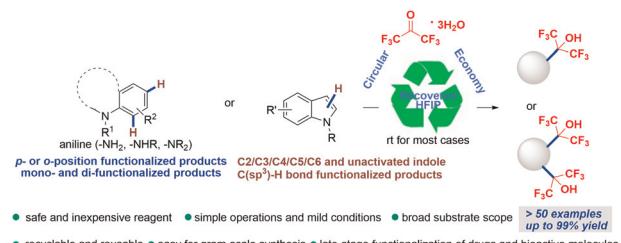
Fengxi Li, Yihang Dai, Shenhan Xie, Xinjia Yu, Xinyan Shi, Zhengqiang Li, Chuang Du,\* Zhi Wang\* and Lei Wang\*



7234

**Facile and rapid access to hexafluoroisopropanol (HFIP)-group-functionalized aniline and indole derivatives using hexafluoroacetone trihydrate in HFIP**

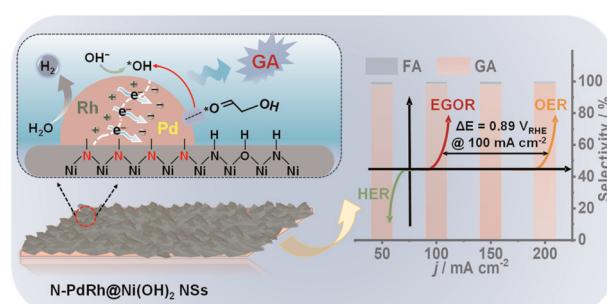
Xindi Li, Yuhao Wu, Jinshan Li,\* Jialin Xie, Juanzu Liu, Zhenchang Wen, Zhendong Zhao and Chunman Jia\*



7242

**N-Coordinated Pd–Rh synergy for highly selective ethylene glycol oxidation and efficient hydrogen evolution**

Hai-Yan Guo, Jin-Wei Kang, Yun-Yan Du, Lu Zhang,\* Jiu-Ju Feng and Ai-Jun Wang



## PAPERS

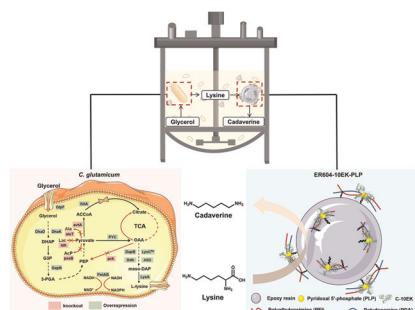
7254



## Hydrogen spillover boosts PET upcycling to aviation fuel additives over Co–ReO<sub>x</sub> catalysts

Xin Zhao, Hui Wang, Zhecheng Fang, Zixu Ma, Shuzhuang Sun,\* Dan Wu, Yongsheng Zhang, Chunbao Charles Xu, Shengyong Lu, Renfeng Nie\* and Jie Fu\*

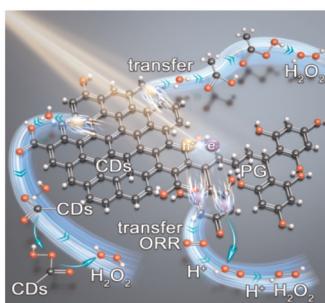
7263



## Engineering a hybrid system of *Corynebacterium glutamicum* and co-immobilized enzymes for efficient cadaverine production from glycerol

Yunpeng Lv, Simin Liu, Liang Wei,\* Lei Zhang and Haishan Qi\*

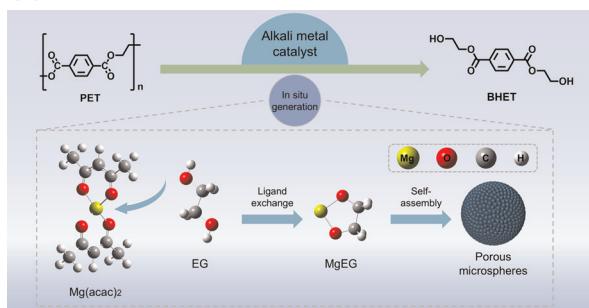
7281



## Carbon-dot-modified phloroglucinol–glutaraldehyde resin photocatalysts for hydrogen peroxide production

Jiarong Wang, Ning Li, Weijie Ren, Jie Wu, Qing Chang, Jinlong Yang, Shengliang Hu\* and Haolan Xu\*

7290



## Depolymerization of polyesters by *in situ* generated alkali metal alkoxides

Junyan Wu, Qingqing Zhao, Diandian Shi, Yiguo He, Zhen Miao, Haijiao Xie, Dianyu Wang,\* Shuzhuang Sun and Yadong Zhang\*

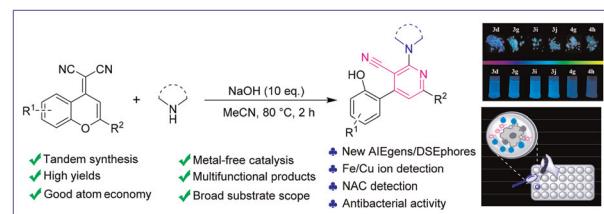


## PAPERS

7300

**Multifunctional 3-cyanopyridine compounds: synthesis based on a tandem reaction with 100% atom economy and their applications**

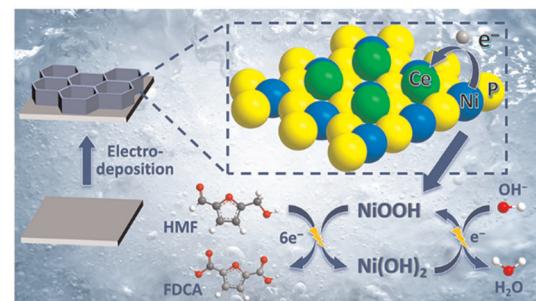
Xi-Ying Cao, Zhong-Hao Li, Xiao-Hui Cao,\* Zong Li, Chu-Ming Pang,\* Zu-Qi Zhang and Zhao-Yang Wang\*



7307

**Enhanced electrocatalytic hydrogen evolution reaction, oxygen evolution reaction and biomass oxidation over Ce-doped NiP<sub>x</sub> via optimization of electronic modulation**

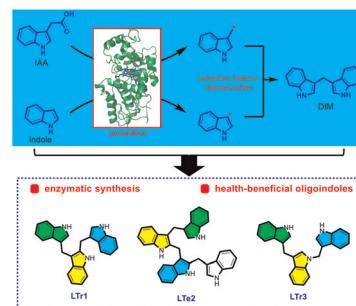
Shuhan Liu, Yifei Ye, Lele Gao, Zhen Yan, Haokun Pan, Zhaokun Wang, Guangrui Zhang and Xiubing Huang\*



7319

**Enzymatic synthesis of health-beneficial oligoindoles using peroxidase**

Dan Liu, Heng Peng Zhang, Jia Cheng Qian, Yi Wang, Su Juan Ren and Ren Xiang Tan\*



7329

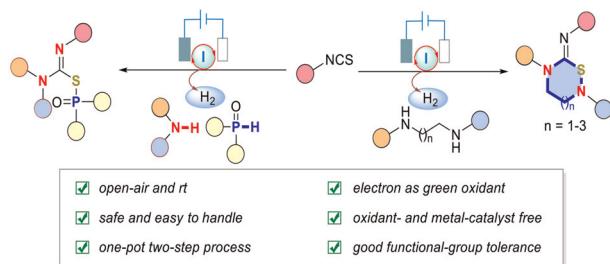
**Aerobic alcoholization via aromatization driven C–C bond cleavage of unstrained ketones**

Renzhi Liu and Huiying Zeng\*



## PAPERS

7336



### Electrochemically driven tandem addition–cyclization: synthesis of thiadiazinanes and thiophosphonates

Honghao Zhou, Yike Zhang, Liting Ma, Xiangyang Liu, Chun Zhang, Feifei Tong, Dandan Hu,\* Jun-Qi Zhang\* and Jianguo Yang\*

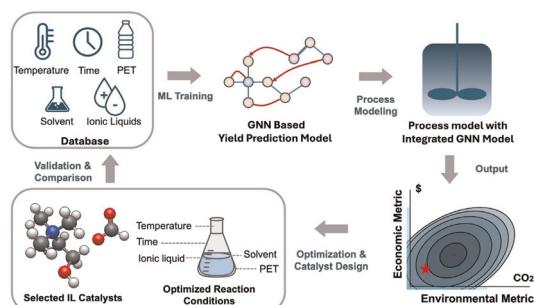
7344



### Aqueous choline acetate as reaction medium for the oxidation of kraft lignin with hydrogen peroxide

Cosimo Annese,\* Michele Casiello, Caterina Fusco, Antonio Monopoli and Lucia D'Accolti

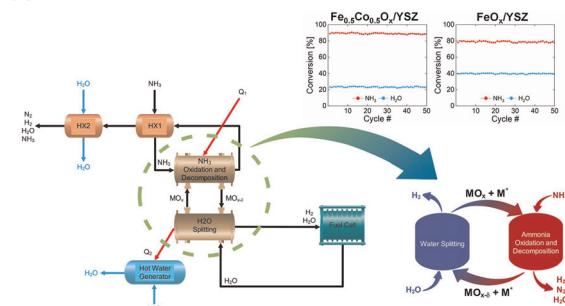
7357



### Machine learning-guided optimization for ionic liquid-based polyethylene terephthalate waste recycling

Ji Gao, Wenbo Peng, Andres Galindo, Ethan Slaton, Jose Perez Martinez, Guanghui Lan and Zhaohui Tong\*

7368



### Chemical looping hydrogen production from ammonia and water: materials and technoeconomics

Amirmohammad Arjomand Kermani, Kyle Shank and Shang Zhai\*

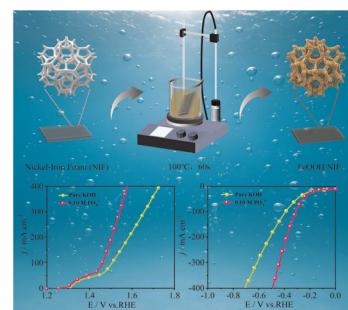


## PAPERS

7380

## Deciphering the synergistic role of chemisorbed phosphate on FeOOH for high-efficiency overall water splitting

Xiaoqian Du, Junjun Zhang,\* Mengyuan Zhang, Huilong Wei, Xiu Lin, Wen Guo,\* Pengfei Zhang\* and Zhenghong Luo



## CORRECTION

7389

Correction: Enhanced electrocatalytic  $\text{CO}_2$  reduction to methane via synergistic Sb and F dual-doping on copper foil under pulsed potential electrolysis

Kuan Wang,\* Xue Jiang, Xin-Peng Li, Zhe Cao, Zhen-Hong He, Weitao Wang, Huan Wang, Xiaojuan Lai\* and Zhao-Tie Liu\*

