

# Green Chemistry

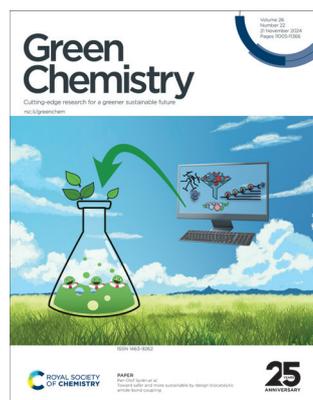
Cutting-edge research for a greener sustainable future

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## IN THIS ISSUE

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### Cover

See Per-Olof Syrén *et al.*, pp. 11147–11163.

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## EDITORIAL

11016

### Measuring green chemistry: methods, models, and metrics

André Bardow, Javier Pérez-Ramírez, Serenella Sala and Luigi Vaccaro

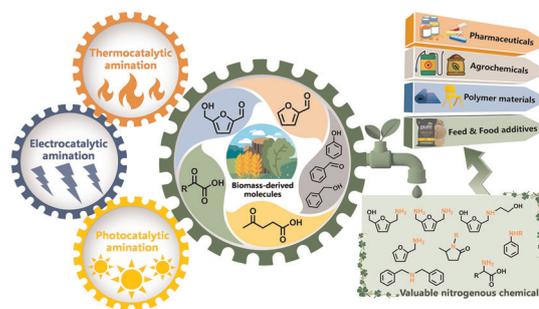


## CRITICAL REVIEW

11019

### Catalytic C–N bond formation strategies for green amination of biomass-derived molecules

Yan Zhong, Feng Liu, Jingsha Li and Chunxian Guo\*



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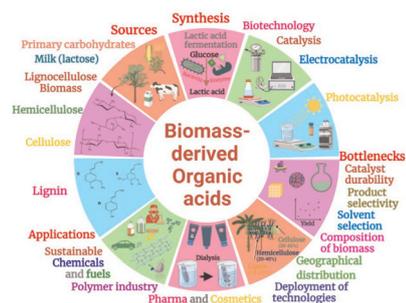


## TUTORIAL REVIEWS

11061

## Scaling up clean production of biomass-derived organic acids as a step towards the realization of dual carbon goals: a review

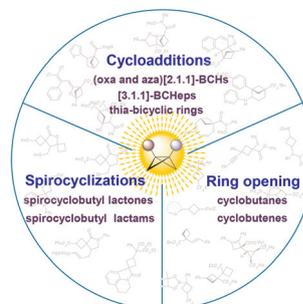
Zulfiqar Ali, Jiliang Ma\* and Runcang Sun\*



11083

## Visible light-induced strain-release transformations of bicyclo[1.1.0]butanes

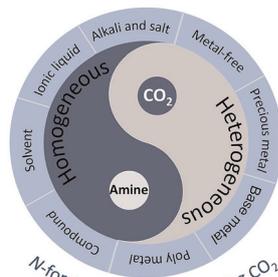
Qing-Bao Zhang,\* Feng Li, Bin Pan, Shanshan Zhang, Xiang-Guo Yue and Qiang Liu\*



11106

Recent advances in *N*-formylation reaction for the chemical recycling of carbon dioxide

Qiang Yuan, Xiao Cai, Weiping Ding and Yan Zhu\*

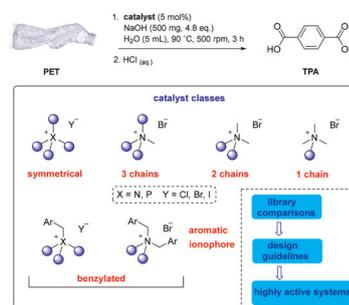


## COMMUNICATIONS

11125

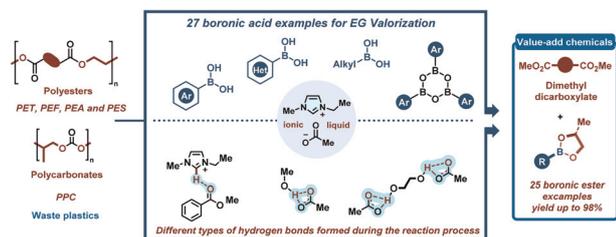
## Effect of a phase transfer catalyst structure on the alkaline hydrolysis of poly(ethylene terephthalate)

Lee B. Anderson, Conall Molloy, Lorenzo Pedrini, Ian L. Martin and Stephen J. Connon\*



## COMMUNICATIONS

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### Converting waste PET into dimethyl terephthalate and diverse boronic esters under metal-free conditions

Minghao Zhang, Yunkai Yu, Zhuo Wang, Shaoyu Zhang, Xiong Gao, Jiaming Liu, Jing Li, Weixiang Wu and Qingqing Mei\*

11140

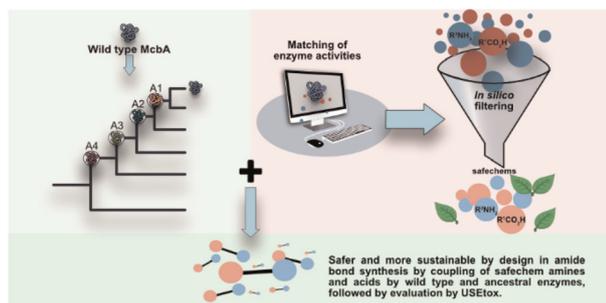


### Reusable Co-catalysts for general and selective $\alpha$ -alkylation of nitriles with alcohols

Zhuang Ma, Zechen Wu, Carsten Kreyenschulte, Stephan Bartling, Henrik Lund, Matthias Beller\* and Rajenahally V. Jagadeesh\*

## PAPERS

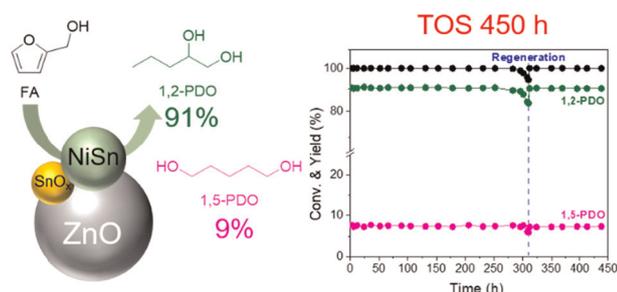
11147



### Toward safer and more sustainable by design biocatalytic amide-bond coupling

Elisabeth Söderberg, Kerstin von Borries, Ulf Norinder, Mark Petchey, Ganapathy Ranjani, Swapnil Chavan, Hanna Holmquist, Magnus Johansson, Ian Cotgreave, Martin A. Hayes, Peter Fantke and Per-Olof Syrén\*

11164



### Continuous production of 1,2-pentandiol from furfuryl alcohol over highly stable bimetallic Ni-Sn alloy catalysts

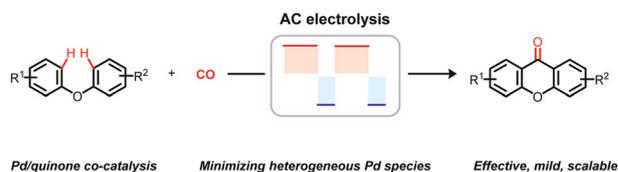
Ajaysing S. Nimbalkar, Kyung-Ryul Oh, Do-Young Hong, Byung Gyu Park, Maeum Lee, Dong Won Hwang, Ali Awad, Pravin P. Upare,\* Seung Ju Han\* and Young Kyu Hwang\*



11177

### Augmentation of Pd-catalysed oxidative C–H/C–H carbonylation through alternating current electrosynthesis

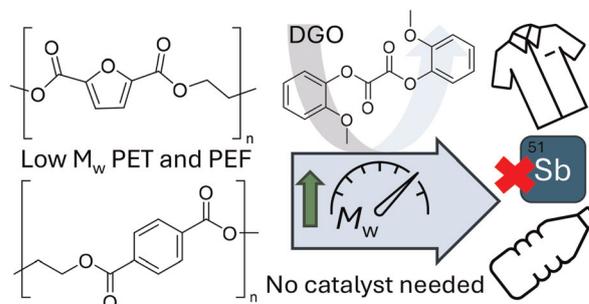
Haoran Li, Jiaqi Peng, Li Zeng,\* Linpu Zhou, Muhammad Shabbir, Feiran Xiao, Jiaxin Yuan, Hong Yi\* and Aiwen Lei\*



11182

### Catalyst free PET and PEF polyesters using a new traceless oxalate chain extender

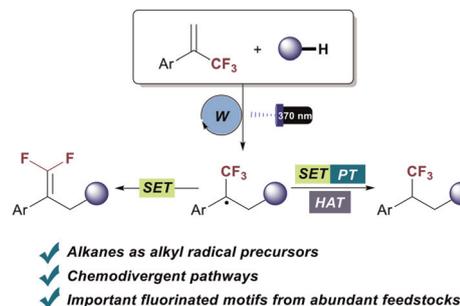
Kevin van der Maas, Daniel H. Weinland, Robert-Jan van Putten, Bing Wang and Gert-Jan M. Gruter\*



11196

### Chemodivergent alkylation of trifluoromethyl alkenes via photocatalytic coupling with alkanes

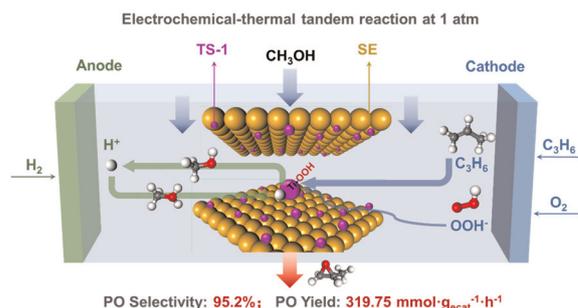
Pol Martínez-Balart, Álvaro Velasco-Rubio, Sergio Barbeira-Arán, Hugo Jiménez-Cristóbal and Martín Fañanás-Mastral\*



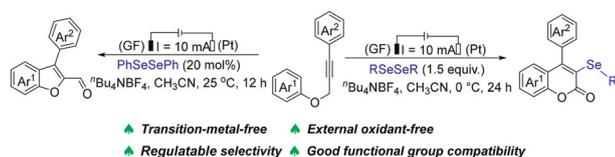
11206

### A spatially integrated electrochemical–thermal tandem reaction for continuous mild synthesis of propylene oxide

Yuefeng Qiu, Peng Jiang, Wenkai Ye, Jiahao Hu, Bin Zhang, Tuo Ji, Liwen Mu, Xin Feng, Xiaohua Lu and Jiahua Zhu\*



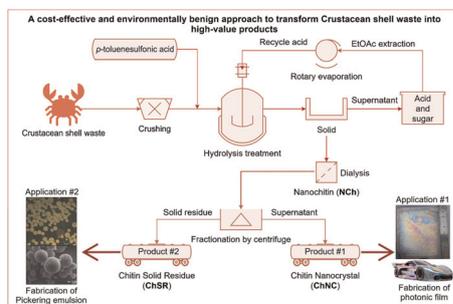
11216



### Regulatable selective synthesis of benzofurans and coumarins from aryl propargyl ethers via an electrochemical tandem cyclization reaction

Zhaoyue Feng, Xueyi Guan, Haiyang Ma, Yingsibing Fan, Ping Liu\* and Peipei Sun\*

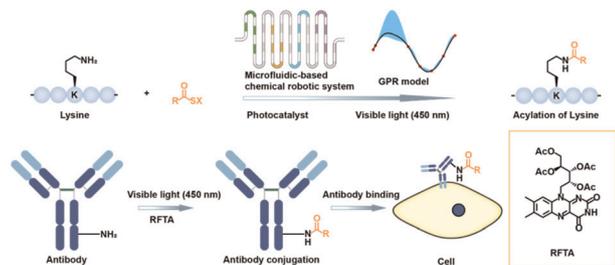
11222



### Production of nanochitins via a shell biorefinery process for self-assembly applications as photonic films and Pickering emulsions

Xuhai Zhu, Fuyan Peng, Hui Li, Rongjun Lin, Rui Lu and Fang Lu\*

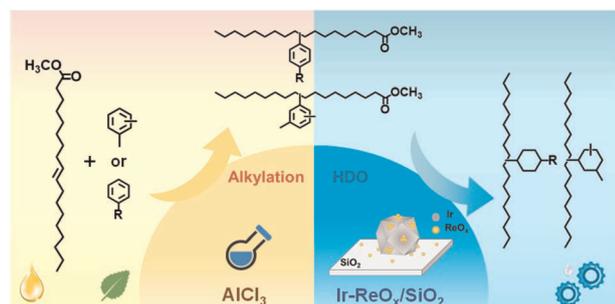
11238



### Photocatalytic acylation of lysine screened using a microfluidic-based chemical robotic system

Zhanfeng Hou, Chuan Wan, Heming Jiang, Yuena Wang, Yun Xing, Jinpeng Wang, Zhihong Liu, Xiaochun Guo, Yuhao An, Wei Han, Rui Wang,\* Xinhao Zhang,\* Feng Yin\* and Zigang Li\*

11249



### Catalytic synthesis of renewable lubricant base oils with methyl oleate and aromatics

Binbin Zhou, Nan Wang, Sibao Liu\* and Guozhu Liu\*

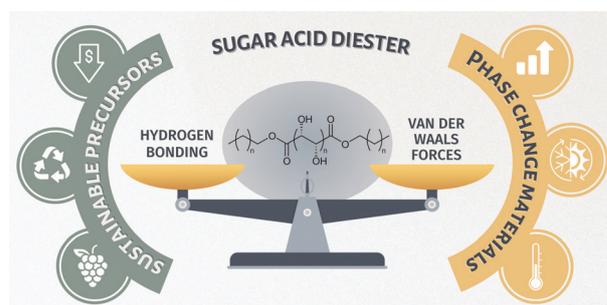


## PAPERS

11259

**Biomass-derived polyol esters as sustainable phase change materials for renewable energy storage**

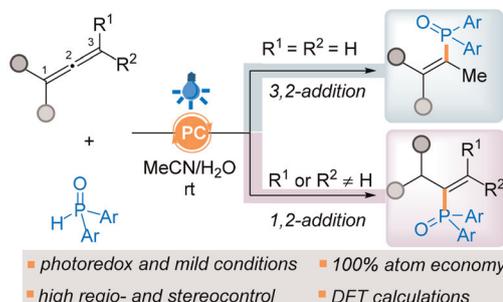
Magdalena Gwózdź, Marta Markiewicz, Stefan Stolte, Anna Chrobok, David R. Turner, Karolina Matuszek\* and Alina Brzęczek-Szafran\*



11272

**Substrate-controlled regioselective hydrophosphorylation of allenes to enable photocatalytic synthesis of alkenylphosphoryl compounds**

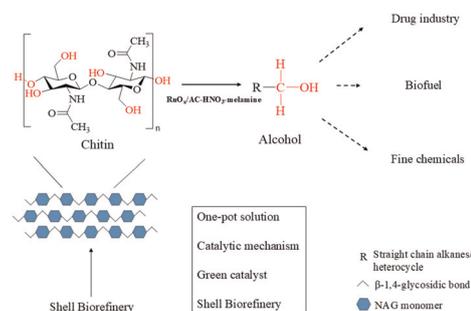
Tian-Ming Yang, Xin-Lu Fan, Wei Shi, Xuefei Zhao\* and Xu-Hong Hu\*



11280

**Shell biorefineries: mixed biofuel production from chitin**

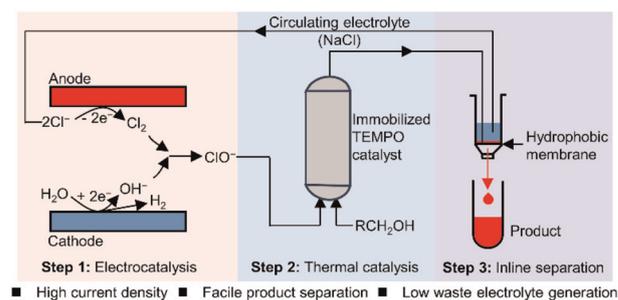
Hao Huang, Guangping Zhou, Xiaolan Cai, Min Zhuang and Shaoqu Xie\*



11290

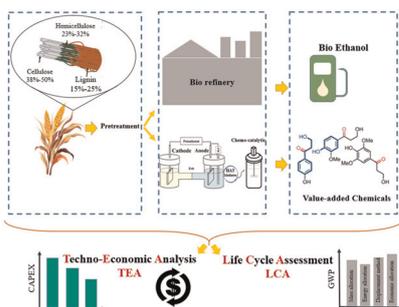
**Selective electrosynthesis of aldehydes at industrially relevant current densities via tandem electrochemical–chemical catalysis**

Ting Lin, Menglu Cai, Huijie Chen and Yiming Mo\*



## PAPERS

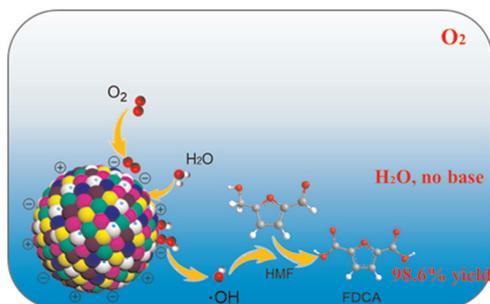
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### Comparative techno-economic and life cycle assessment of electrocatalytic processes for lignin valorization

Zahra Ebrahimpourbora, Manish Mosalpuri, Cheng Yang, Aditya Ponukumati, Corey Stephenson, Marcus Foston and Mark Mba Wright\*

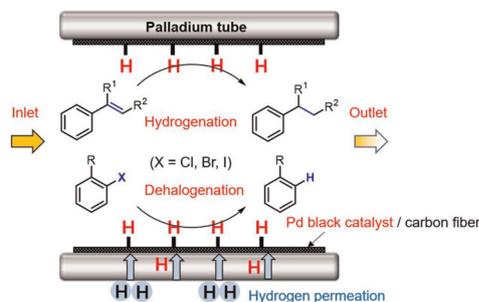
11316



### Thermodynamically stable synthesis of high entropy alloys and efficiently catalyzed oxidation of 5-hydroxymethylfurfural into 2,5-furandicarboxylic acid under base-free conditions

Guangqiang Lv,\* Shan Liu, Xiaoyan Chen, Mengxin Chen, Yanjuan Wu, Yuji Gao, Shuai Wang, Furong Tao, Jingui Wang\* and Liwei Niu\*

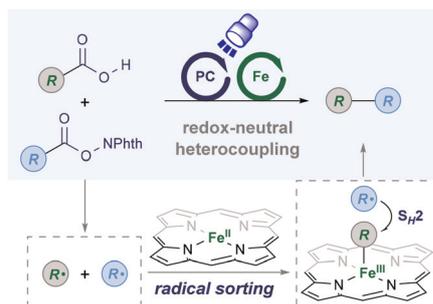
11328



### Development of a highly efficient electrocatalytic hydrogenation and dehalogenation system using a flow cell with a Pd tube cathode

Hiroaki Tajima, Hideki Ishii, Shinsuke Inagi and Toshio Fuchigami\*

11334



### Iron/photoredox dual-catalyzed redox-neutral double decarboxylative C(sp<sup>3</sup>)-C(sp<sup>3</sup>) cross-coupling

Qi Zhang, Shanghui Wu and Xuesong Wu\*

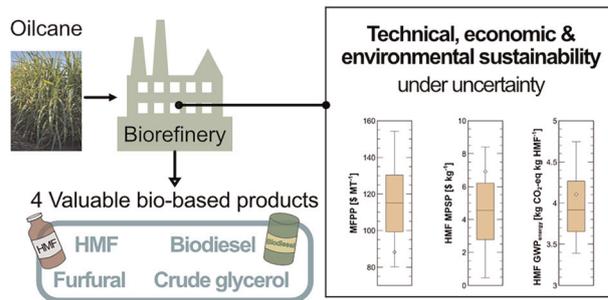


## PAPERS

11340

### Economic and environmental sustainability of bio-based HMF production and recovery from lignocellulosic biomass

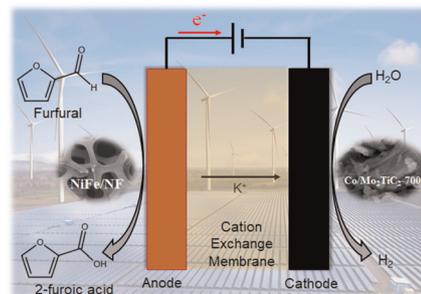
Yuyao Jia, Shraddha Maitra, Lavanya Kudli, Jeremy S. Guest and Vijay Singh\*



11351

### A paired alkaline electrolyzer for furfural oxidation and hydrogen evolution over noble metal-free NiFe/Ni and Co/MXene catalysts

Xiaopeng Liu, Mohammad Albloushi, Michael Galvin, Connor W. Schroeder, Yue Wu\* and Wenzhen Li\*



## CORRECTION

11364

### Correction: Continuous production of 1,2-pentanediol from furfuryl alcohol over highly stable bimetallic Ni–Sn alloy catalysts

Ajaysing S. Nimbalkar, Kyung-Ryul Oh, Do-Young Hong, Byung Gyu Park, Maeum Lee, Dong Won Hwang, Ali Awad, Pravin P. Upare,\* Seung Ju Han\* and Young Kyu Hwang\*

