

# Green Chemistry

Cutting-edge research for a greener sustainable future

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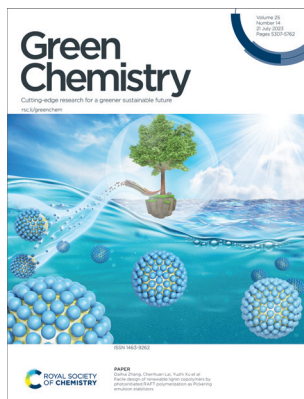
ISSN 1463-9262 CODEN GRCHFJ 25(14) 5307–5762 (2023)



### Cover

See James A. Dumesic *et al.*, pp. 5416–5427.

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### Inside cover

See Daihui Zhang, Chenhuan Lai, Yuzhi Xu *et al.*, pp. 5428–5437.

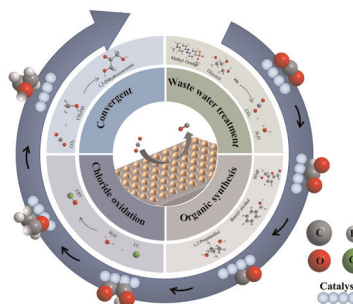
Image reproduced by permission of Daihui Zhang from *Green Chem.*, 2023, **25**, 5428.

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Honglei Chen, Chenglong Ding, Caitao Kang, Jiahong Zeng, Yao Li, Yanming Li, Yuanli Li, Changli Li\* and Jingfu He\*

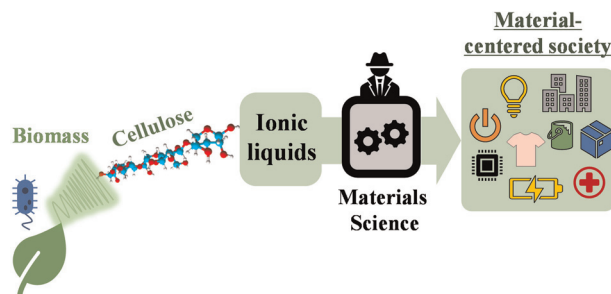


## TUTORIAL REVIEW

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### Cellulose processing in ionic liquids from a materials science perspective: turning a versatile biopolymer into the cornerstone of our sustainable future

László Szabó,\* Romain Milotskyi, Gyanendra Sharma and Kenji Takahashi\*



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# Green Chemistry

Cutting-edge research for a greener sustainable future

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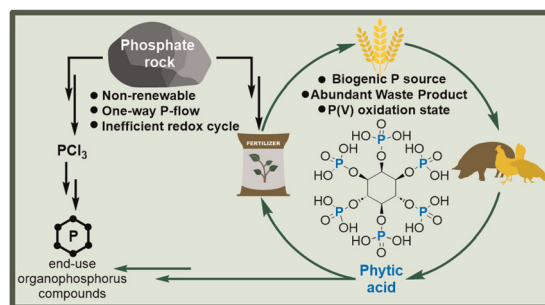


## PERSPECTIVE

5390

## Phosphorus sustainability: a case for phytic acid as a biorenewable platform

Emma K. Davison,\* Jessica C. Neville and Jonathan Sperry\*

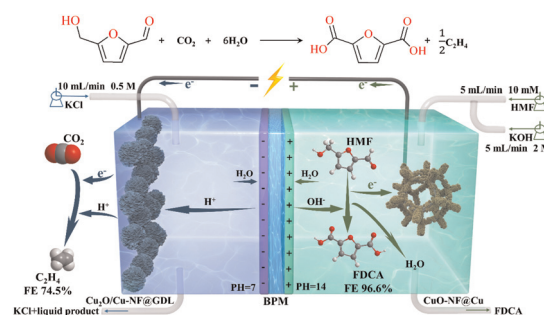


## COMMUNICATION

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High efficiency coupled electrocatalytic CO<sub>2</sub> reduction to C<sub>2</sub>H<sub>4</sub> with 5-hydroxymethylfurfural oxidation over Cu-based nanoflower electrocatalysts

Zonghang Zhang, Shan Liu, Zhao Wu,\* Xiaoyan Chen, Jingui Wang, Yuji Gao, Shuai Wang, Furong Tao and Guangqiang Lv\*

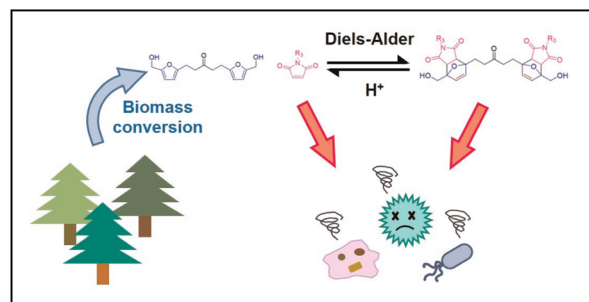


## PAPERS

5416

## Controlling the toxicity of biomass-derived difunctional molecules as potential pharmaceutical ingredients for specific activity toward microorganisms and mammalian cells

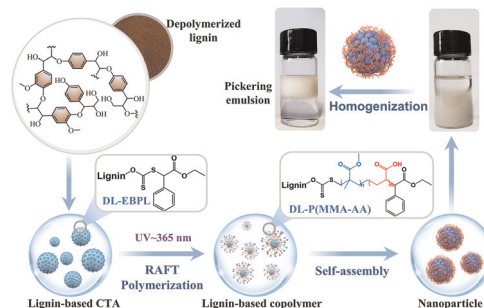
Hochan Chang, Douglas H. Chang, Alexios G. Stamoulis, George W. Huber, David M. Lynn, Sean P. Palecek and James A. Dumesic\*



5428

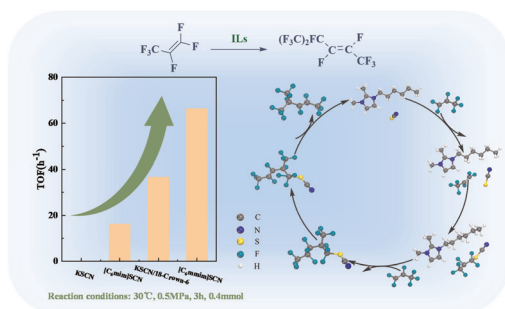
## Facile design of renewable lignin copolymers by photoinitiated RAFT polymerization as Pickering emulsion stabilizers

Jingyi Liu, Xiaoyu Shi, Lin Ma, Daihui Zhang,\* Chenhuan Lai,\* Chunpeng Wang, Mi Li, Arthur J. Ragauskas, Fuxiang Chu and Yuzhi Xu\*



## PAPERS

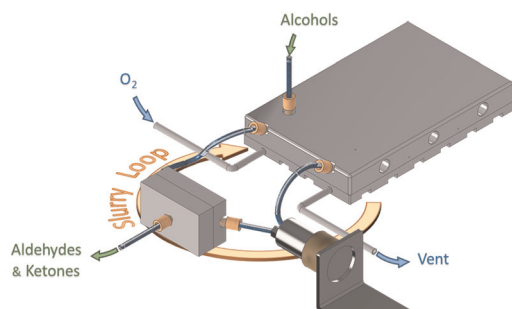
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### Efficient dimerization of perfluoroolefin with strong nucleophilic ionic liquid catalysts by adjusting the interaction of anions and cations

Shiqi Huang, Xianglei Meng,\* Yanzhao Gao, Minmin Liu, Junjie Zhang, Yu Zhou, Yuting Song\* and Yanyan Diao\*

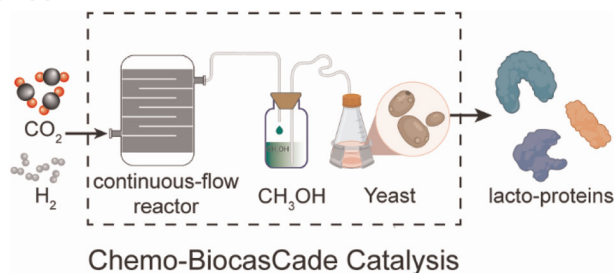
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### Aerobic oxidation of alcohols using a slurry loop membrane reactor

Baldassarre Venezia and Asterios Gavrilidis\*

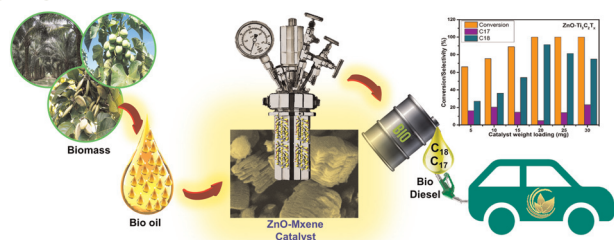
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### Cascaded *de novo* biosynthesis of lacto-proteins from CO<sub>2</sub> by engineered *Pichia pastoris*

Xueqin Lv, Shixiu Cui, Jie Chen, Lingrui Wang, Yanfeng Liu, Jianghua Li, Guocheng Du, Xiaohao Liu,\* Jian Chen, Rodrigo Ledesma-Amaro and Long Liu\*

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### On the reduction of CO<sub>2</sub> footprint via selective hydrodeoxygenation by ZnO–Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> catalyst under solvent-free conditions

Bhagirath Saini, R. Krishnapriya, Meena Yadav, Rahul Singhal and Rakesh K. Sharma\*

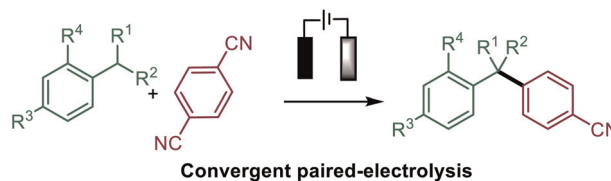


## PAPERS

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**Benzylic C–H arylation with dicyanoarenes via convergent paired electrolysis**

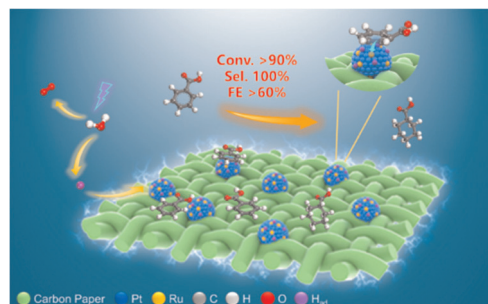
Shanyu Tang and Guillaume Vincent\*



5489

**Electrocatalysis as an efficient alternative to thermal catalysis over PtRu bimetallic catalysts for hydrogenation of benzoic acid derivatives**

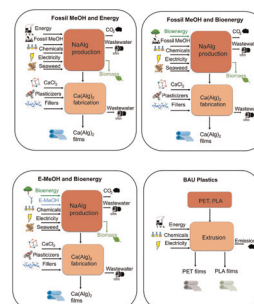
Yan Du, Xiao Chen,\* Weilin Shen, Huibin Liu, Min Fang, Jinxuan Liu and Changhai Liang\*



5501

**The environmental impact and economic feasibility assessment of composite calcium alginate bioplastics derived from *Sargassum***

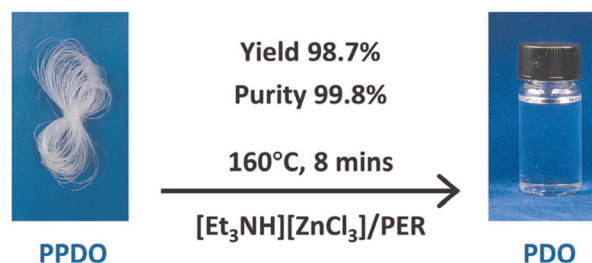
Akeem Mohammed, Keeran Ward,\* Koon-Yang Lee\* and Valerie Dupont



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**Ultrafast and selective recycling of poly(*p*-dioxanone) to monomers by using Brønsted–Lewis acidic ionic liquids as solvents/catalysts**

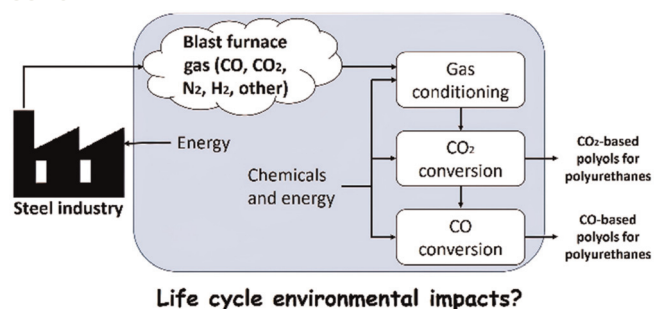
Wei Zhang, Guo-Qiang Tian,\* Gang Wu, Si-Chong Chen\* and Yu-Zhong Wang





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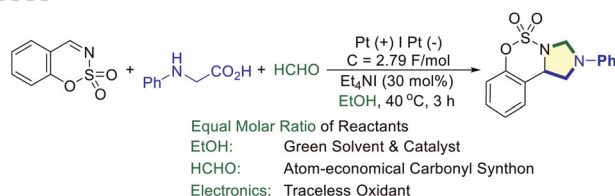
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### Ex-ante life cycle assessment of polyols using carbon captured from industrial process gas

Natalya Tsoy,\* Bernhard Steubing and Jeroen B. Guinée

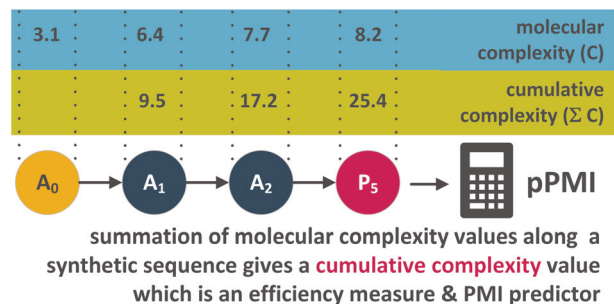
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### EtOH-catalyzed electrosynthesis of imidazolidine-fused sulfamidates from *N*-sulfonyl ketimines, *N*-arylglycines and formaldehyde

Yu-Han Lu, Si-Yu Mu, Hong-Xia Li, Jun Jiang, Chao Wu, Min-Hang Zhou, Wen-Tao Ouyang and Wei-Min He\*

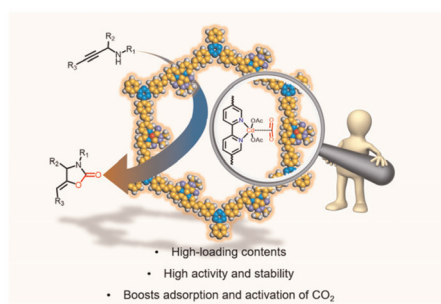
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### Cumulative complexity meta-metrics as an efficiency measure and predictor of process mass intensity (PMI) during synthetic route design

Lucrezia Angelini, Charlotte E. Coomber, Gareth P. Howell,\* George Karageorgis and Brian A. Taylor

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### Covalent organic frameworks embedding single cadmium sites for efficient carboxylative cyclization of CO<sub>2</sub> with propargylic amines

Yize Zhang, Hangshuai Li, Xingyue He, Aiqing Wang,\* Guoyi Bai\* and Xingwang Lan\*

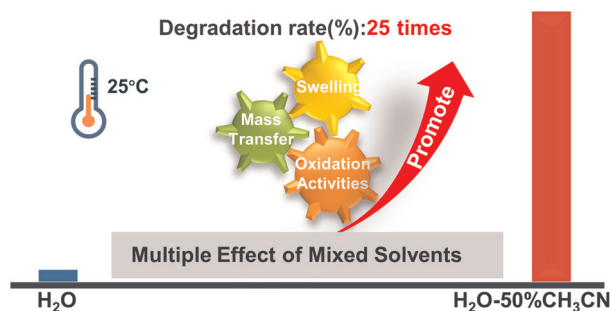


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### Multiple promotion effect of mixed solvents on the oxidative degradation of thermosetting polymers

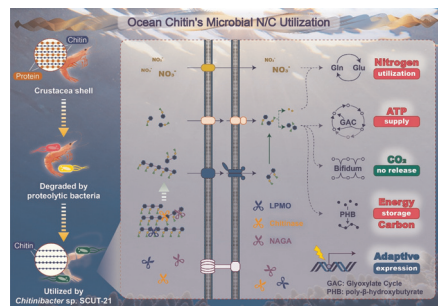
Yuwei Long, Zhishan Su, Lan Bai, Xu Zhao, Wenli An, Xuehui Liu, Shimei Xu\* and Yu-Zhong Wang\*



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### The chitin utilization mechanisms of a new *Chitinibacter* sp. isolate SCUT-21

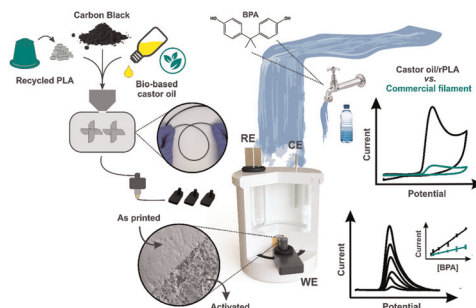
Zhen-Dong Yang, Ming-Shu Zhang, De-Lin Lu, Zhi-Wei Li, He-Hua Mao, Lei Wu, Jia-Rui Zhang, Jing-Tao Ni, Jun-Jin Deng\* and Xiao-Chun Luo\*



5591

### Utilising bio-based plasticiser castor oil and recycled PLA for the production of conductive additive manufacturing feedstock and detection of bisphenol A

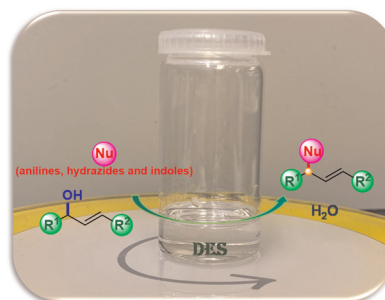
Robert D. Crapnell, Iana V. S. Arantes, Matthew J. Whittingham, Evelyn Sigley, Cristiane Kalinke, Bruno C. Janegitz, Juliano A. Bonacin, Thiago R. L. C. Paixão and Craig E. Banks\*



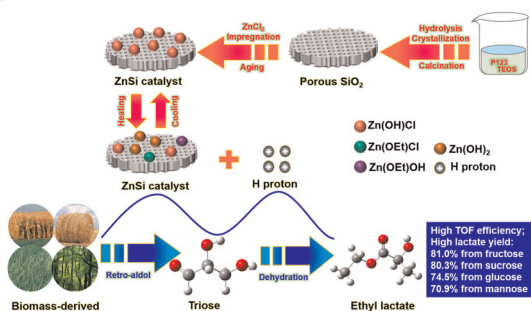
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### Alkylation of amines with allylic alcohols and deep eutectic solvents as metal-free and green promoters

Stephany Zárate-Roldán, M. Concepción Gimeno\* and Raquel P. Herrera\*



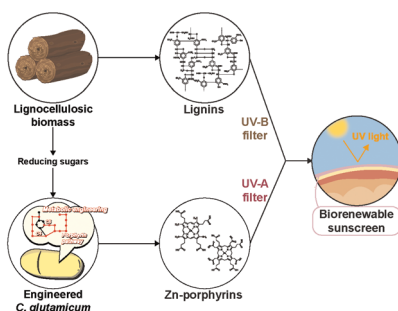
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### Temperature-responsive Zn-based catalysts for efficient catalytic conversion of biomass-derived carbohydrates to ethyl lactate

Jiangang Wang, Jinghua Wang, Yifan Liu, Tihang Liu, Zhaobin Pang, Hongyou Cui,\* Yuan Zhang and Feng Song

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### Biobased sunscreen fabrication using Zn-porphyrins from engineered *Corynebacterium glutamicum*

Young Jin Ko, Jeong-Joo Oh and Sung Ok Han\*

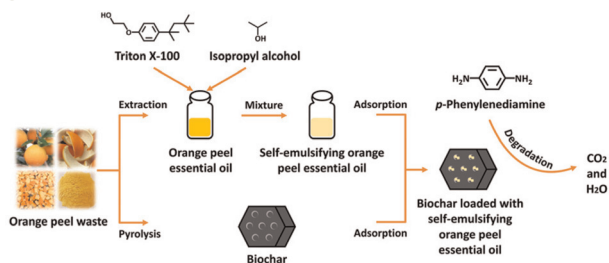
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### Sequential extraction of hemicelluloses by subcritical water improves saccharification of hybrid aspen wood grown in greenhouse and field conditions

Pramod Sivan, Emilia Heinonen, Madhavi Latha Gandla, Amparo Jiménez-Quero, Hüsamettin Deniz Özeren, Leif J. Jönsson, Ewa J. Mellerowicz and Francisco Vilaplana\*

5647



### Reactive oxygen species induced by plant essential oil for effective degradation of *p*-phenylenediamine

Huixian Xu, Yanjun Li, Qin Li, Dandan Yang, Ting Li, Saimeng Jin,\* Liandi Zhou,\* Qihui Zhang\* and James H. Clark



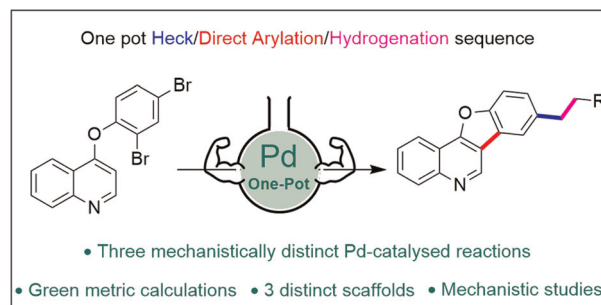


## PAPERS

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### A phosphine free, inorganic base free, one-pot tandem Mizoroki–Heck olefination/direct arylation/hydrogenation sequence, to give multicyclic alkylated heteroarenes

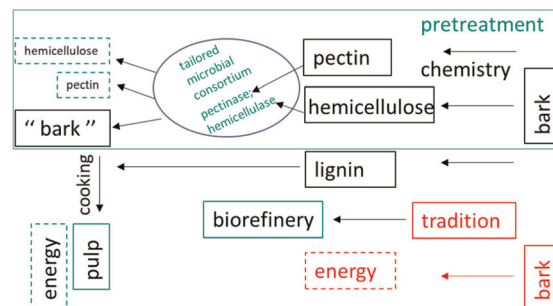
Roberta A. Kehoe, Mark E. Light, David J. Jones and Gerard P. McGlacken\*



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### Structural features of lignin–hemicellulose–pectin (LHP) orchestrate a tailored enzyme cocktail for potential applications in bark biorefineries

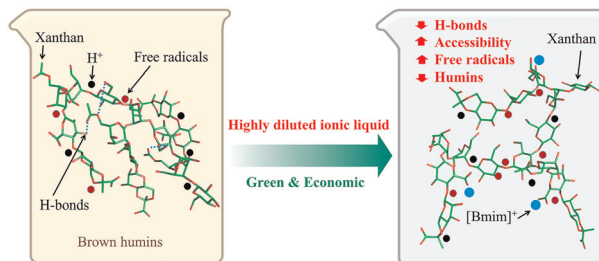
Jinze Dou,\* Jincheng Wang, Sami Hietala, Dmitry V. Evtuguin, Tapani Vuorinen\* and Jian Zhao



5679

### Diluted aqueous ionic liquid assists the acidic oxidative hydrolysis of water-soluble recalcitrant polysaccharide xanthan through structural deterioration

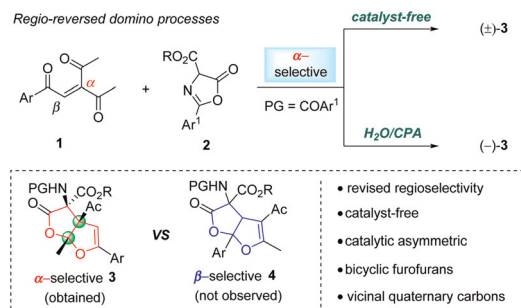
Weiming Liu, Liwei Zhang, Miao Li, Qian Wang, Jinyun Gu, Xiaoyi Chen, Xiaoyu Guo, Zhimin Yu, Xianzhen Li, Shang Wang\* and Fan Yang\*



5692

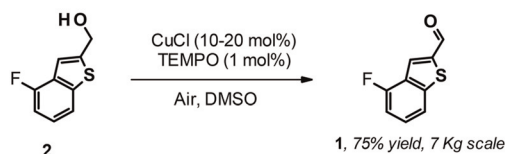
### Catalyst-free racemic and H<sub>2</sub>O/CPA-catalyzed asymmetric regio-reversed domino processes of triketone enones with azlactones

Yun-Dong Fu, Xiang Gao, Shi-Kun Jia, Xiao Xiao, Min-Can Wang, Lihua Huang\* and Guang-Jian Mei\*



## PAPERS

5698

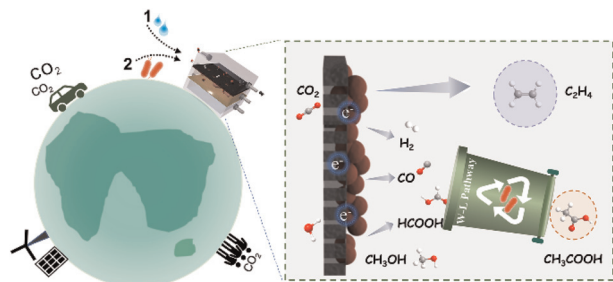
2<sup>nd</sup> generation process

- Eco-friendly catalytic system   ■ Air as terminal oxidant   ■ Simple, safe Protocol
- Pilot scale implementation   ■ Green metrics improvement (PMI, RME, EMY)

### Development and pilot scale implementation of safe aerobic Cu/TEMPO oxidation in a batch reactor

Sylvain Lemaitre, Anne-Lise Romain, François Bariere, Anthony Craquelin, Chloé Copin\* and Alexandre Jean\*

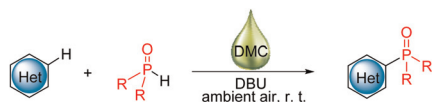
5712



### A novel tandem reactor design based on nano-Cu electrocatalysts and microbial biocatalysts for converting CO<sub>2</sub> into ethylene and acetate

Juan Liu, Xiaoxiao Guo, Zhaoyuan Lyu, Rong-Bin Song, Pengyu Zhou, Shichao Ding, Yang Zhou, Li-Ping Jiang, Yuehe Lin\* and Wenlei Zhu\*

5721



N-heterocycles scope:  
1,2,4-triazine-3,5(2H, 4H)-diones  
Quinoxalin-2(1H)-ones  
Quinoxalines,  
Pyrazinones

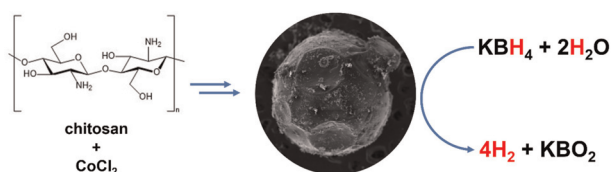
42 Examples yields up to 98%

- ✓ Scaled-up to grams
- ✓ ambient air as green oxidant
- ✓ Mild and simple conditions, easy operation
- ⊘ metal catalyst or Photocatalyst

### Metal-free direct C–H phosphonation of N-heterocycles with diphenylphosphine oxides under mild conditions

Zhao-Nan Cai, Ya-Ping Han, Yuecheng Zhang, Hong-Yu Zhang,\* Jiquan Zhao\* and Shang-Dong Yang

5727



### From shrimp balls to hydrogen bubbles: borohydride hydrolysis catalysed by flexible cobalt chitosan spheres

Frances Pope, Jeffrey Jonk, Millie Fowler, Petrus C. M. Laan, Norbert J. Geels, Larissa Drangai, Vitaly Gitis and Gadi Rothenberg\*

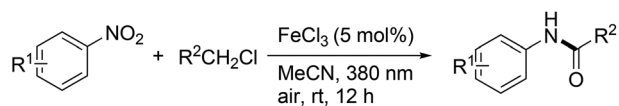


## PAPERS

5735

Visible-light-induced iron-catalyzed synthesis of *N*-aryl amides from nitroarenes and chloroalkanes

Qun-Liang Zhang, Wenxin Liu, Yirong Zhou\* and Fang-Lin Zhang\*

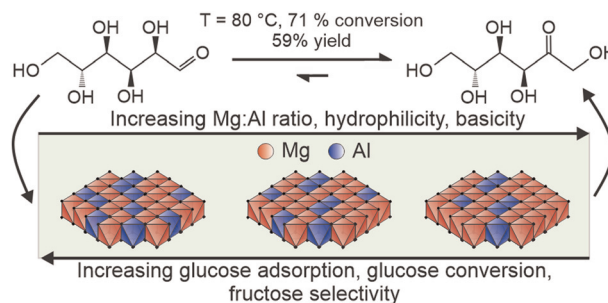


- reductant and photocatalyst free
- nontoxic sustainable iron catalyst
- good functional group tolerance
- high step economy
- mild conditions
- simple manipulation

5741

## Structure–activity relationships of LDH catalysts for the glucose-to-fructose isomerisation in ethanol

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## COMMENT

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Comment on "Catalyst- and additive-free sunlight-induced autoxidation of aldehydes to carboxylic acids" by H. Shi, J. Li, T. Wang, M. Rudolph and A. S. K. Hashmi, *Green Chem.*, 2022, 24, 5835

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