

# Green Chemistry

Cutting-edge research for a greener sustainable future

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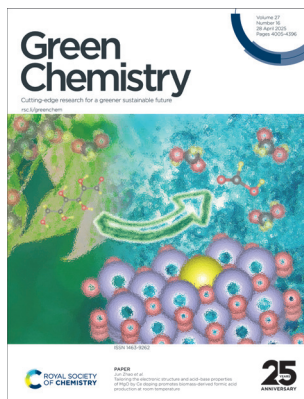
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### Cover

See Yohei Yoshinaka and Stephen A. Miller, pp. 4152–4164.

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### Inside cover

See Jun Zhao *et al.*, pp. 4165–4176.

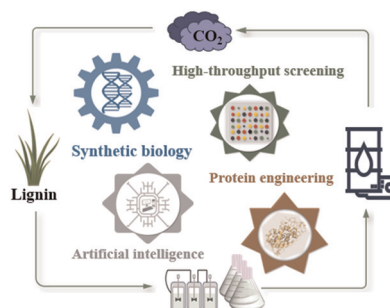
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## CRITICAL REVIEWS

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### Technological advances in ligninolytic enzymes for the biological valorization of lignin

Ning Fu, Ruo-Ying Liu, Ya Zhou, Bing-Zhi Li,\*  
Ying-Jin Yuan and Zhi-Hua Liu\*



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### Recent developments in recycling of post-consumer polyethylene waste

Yang Ma, Xinyao Jiang, Xinyue Xiang, Ping Qu\* and Maiyong Zhu\*



# EES Batteries

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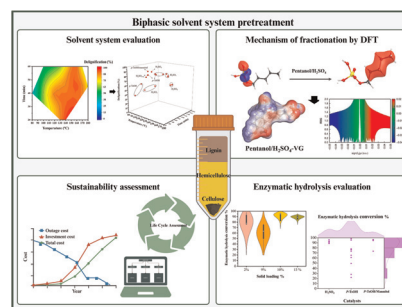


## CRITICAL REVIEWS

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## Harnessing the potential of biphasic solvent systems in lignocellulosic biomass fractionation through computational insights

Maryam Saleknezhad, Meysam Madadi,\* Salauddin Al Azad and Vijai Kumar Gupta\*



## COMMUNICATIONS

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## Electrochemical $\alpha$ -hydroxylation of aryl ketones with methanol as the oxygen source

Zhaoliang Yang,\* Jianwei Huang, Yahao Wang, Haiyan Du, Yuan Zhou\* and Mingming Yu

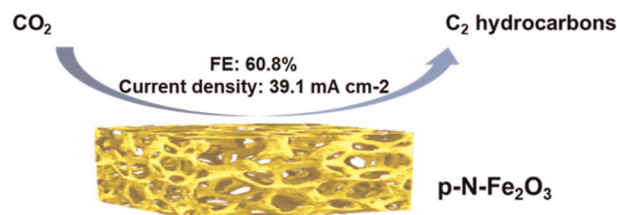


- Oxidant-free and metal-free
- Methanol as the Oxygen Source
- Broad Substrate Scope and high yields
- Scaled up to 2-gram synthesis

4134

## Enhancing the selectivity of $C_2$ hydrocarbons over Fe-based catalysts by controlling nitrogen doping in electrocatalytic $CO_2$ reduction

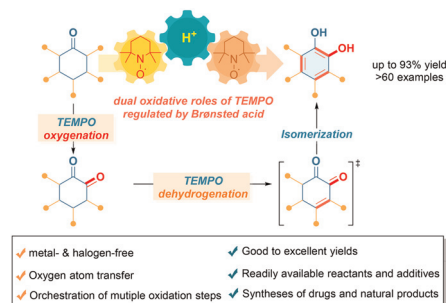
Peng Chen, Shiqiang Liu, Pei Zhang,\* Xinchun Kang, Xing Tong, Jun Ma, Chunjun Chen, Zhimin Liu, Xueqing Xing, Zhonghua Wu, Lirong Zheng and Buxing Han\*



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## Synthesis of catechols from cyclohexanones via acid-regulated dual oxidative transformations with TEMPO

Biping Xu, Xiaojie Liu, Lei Deng, Yaping Shang, Xiaoming Jie\* and Weiping Su\*

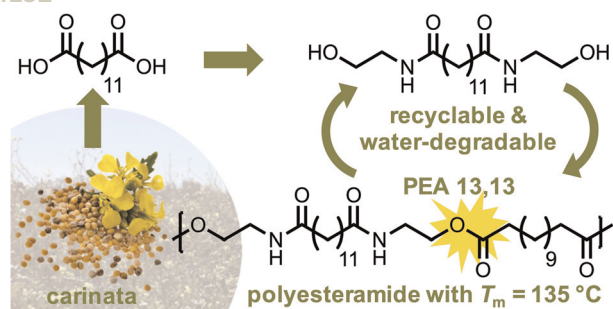


- ✓ metal- & halogen-free
- ✓ Oxygen atom transfer
- ✓ Orchestration of multiple oxidation steps
- ✓ Good to excellent yields
- ✓ Readily available reactants and additives
- ✓ Syntheses of drugs and natural products



## PAPERS

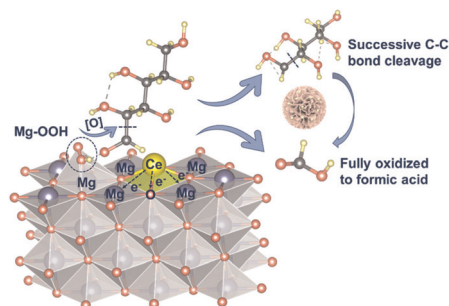
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### Bio-oil derived polyesteramides as water-degradable replacements for polyethylene

Yohei Yoshinaka and Stephen A. Miller\*

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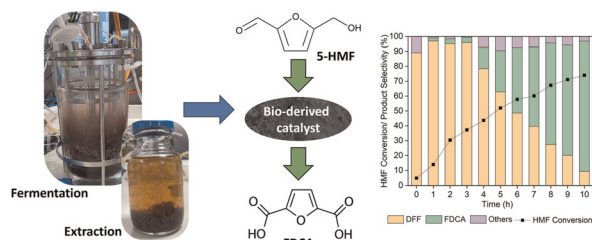
### Tailoring the electronic structure and acid–base properties of MgO by Ce doping promotes biomass-derived formic acid production at room temperature

Yiqi Geng, Wenhua Xue, Jian Ye, Ruilong Zhang, Puranjan Mishra and Jun Zhao\*

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## Microbial catalyst synthesis

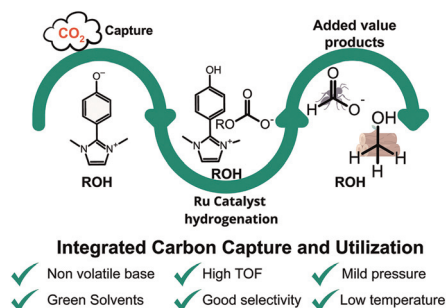
## HMF Oxidation



### Pulcherrimin: a bio-derived iron chelate catalyst for base-free oxidation of 5-hydroxymethylfurfural to furandicarboxylic acid

Swathi Mukundan, Fabio Santomauro, Daniel Miramontes Subillaga, Noelia Villarroel, Adriano Randi, Sandra E. Dann, Jose F. Marco and Jonathan L. Wagner\*

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### Zwitterionic alcoholic solutions for integrated CO<sub>2</sub> capture and hydrogenation

Bruno A. Cândido, Marcelli L. C. Zanirati, Francisco P. dos Santos, Wilmer Villarreal, Jairton Dupont and Pedro Migowski\*

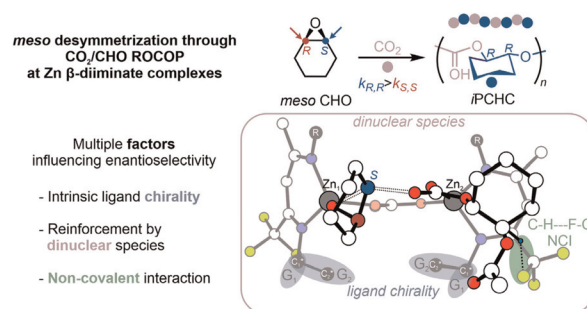


## PAPERS

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### Disclosing multiple factors influencing enantioselective copolymerization of CO<sub>2</sub> with *meso*-epoxides using $\beta$ -diiminato Zn catalysts

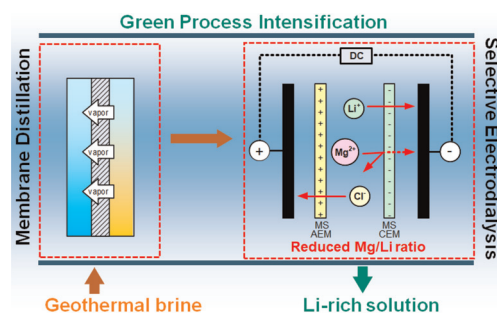
Yolanda Rusconi, Massimo Christian D'Alterio, Claudio De Rosa, Geoffrey W. Coates and Giovanni Talarico\*



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### Sustainable lithium recovery from geothermal brine via integrated membrane distillation – selective electrodialysis

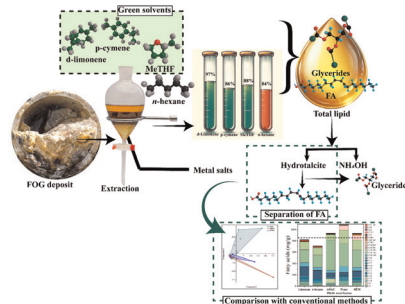
Roviel Berhane Zegeye, Ramato Ashu Tufa,\* Sergio Santoro, Bruno Marco Inzillo, Marco Aquino, Grazia Giuseppina Politano, Alula Selomon Embaye, Pietro Argurio, Loredana De Bartolo and Efrem Curcio



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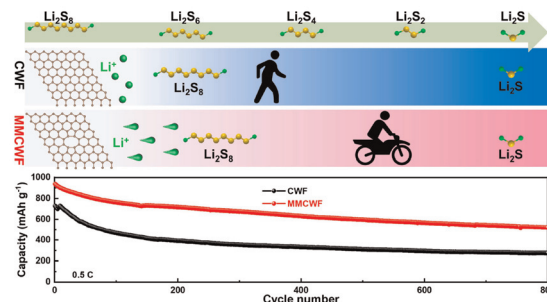
Anika Amir Mohana, Felicity Roddick, Selvakannan Periasamy, Li Gao and Biplob Kumar Pramanik\*



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### Solvothermal-assisted defect engineering in hierarchically porous carbonized wood fibers for high-performance lithium–sulfur batteries

Yangyang Chen, Yu Liao, Lei Li, Yiding Ding, Ying Wu, Zhen Zhang, Sha Luo, Yiqiang Wu and Yan Qing\*



## PAPERS

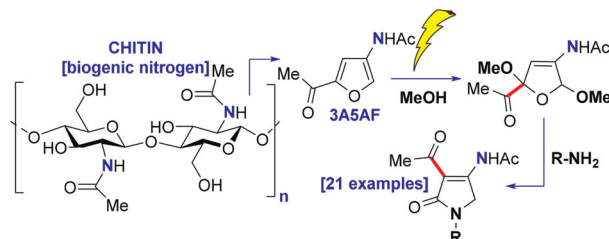
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### Protective fractionation of highly uncondensed lignin with high purity and high yield: new insights into propanediol-blocked lignin condensation

Yaling Zhao, Deqing Zhao,\* Jingpeng He, Kaibin Ma, Jiatian Zhu, Jianrong Liu,\* Yongqi Zhang, Qinqin Xia and Ting Li

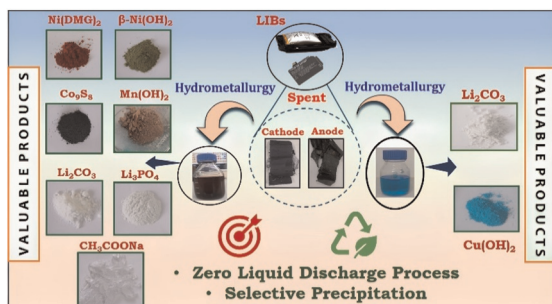
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### Electrochemical oxidation–cyclocondensation of chitin-derived 3-acetamido-5-acetylfuran (3A5AF) for the synthesis of 3-acetyl-4-acetamidopyrrolin-2-ones

Juan J. Arteaga Giraldo, Tilo Söhnle, Paul A. Kilmartin and Jonathan Sperry\*

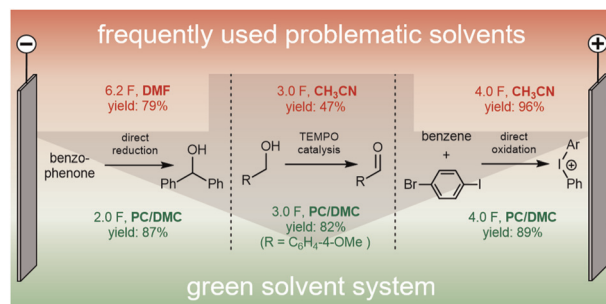
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### A closed-loop zero-liquid-discharge process for the precipitative separation of all valuable metals from waste lithium-ion batteries of mixed chemistries at room-temperature

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### On the use of propylene carbonate and dimethyl carbonate as green solvents in organic electrosynthesis

Adrian Prudlik, Alexandra Matei, Anton Scherkus, Javier Ivan Bardagi, Sebastian B. Beil\* and Robert Francke\*

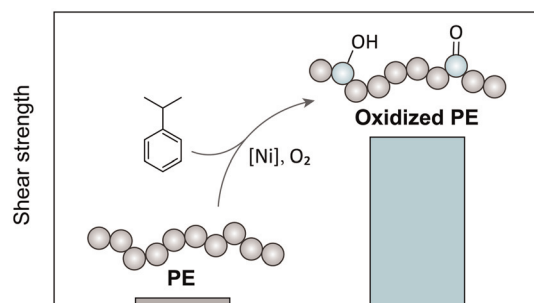


## PAPERS

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**Cumene-mediated aerobic oxidation of polyethylene**

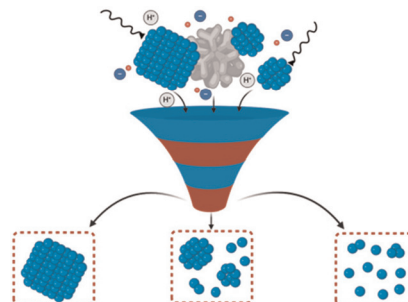
Yizhen Che, Yanfen Wu, Yanyan Zheng, Helai Huang, Qikun Hu and Zhiqiang Niu\*



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**A nano-SPR model for predicting the dissolution rate of metal and metal oxide nanomaterials in the aqueous environment**

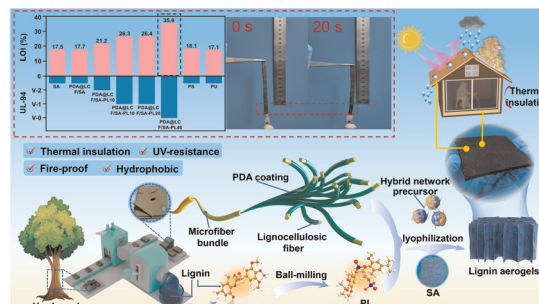
Michal Kalapus and Tomasz Puzyn\*



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**P–N synergy with lignocellulosic biomimetic flame-retardant aerogels for effective fire-safe and thermal insulation**

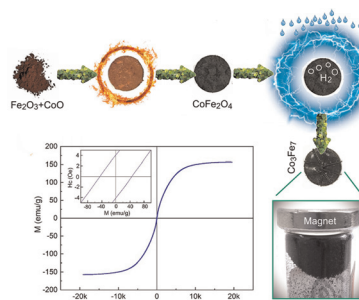
Tao Gui, Shuang-Lin Zou, Hao-Zhen Dou, Wen-Feng Ren, Chang-You Shao, Chun-Lin Xu, Ling-Ping Xiao\* and Run-Cang Sun



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**Water-assisted clean electro-preparation of  $\text{Co}_3\text{Fe}_7$  in molten salts: its enhanced ferromagnetic properties and hydrogen evolution rate**

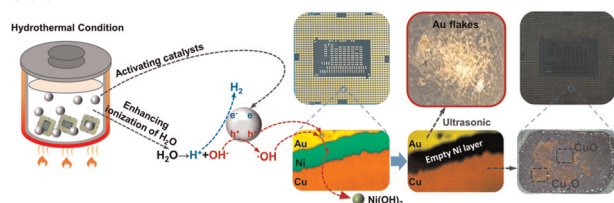
Shengxi Zhao, Kaiyu Xie and Ali Reza Kamali\*





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### Hydrothermal enhanced etching of Ni for direct recovery of gold flakes from electronic waste

Shuling Shen,\* Yu Chu, Ziwei Feng, Zheng Du, Huixin Xiu, Xinjuan Liu, Shuning Xiao, Zhihong Tang, Jing Li and Xun Wang\*

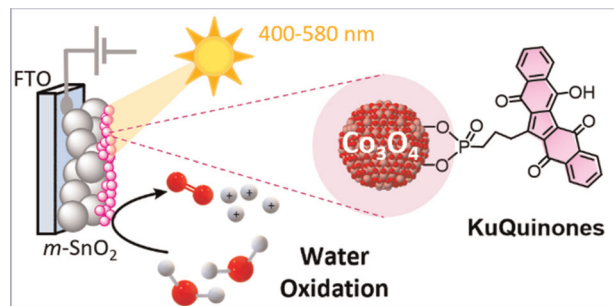
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### Sustainable and biobased self-blown polycarbonate foams: from synthesis to application

Tansu Abbasoglu, Xabier Lopez de Pariza, Gabriel Perli, Danila Merino, Phœbé Caillard-Humeau, Antoine Duval, Luc Avérous, Lourdes Irusta, Alba González and Haritz Sardon\*

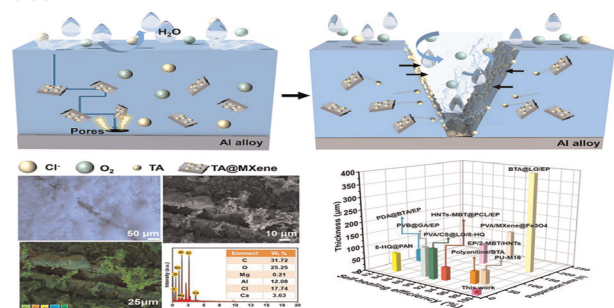
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### KuQuinone-sensitized cobalt oxide nanoparticles for photoelectrocatalytic oxygen evolution with visible light

Ruggero Bonetto, Nuria Romero,\* Federica Sabuzi,\* Mattia Forchetta, Mirco Natali, Raffaella Signorini, Roger Bofill, Laia Francàs, Marcos Gil-Sepulcre,\* Olaf Rüdiger, Serena DeBeer, Jordi García-Antón, Karine Philippot, Pierluca Galloni, Andrea Sartorel\* and Xavier Sala\*

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### Enhanced corrosion resistance of an eco-friendly MXene composite coating with self-healing performance

Xiaoqing Ma, Tiange Wang, Baolong Gong, Jiale Hou, Shuxian Ji and Huaijie Cao\*





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## Shedding light on the path to multifunctional task-specific supported ionic liquids with enhanced catalyst stability and activity

Sergio Alcalde, Raúl Porcar, Nuria Martín, Francisco G. Cirujano, Belén Altava and Eduardo García-Verdugo\*

