

# Green Chemistry

Cutting-edge research for a greener sustainable future

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## IN THIS ISSUE

ISSN 1463-9262 CODEN GRCHFJ 26(10) 5585-6220 (2024)

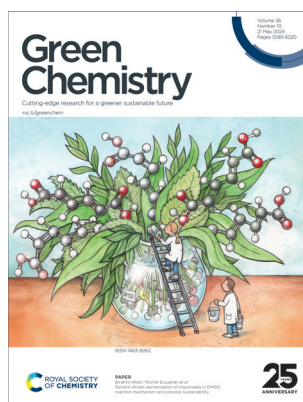


### Cover

See Indrajit Ghosh, Burkhard König *et al.*, pp. 5845–5851.

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Image created by Vladimir Arhipkin.



### Inside cover

See Ibrahim Khalil, Michiel Dusselier *et al.*, pp. 5852–5861.

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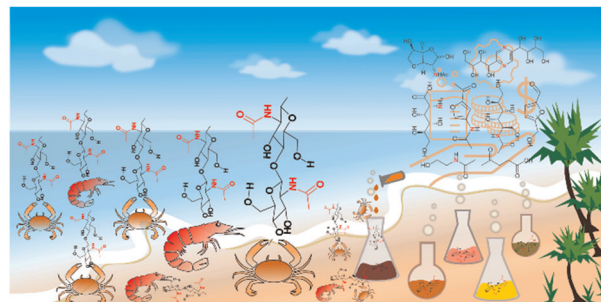
Image created by Joris Snaet.

## CRITICAL REVIEWS

5601

### Shell waste valorization to chemicals: methods and progress

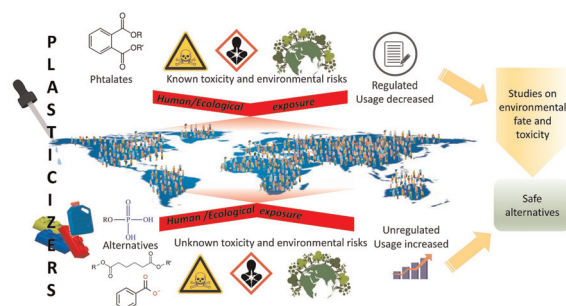
Lavanya Korampattu, Neha Ghosh and Paresh L. Dhepe\*



5635

### Global environmental and toxicological data of emerging plasticizers: current knowledge, regrettable substitution dilemma, green solution and future perspectives

Abdul Qadeer,\* Muhammad Anis, Genoa R. Warner, Courtney Potts, Georgios Giovanoulis, Samia Nasr, Denisse Archundia, Qinghuan Zhang, Zeeshan Ajmal,\* Anthony C. Tweedale, Wang Kun, Pengfei Wang, Ren Haoyu, Xia Jiang\* and Wang Shuhang\*



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## CRITICAL REVIEWS

5684

## Trash or treasure? Sustainable noble metal recovery

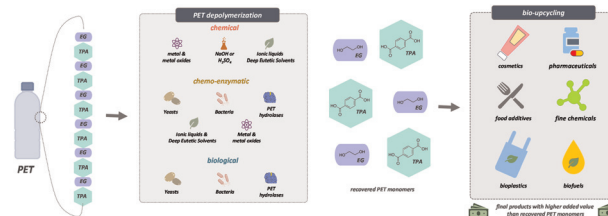
Yicui Wei, Weibo Zhang and Jiao Gao\*



5708

## From trash to cash: current strategies for bio-upcycling of recaptured monomeric building blocks from poly(ethylene terephthalate) (PET) waste

Adriano Carniel, Nathália Ferreira dos Santos, Filipe Smith Buarque, João Victor Mendes Resende, Bernardo Dias Ribeiro, Isabel M. Marrucho, Maria Alice Zarur Coelho and Aline M. Castro\*

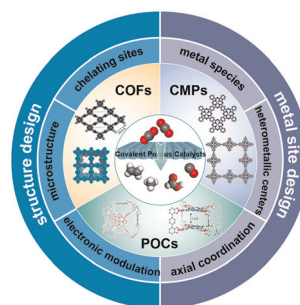


## TUTORIAL REVIEWS

5744

Covalent porous catalysts for electrochemical reduction of CO<sub>2</sub>

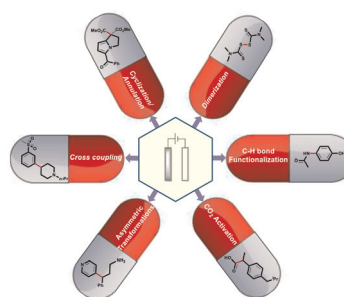
Shuanglong Lu, Hongyin Hu, Huimin Sun, Fulin Yang, Han Zhu, Mingliang Du, Yinghua Jin and Wei Zhang\*



5770

## Challenges and opportunities on sustainable electrochemical transformations: application towards the synthesis of pharmaceuticals and precursors of drug-like molecules

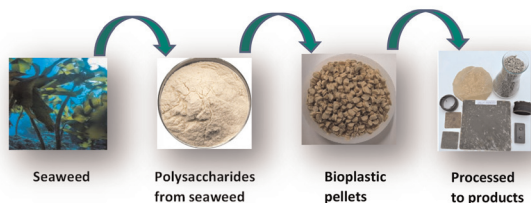
Adrija Ghosh, Vishal Kumar Parida and Debasis Banerjee\*



## TUTORIAL REVIEWS

5790

Bioplastics from seaweeds- promoting circular economies

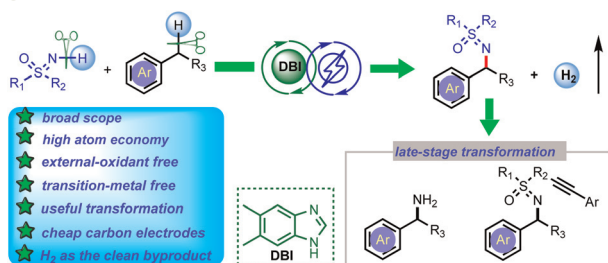


## Seaweed-based polysaccharides – review of extraction, characterization, and bioplastic application

Lakshmi Krishnan, Nandhini Ravi, Anjon Kumar Mondal, Farjana Akter, Manoj Kumar, Peter Ralph and Unnikrishnan Kuzhiumparambil\*

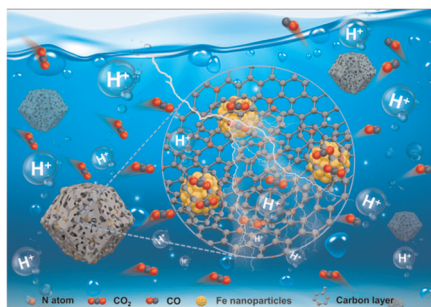
## COMMUNICATIONS

5824

Electrochemical  $N(sp^2)$ - $H/C(sp^3)$ - $H$  cross-coupling reaction between sulfoximines and alkylarenes

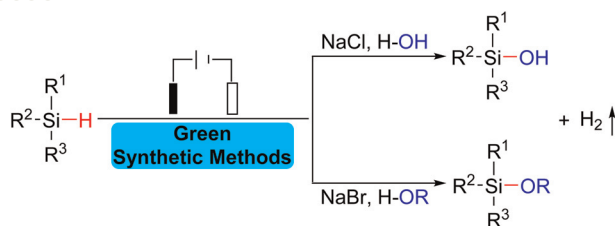
Qing-Ru Zhu, Peng-Zhan Zhang, Xiang Sun, Hui Gao, Pei-Long Wang\* and Hongji Li\*

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Efficient electrochemical  $CO_2$  reduction in acidic electrolytes using armor-like iron nanoparticles/porous nitrogen-doped carbon

Wenli Hao, Li Peng,\* Rongxing Qiu, Tianwei Xue, Ruiqing Li, Qing-Na Zheng, Jia Yu, Tongxin Qiao, Linxiao Cui, Yuzhong Su, Yanzhen Hong, Hongtao Wang, Shuliang Yang\* and Jun Li\*

5838



## Electrochemical strategies for NaX-mediated hydrolysis and alcoholysis of hydrosilanes under mild conditions

Zhengjiang Fu,\* Fei Xiao, Jian Yin, Fei Tong, Shengmei Guo and Hu Cai\*

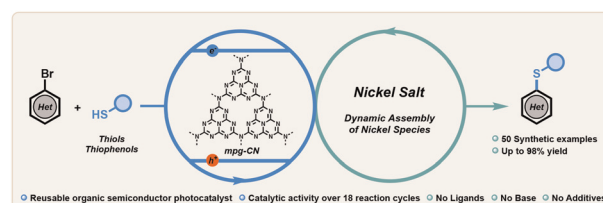


## PAPERS

5845

**C(sp<sup>2</sup>)-S cross-coupling reactions with nickel, visible light, and mesoporous graphitic carbon nitride**

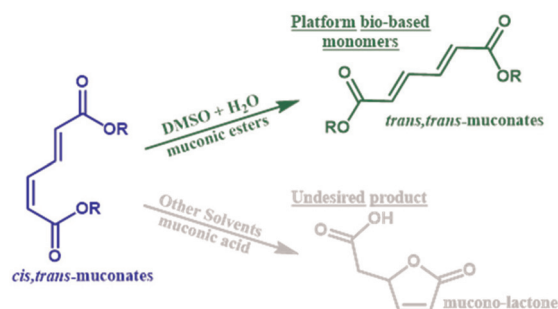
Maksim Nikitin, Florence Babawale, Sena Tastekin, Markus Antonietti, Indrajit Ghosh\* and Burkhard König\*



5852

**Solvent-driven isomerization of muconates in DMSO: reaction mechanism and process sustainability**

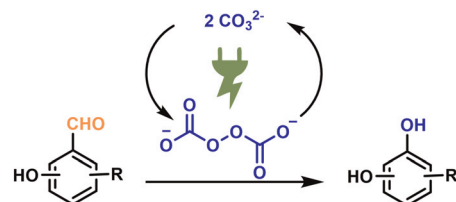
Ibrahim Khalil,\* Fatima Rammal, Lisa De Vriendt, An Sofie Narmon, Bert F. Sels, Sebastian Meier and Michiel Dusselier\*



5862

**E-Dakin reaction: oxidation of hydroxybenzaldehydes to phenols with electrochemically generated peroxodicarbonate as sustainable ex-cell oxidizer**

Fiona Sprang, Niclas Schupp, Philipp J. Kohlpaintner, Lukas J. Gooßen and Siegfried R. Waldvogel\*

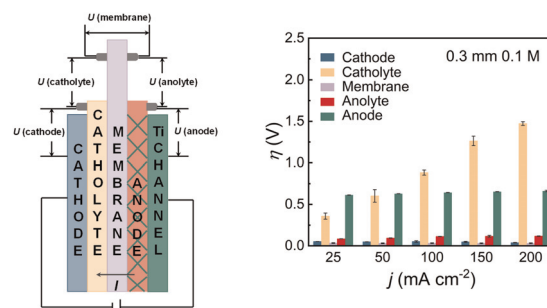


- ✓ solvent-free
- ✓ electrochemically generated oxidizer
- ✓ PODIC acts as required base and oxidant
- ✓ gram scale
- ✓ broad scope
- ✓ no toxic reagents

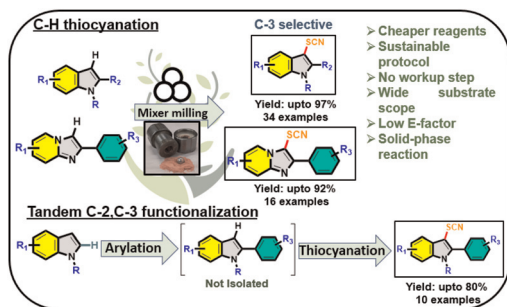
5869

**Low-cell-voltage electrosynthesis of hydrogen peroxide**

Junyu Yan, Jing Xia and Kai Wang\*



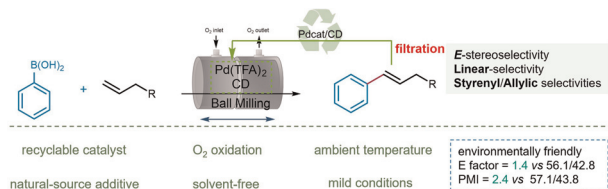
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### A solvent-free mechanochemical electrophilic C–H thiocyanation of indoles and imidazo[1,2-a]pyridines using a cost-effective combination of *N*-chlorosuccinimide-NaSCN and tandem C–C and C–S bond formation

Soumik Saha, Abigail B. Pinheiro, Amrita Chatterjee,\*  
Zigme T. Bhutia and Mainak Banerjee\*

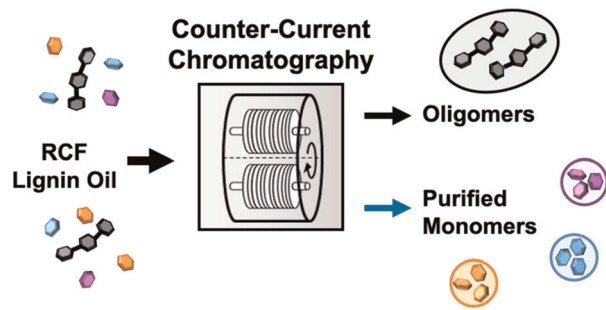
5890



### Mechanochemical aerobic oxidative Heck coupling by polymer-assisted grinding: cyclodextrin additive facilitating regioselectivity control

Keyu Xiang, Haowen Shou, Chenhui Hu, Weike Su and  
Jingbo Yu\*

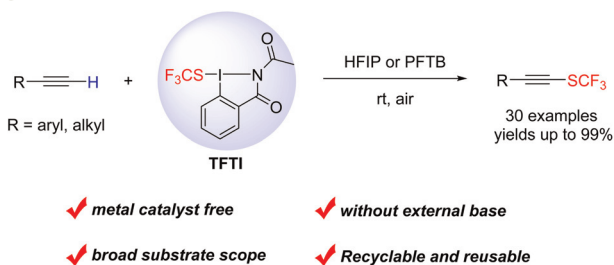
5900



### Counter-current chromatography for lignin monomer–monomer and monomer–oligomer separations from reductive catalytic fractionation oil

Hoon Choi, Manar Alherech, Jun Hee Jang,  
Sean P. Woodworth, Kelsey J. Ramirez, Eric M. Karp and  
Gregg T. Beckham\*

5914



### Direct trifluoromethylthiolation of terminal alkynes mediated by a hypervalent trifluoromethylthioiodine(III) reagent; boosting effect of fluorinated alcohol

Yu-Xin Cheng, Xiao-Guang Yang, Feng-Huan Du and  
Chi Zhang\*



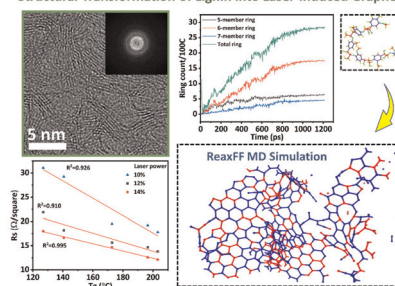
## PAPERS

5921

## Probing laser-induced structural transformation of lignin into few-layer graphene

Hanwen Zhang, Qianwei Li, Karl D. Hammond, Xiaoqing He, Jian Lin and Caixia Wan\*

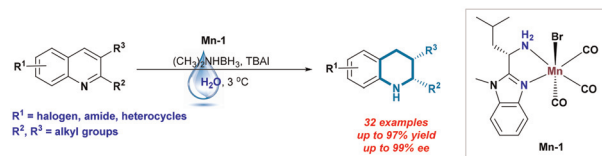
## Structural Transformation of Lignin into Laser-induced Graphene



5933

## Manganese-catalyzed asymmetric transfer hydrogenation of quinolines in water using ammonia borane as a hydrogen source

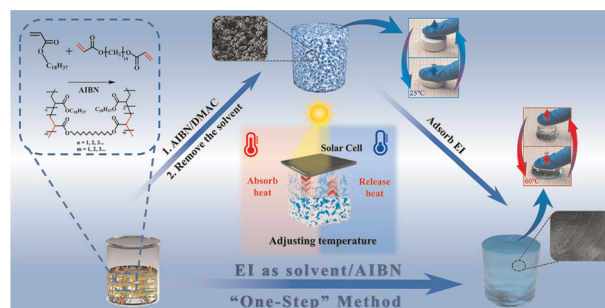
Wenhao Mao, Dingguo Song, Jiyuan Guo, Kali Zhang, Changdi Zheng, Jie Lin, Lian Huang, Lizhou Zheng, Weihui Zhong\* and Fei Ling\*



5940

## Octadecyl acrylate-based self-supporting elastic phase change framework materials for the enhancement of photovoltaic conversion efficiency

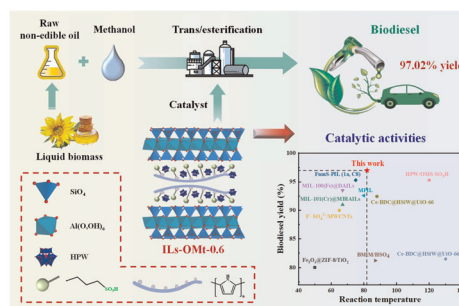
Yongqiang Qian, Lei Tan, Wentao He, Liling Liao, Yongjia Wu, Yiyang Chen, Dan Li, Xu Zhang, Guxia Wang, Yen Wei and Shengwei Guo\*



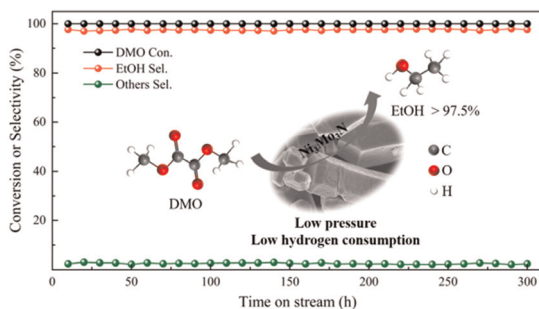
5954

## A practical approach for enhanced biodiesel production using organic modified montmorillonites as efficient heterogeneous hybrid catalysts

Lijuan He, Long Chen, Yingxia Nie, Minglu He, Guixiang Wu, Yan Li, Hanjing Tian\* and Heng Zhang\*



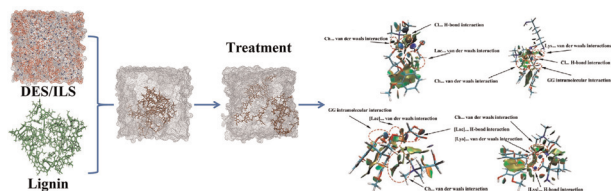
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### Bimetallic nickel molybdenum nitride catalyst with low pressure and reduced hydrogen consumption for hydrogenation of dimethyl oxalate to ethanol: the impact of reduction temperature on catalytic performance

Jiang Gong, Hanqing Zhang, Weihan Shu, Fengling Zheng, Chuancai Zhang,\* Hao Wang, Ni Zhang and Bin Dai\*

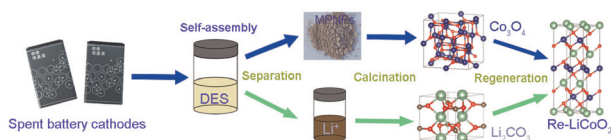
5977



### Tailoring a suitable partner system for cholinium cation to build effective solvents for biomass deconstruction

Xuedan Hou, Guojian Feng, Zishi Chen, Hongjie Wu, Hengyun Zhao, Shilin Cao\* and Jason P. Hallett\*

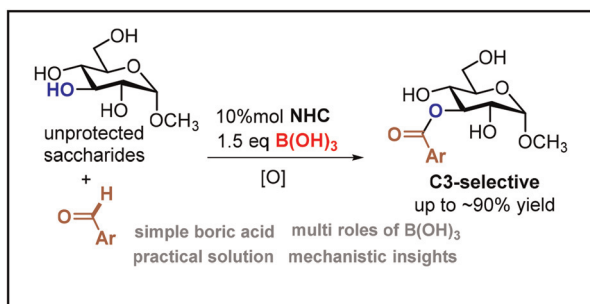
5988



### Upcycling spent lithium-ion battery cathodes into cobalt-polyphenol networks by DES dissolution and solvent-induced crystallization

Zeyu Wang, Yu Chen, Fengyi Zhou, Rui Qin, Yurun Tian, Zhimin Xue and Tiancheng Mu\*

5997



### NHC/B(OH)<sub>3</sub>-mediated C3-selective acylation of unprotected monosaccharides: mechanistic insights and toward simpler/greener solutions

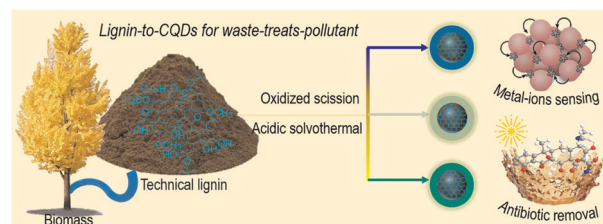
Jiamiao Jin, Jiangtao Guo, Feng Xu, Ya Lv, Guanjie Wang, Jia Song, Wen-Xin Lv, Tingting Li\* and Yonggui Robin Chi\*



6005

## Driving multicolor lignin-based carbon quantum dots into selective metal-ion recognition and photocatalytic antibiotic decomposition

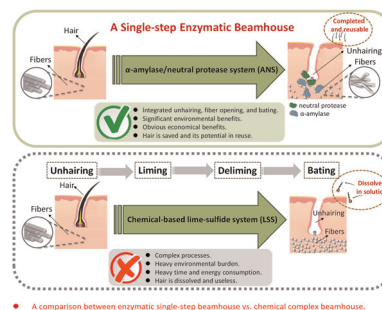
Pengfei Zhou, Jikun Xu,\* Jun Guo, Xinyan Hou, Lin Dai, Xiao Xiao and Kaifu Huo



6019

## Optimization of a single-step enzymatic beamhouse: toward eco-friendly leather manufacturing

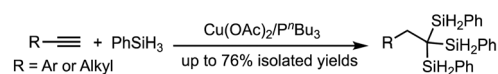
Mingrui Zhang, Chao Tang, Hui Liu, Shufa Qin, Jie Liu, Mădălina Georgiana Albu Kaya and Keyong Tang\*



6032

## Solvent-free copper-catalyzed trisilylation of alkynes: a practical and atom-economical approach for accessing 1,1,1-trisilylalkanes

Jia Li and Shaozhong Ge\*

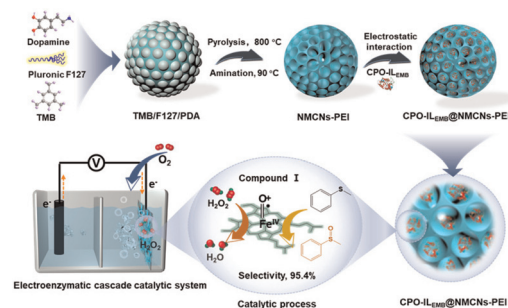


- ✦ high chemo- and regioselectivity ✦ readily available copper catalyst ✦ solvent-free
- ✦ broad scope of alkynes ✦ mild reaction conditions ✦ high functional group tolerance

6039

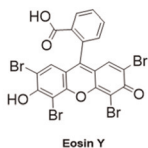
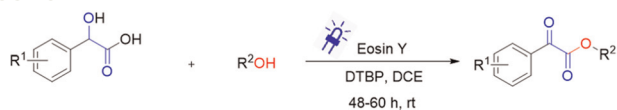
## The selective oxidation of thioanisole to sulfoxide using a highly efficient electroenzymatic cascade system

Xuefang Zhu, Xiyue Liu, Yu Ding, Shuni Li, Yucheng Jiang\* and Yu Chen\*



## PAPERS

6046

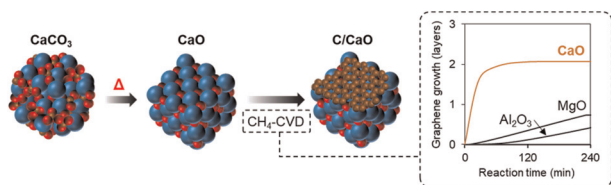


- Transition-metal-free photocatalysis
- Excellent functional group tolerance, 42 compounds
- Easy handling and mild reaction conditions

### Visible light-induced oxidative esterification of mandelic acid with alcohols: a new synthesis of $\alpha$ -ketoesters

Zechuan Mao, Kun Xia, Kaifa Zhang, Hui Chen, Mingqiang Li, Ablimit Abdukader\* and Weiwei Jin\*

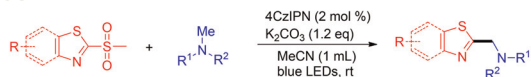
6051



### A thermodynamically favorable route to the synthesis of nanoporous graphene templated on CaO *via* chemical vapor deposition

Kritin Pirabul, Qi Zhao, Shogo Sunahiro, Zheng-Ze Pan,\* Takeharu Yoshii, Yuichiro Hayasaka, Eddie Hoi-Sing Pang, Rachel Crespo-Otero, Devis Di Tommaso,\* Takashi Kyotani and Hiroto Nishihara\*

6063

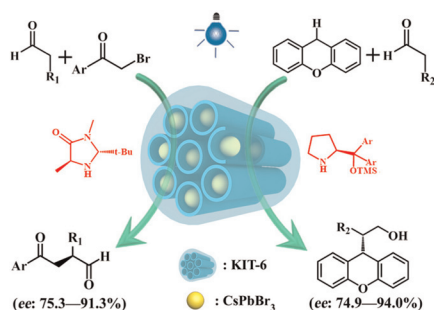


- metal and oxidant-free ✓
- 28 examples, up to 96% yields ✓
- broad substrate scope ✓
- practical and cost-effective ✓
- mild reaction conditions ✓
- biologically valuable thiazoles ✓

### Photoredox catalytic aminomethylation of sulfonylthiazoles

Li Meng, Jun Dong, Yan Tang, Hekun Yang, Long Sun, Jingchao Chen\* and Baomin Fan\*

6068



### Lead-halide perovskite quantum dots embedded in mesoporous silica as heterogeneous photocatalysts combined with organocatalysts for asymmetric catalysis

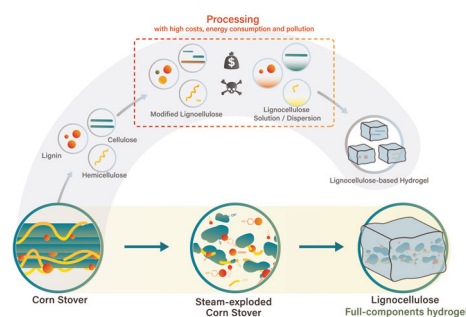
Hao Ren, Yi-Ming Li, Wen-Jing Li, Qing-Chao Zhai and Lin Cheng\*



6078

## Lignocellulosic full-components hydrogelation using steam-exploded corn stover

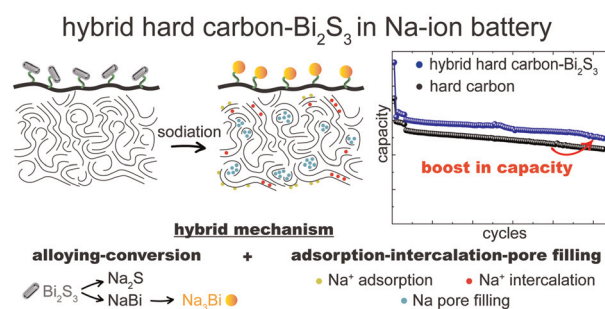
Tairan Pang, Lan Wang\* and Hongzhang Chen



6089

## Exploring hybrid hard carbon/Bi<sub>2</sub>S<sub>3</sub>-based negative electrodes for Na-ion batteries

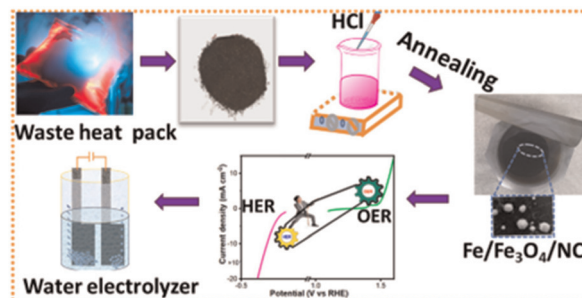
Blaž Tratnik, Sergio Aina, Elena Tchernychova, Matej Gabrijelčič, Gregor Mali, Maria Pilar Lobera, Maria Bernechea, Mathieu Morcrette, Alen Vizintin\* and Robert Dominko



6100

## Waste iron-based disposable chemical warmer derived electrocatalyst for water splitting

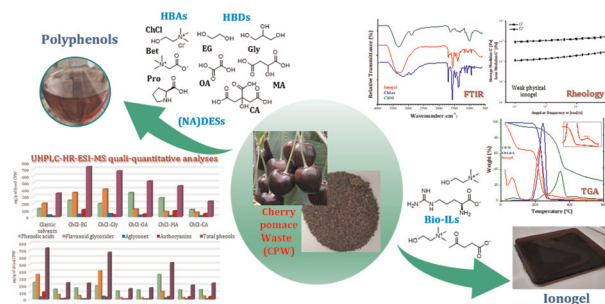
Keyru Serbara Bejigo, Raaju Sundhar Arul Saravanan, Kousik Bhunia and Sang-Jae Kim\*



6109

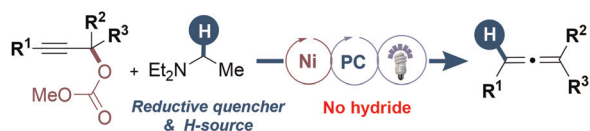
## Sustainable valorization of cherry (*Prunus avium* L.) pomace waste via the combined use of (NA)DESS and bio-ILs

Angelica Mero, Andrea Mezzetta, Marinella De Leo,\* Alessandra Braca and Lorenzo Guazzelli\*

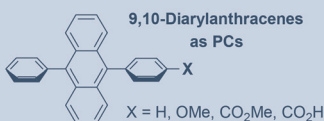


## PAPERS

6124



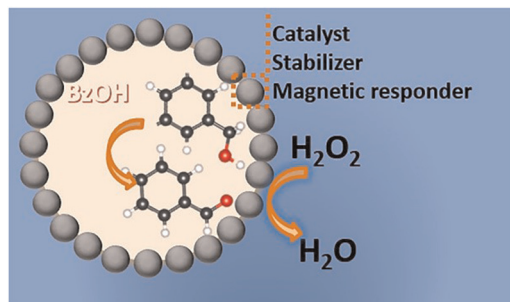
- Electron and proton transfer
- Organo-photocatalysis
- Trialkylamine as H-source
- Mild and sustainable



### Hydride-free reduction of propargyl electrophiles: a nickel-catalyzed photoredox strategy for allene synthesis

Tingjun Hu, Vincent Fagué, Didier Bouyssi, Nuno Monteiro and Abderrahmane Amgoune\*

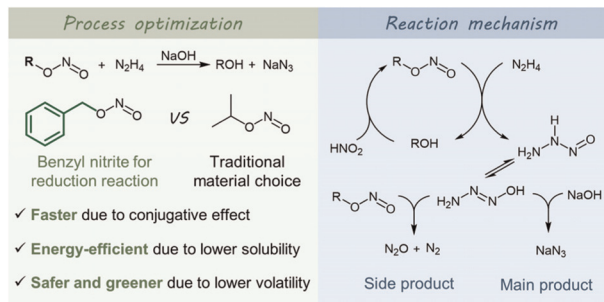
6131



### Magnetic-responsive Pickering emulsions based on $MFe_2O_4$ ( $M = Mn, Fe, Co, Ni, Cu, Zn$ ) for green and efficient oxidation of benzyl alcohol

Yan Wang, Xuan Wang, Yonghao Dong, Mingli Peng,\* Lina Guo, Mengyao Cui, Yuan He, Jiabao Yi, Huijun Ma, Huan Zhang and Haiming Fan

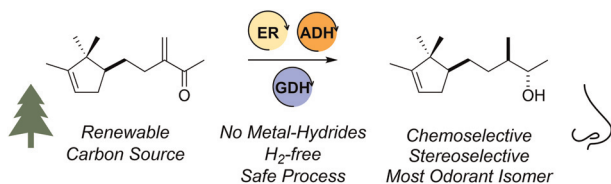
6139



### A safer, greener and faster synthesis process of sodium azide by simply altering the alcohol reactant

Zifei Yan, Jian Deng, Jiaxin Tian and Guangsheng Luo\*

6150



### Biocatalytic approaches for a more sustainable synthesis of sandalwood fragrances

Maria C. Cancellieri, Davide Maggioni, Lorenzo Di Maio, Daniele Fiorito, Elisabetta Brenna, Fabio Parmeggiani and Francesco G. Gatti\*

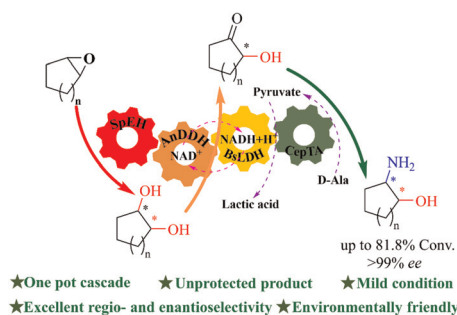


## PAPERS

6160

### Biocatalytic asymmetric ring-opening of *meso*-epoxides to enantiopure cyclic *trans*- $\beta$ -amino alcohols involving a key amine transaminase

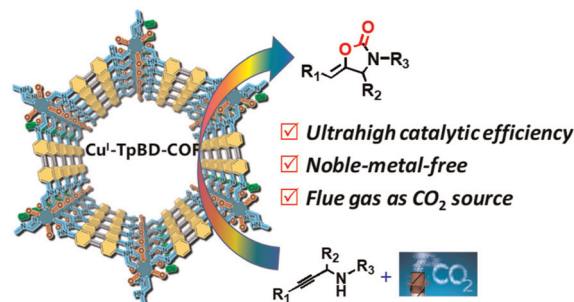
Jingqi Zhang, Hang Gao, Lili Gao,\* Mengyi Chen, Shuangping Huang and Jiandong Zhang\*



6172

### Cu<sup>I</sup>-anchored porous covalent organic frameworks for highly efficient conversion of propargylic amines with CO<sub>2</sub> from flue gas

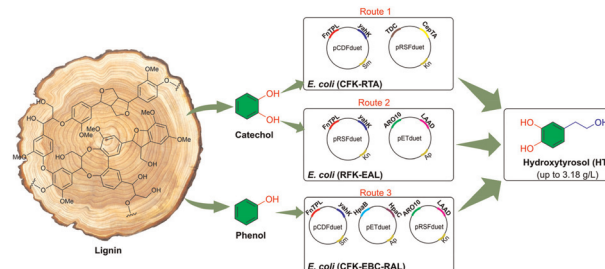
Jikuan Qiu, Xiaoqing Qi, Keping Zhu, Yuling Zhao, Haiyan Wang, Zhiyong Li, Huiyong Wang, Yang Zhao and Jianji Wang\*



6180

### One-pot biocatalytic upgrading of lignin-derived phenol and catechol to hydroxytyrosol

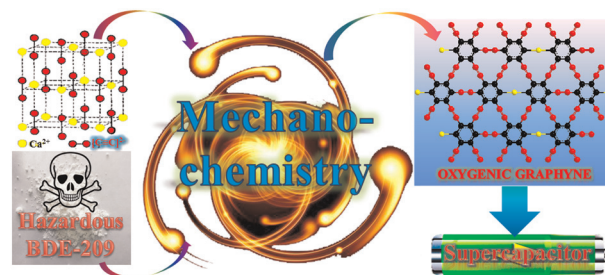
Rui-Yan Zhao, Shuang-Ping Huang, Li-Li Gao and Jian-Dong Zhang\*



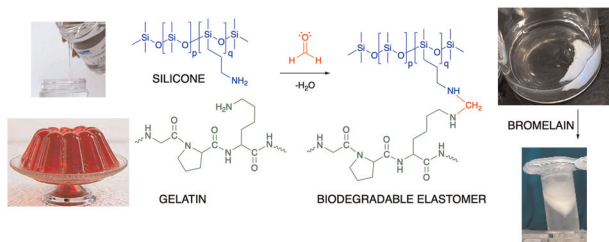
6190

### Green synthesis of oxygenic graphyne with high electrochemical performance from efficient mechanochemical degradation of hazardous decabromodiphenyl ether

Yingjie Li,\* Xiaoyu Wang, Bo Qiang, Shenao Xu, Jing Gu, Xiaojun He and Chunxi Li\*



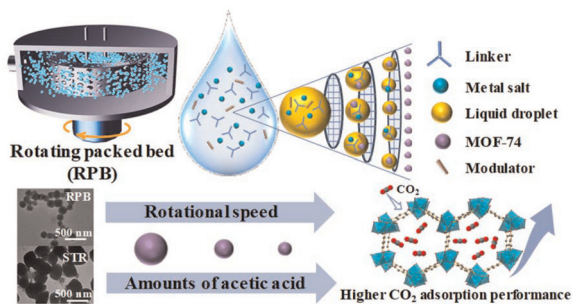
6200



### Biodegradable, crosslinked silicone-gelatin hydrogels

Kaitlyn E. C. Silverthorne, Erin M. Donahue-Boyle, Ana Pricu, Angela Yayun Li and Michael A. Brook\*

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### Green, efficient and controllable synthesis of high-quality MOF-74 with high gravity technology

Xin-Ran Shi, Meng Qiao, Yan Wei, Ling-Xia Yun, Jie-Xin Wang\* and Jian-Feng Chen

