

Green Chemistry

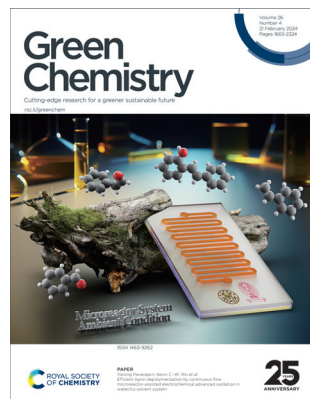
Cutting-edge research for a greener sustainable future

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 26(4) 1665–2324 (2024)



Cover

See Varong Pavarajarn, Kevin C.-W. Wu *et al.*, pp. 1889–1900.

Image reproduced by permission of Kevin C.-W. Wu from *Green Chem.*, 2024, **26**, 1889.



Inside cover

See Seul-Yi Lee, Soo-Jin Park *et al.*, pp. 1901–1909.

Image reproduced by permission of Soo-Jin Park from *Green Chem.*, 2024, **26**, 1901.

CRITICAL REVIEWS

1682

Basic comprehension and recent trends in photoelectrocatalytic systems

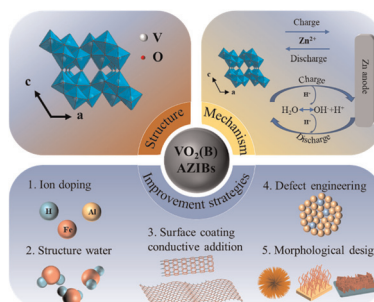
Jie Yu,* Jesús González-Cobos, Frederic Dappozze, Philippe Vernoux, Angel Caravaca* and Chantal Guillard*



1709

One-dimensional tunnel VO₂(B) cathode materials for high-performance aqueous zinc ion batteries: a mini review of recent advances and future perspectives

Lingjiang Kou, Yong Wang, Jiajia Song,* Taotao Ai,* Wenhui Li, Panya Wattanapaphawong and Koji Kajiyoshi*



RSC Sustainability

GOLD
OPEN
ACCESS

Dedicated to sustainable
chemistry and new solutions

For an open, green and inclusive future

rsc.li/RSCSus

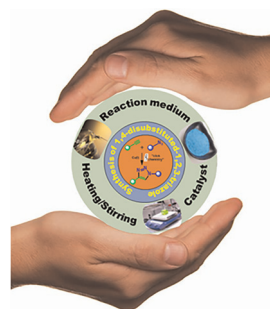
Fundamental questions
Elemental answers

CRITICAL REVIEWS

1725

Green synthesis of 1,4-disubstituted 1,2,3-triazoles: a sustainable approach

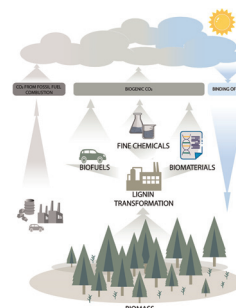
Sachin Kumar, Bajrang Lal and Ram Kumar Tittal*



1770

Biotransformation of lignin into 4-vinylphenol derivatives toward lignin valorization

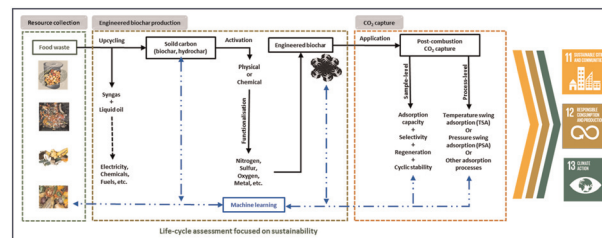
Ruo-Ying Liu, Zhi-Hua Liu,* Bing-Zhi Li* and Ying-Jin Yuan



1790

Sustainable valorisation of food waste into engineered biochars for CO₂ capture towards a circular economy

Wenhui Jia, Shuangjun Li, Junyao Wang, Jonathan T. E. Lee, Carol Sze Ki Lin, Ondřej Mašek, Huiyan Zhang and Xiangzhou Yuan*

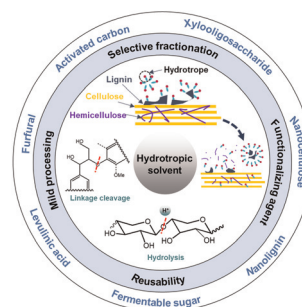


TUTORIAL REVIEWS

1806

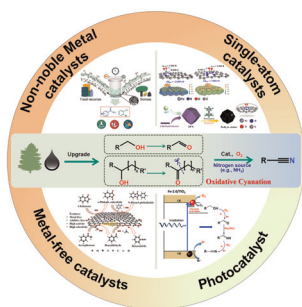
Recent advances in hydrotropic solvent systems for lignocellulosic biomass utilization

Soyeon Jeong, Jiae Ryu, Qiang Yang,* J. Y. Zhu* and Chang Geun Yoo*



TUTORIAL REVIEWS

1831



Thermo-/photo-catalysts for aerobic oxidative cyanation of diverse oxygen-containing feedstocks

Jie He, Peng Zhou, Shiyong Zhang, Jason Chun-Ho Lam, Yuhe Liao and Zehui Zhang*

1846

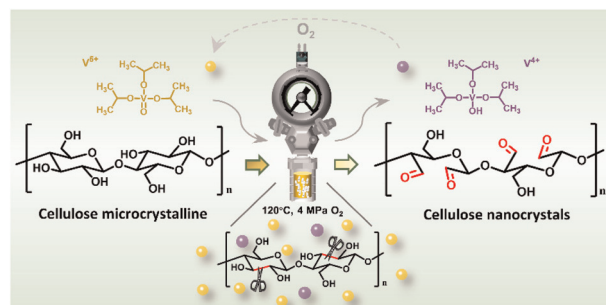


Enantioselective cross-dehydrogenative coupling enabled by organocatalysis

Quanbin Jiang, Jie Luo and Xiaodan Zhao*

COMMUNICATIONS

1876



Preparation of aldehyde-functionalized cellulose nanocrystals via aerobic oxidation of cellulose in a recyclable triisopropoxy vanadium oxidation system

Xianqing Lv, Chengke Zhao, Xiwei Zhang, Zhuotong Wu* and Li Shuai*

1883



Synthesis of 3-arylino-2-polyhydroxyalkyl-substituted indoles from unprotected saccharides and anilines

Jilai Wu, Likai Zhou, Song Xie, Chao Wei, Xiaoliu Li and Hua Chen*

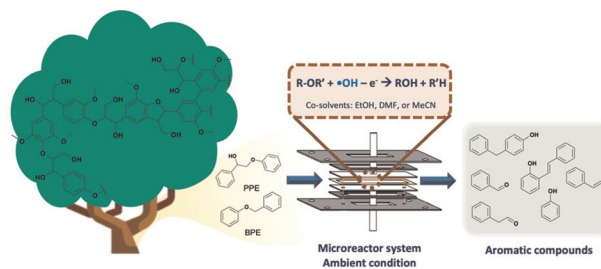


PAPERS

1889

Efficient lignin depolymerization by continuous flow microreactor-assisted electrochemical advanced oxidation in water/co-solvent system

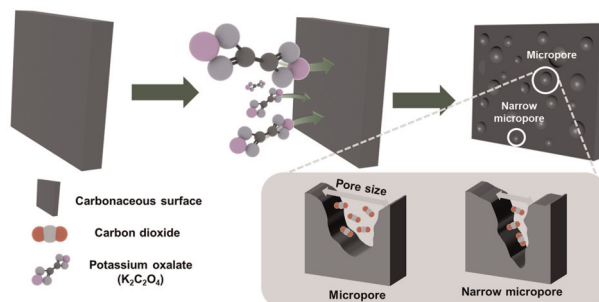
Lalida Waura-angkura, Babasaheb M. Matsagar, Kevin Lee, Varong Pavarajarn* and Kevin C.-W. Wu*



1901

Valorization of waste coffee grounds into microporous carbon materials for CO₂ adsorption

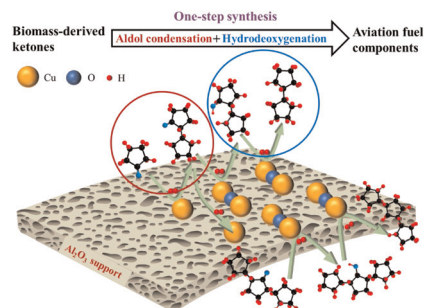
Choong-Hee Kim, Seul-Yi Lee* and Soo-Jin Park*



1910

The synergistic effect of Cu⁰ and Cu⁺ for one-step synthesis of aviation biofuel from biomass-derived ketones

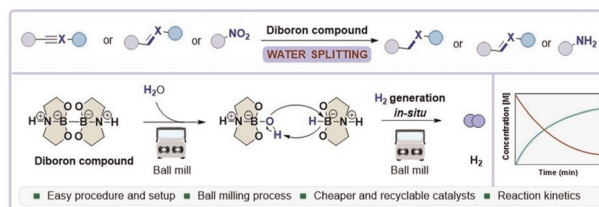
Tan Li, Jing Su, Linjia Yin, Xiangkun Zhang, Cong Wang, Xinbao Li,* Jing Zhang and Kaige Wang*



1927

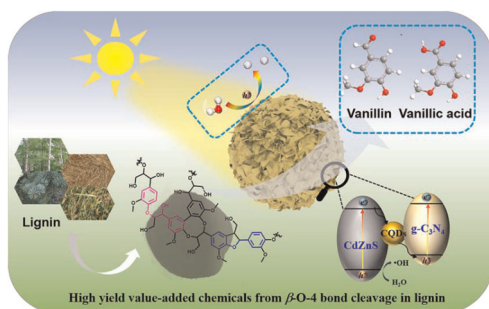
Mechanically accelerated catalytic hydrogenation: correlating physical state, reaction rate, and interface area

Federico Cuccu, Francesco Basoccu, Claudia Fattuoni and Andrea Porcheddu*



PAPERS

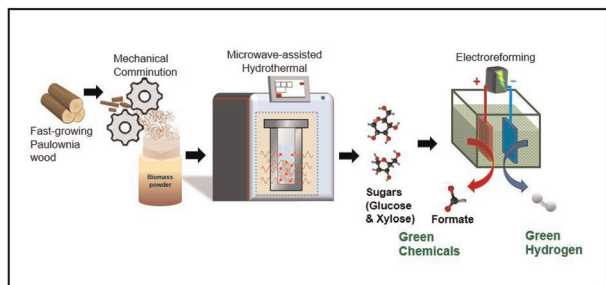
1935



Z-scheme heterojunction g-C₃N₄/CQD/CdZnS with high redox capability for enhancing visible light-driven photocatalytic depolymerization of lignin into aromatic monomers

Xutang Liu, Zhijie Jiang, Xiru Cao, Zhen Shen,*
Wei Zhao,* Fei Wang, Mingyu Cui and Chong Liang

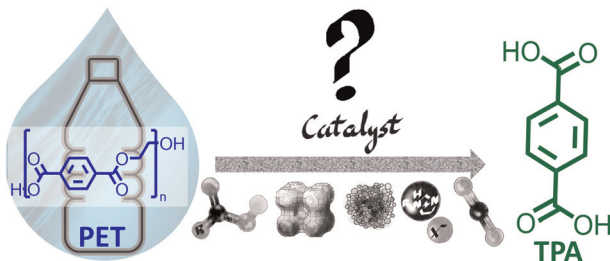
1949



Valorization of fast-growing Paulownia wood to green chemicals and green hydrogen

Li Quan Lee, Hu Zhao, Junyu Ge, Yan Zhou* and Hong Li*

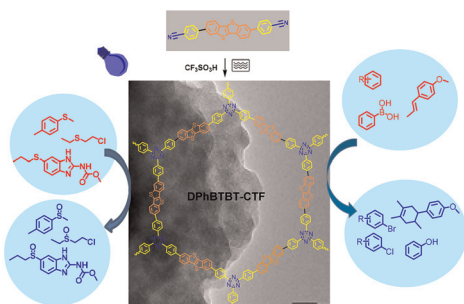
1964



Acid catalyst screening for hydrolysis of post-consumer PET waste and exploration of acidolysis

Patrícia Pereira, Phillip E. Savage* and Christian W. Pester*

1975



Unveiling the potential of a covalent triazine framework based on [1]benzothieno[3,2-*b*][1]benzothiophene (DPbBTBT-CTF) as a metal-free heterogeneous photocatalyst

M. Carmen Borrallo-Aniceto, Mercedes Pintado-Sierra,
Antonio Valverde-González, Urbano Díaz,
Félix Sánchez, Eva M. Maya* and Marta Iglesias*

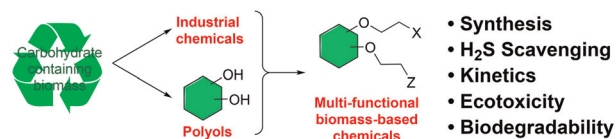


PAPERS

1984

Multifunctional biomass-based chemicals: H₂S scavenging

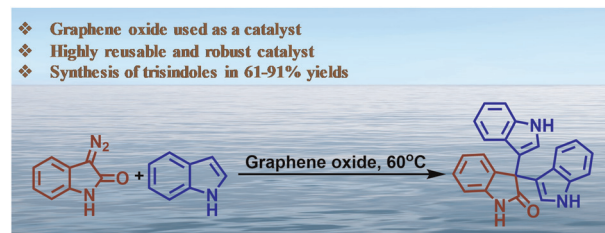
Asger M. Koue, Fernando Montero, Lars M. Skjolding, Sergey Kucheryavskiy, Marco Maschietti and Christian M. Pedersen*



1990

Graphene oxide-catalysed carbene-transfer reaction in water: a highly "green" and selective approach to access 3,3',3''-trisindoles

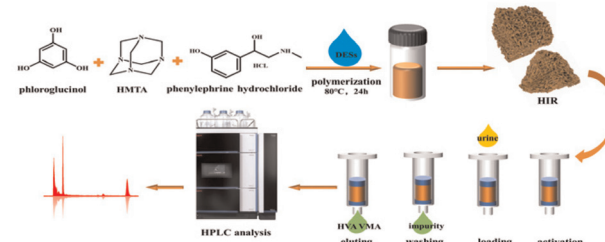
Priya Kamboj and Vikas Tyagi*



2000

Facile and green synthesis of a hydrophilic imprinted resin in a deep eutectic solvent–water medium for the specific molecular recognition of tumor biomarkers in complex biological matrices

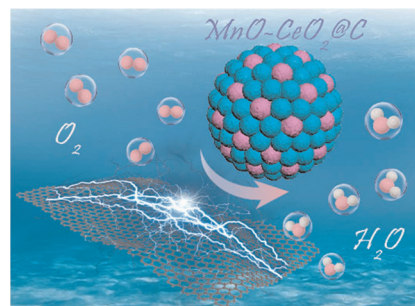
Mingwei Wang, Liang Zhou, Fengxia Qiao and Hongyuan Yan*



2011

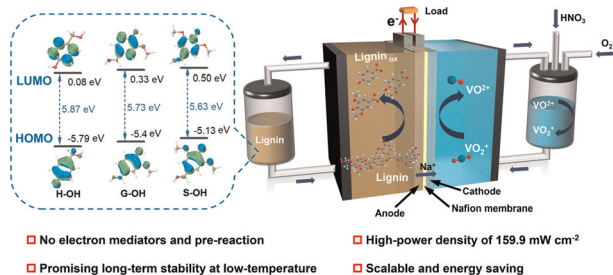
Engineering built-in electric fields in oxygen-deficient MnO–CeO₂@Cs catalysts: enhanced performance and kinetics for the oxygen reduction reaction in aqueous/flexible zinc–air batteries

Lixia Wang, Xinran Hu, Huatong Li, Zhiyang Huang, Jia Huang, Tayirjan Taylor Isimjan* and Xiulin Yang*



PAPERS

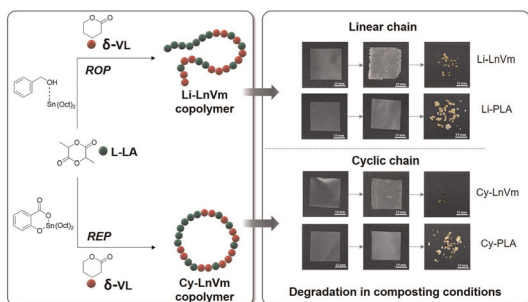
2021



A high-performance lignin flow fuel cell based on self-generating electricity of lignin at low temperature via a privileged structure and redox chemistry

Zixin Xie, Xihong Zu,* Jinxin Lin, Xueqing Qiu,* Tengda Liang and Liheng Chen

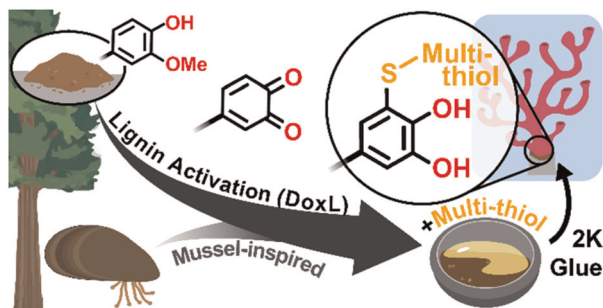
2031



Effect of chain architecture and comonomer ratio on the biodegradability and thermal stability of biodegradable copolymers of L-lactide and δ-valerolactone

Phornwan Nanthananon and Yong Ku Kwon*

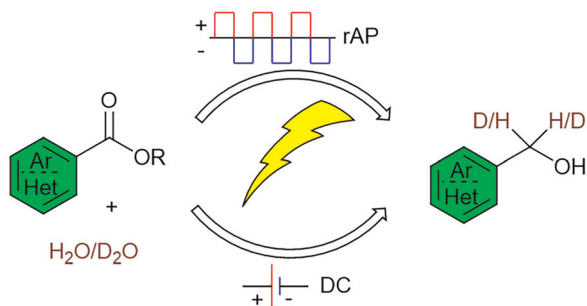
2044



Organic transformation of lignin into mussel-inspired glues: next-generation 2K adhesive for setting corals under saltwater

Ching-Yi Choi, Francisco Lossada, Keven Walter, Tom Fleck-Kunde, Sascha Behrens, Thomas Meinelt, Jana Falkenhagen, Matthias Hiller, Hartmut Oschkinat, André Dallmann, Andreas Taden and Hans G. Börner*

2059



Electrochemical reduction of benzoic acid esters using water as a H/D source

Lei Zhang, Mengfan Li, Yin Yang, Xu Cheng* and Qi-Lin Zhou*

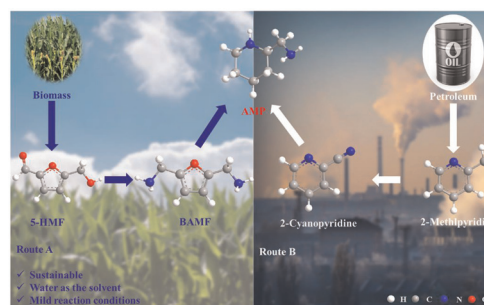


PAPERS

2067

A new method for green production of 2-aminomethylpiperidine from bio-renewable 2,5-bis(aminomethyl)furan

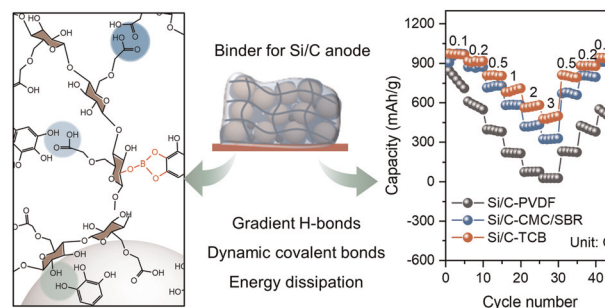
Shuxing Zhang, Xiaoshu Ding* and Yanji Wang*



2078

Co-operation of hydrogen bonds and dynamic covalent bonds enables an energy-dissipative crosslinked binder for silicon-based anodes

Xiangyu Lin, Yong Wen, Jie Wang, Shanshan Wang, Xingshen Sun, He Liu* and Xu Xu*



2087

Chemical recycling of polycarbonate and polyester without solvent and catalyst: mechanochemical methanolysis

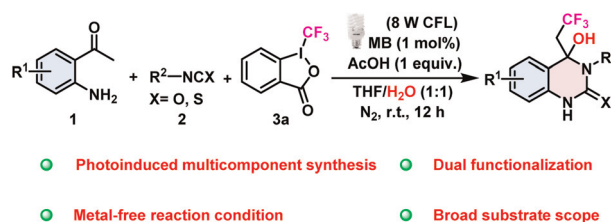
Hyo Won Lee, Kwangho Yoo, Lars Borchardt* and Jeung Gon Kim*



2094

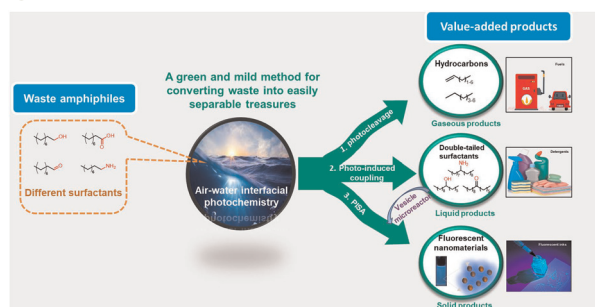
A photoinduced multicomponent intramolecular cyclization/hydroxytrifluoromethylation cascade: facile access to polyfunctionalized 3,4-dihydroquinazolinones

Changjun Zhang,* Yuxin Ding, Wenkai Huang, Hao Zhang, Xue Yang, Yuan Shi, Hongmei Luo, Dingyuan Lou and Yuanyuan Xie*



PAPERS

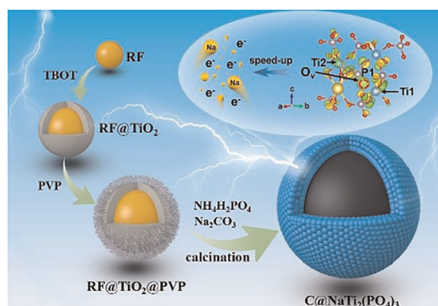
2102



Photoconverting waste amphiphiles at the mild air–water interface into easily separable value-added products

Qin Dai, Xiaoyu Zhang, Jingyi Lin, Tao Cui, Wenbo Wang, Guangfei Yu, Hongbin Cao and He Zhao*

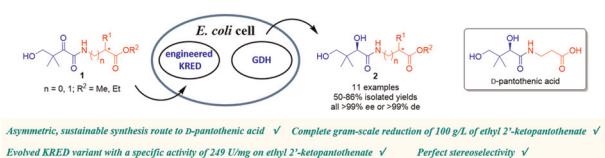
2114



Tailoring the electronic structure of the $\text{NaTi}_2(\text{PO}_4)_3$ anode for high-performing sodium-ion batteries via defect engineering

Qinchao Wang,* Sha He, Hao Chen, Zhaoquan Peng, Zhixin Xu, Zhiyong Zeng, Chao Wang, Pan Xue, Lubin Ni, Xiaoge Li* and Jie Han*

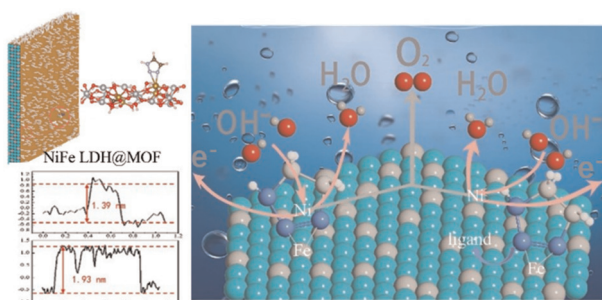
2124



Engineered ketoreductase-catalyzed stereoselective reduction of ethyl 2'-ketopantothenate and its analogues: chemoenzymatic synthesis of D-pantothenic acid

Pan Hu, Xiaofan Wu, Yajiao Zhang, Minjie Liu, Yuan Tao, Zedu Huang* and Fener Chen*

2135



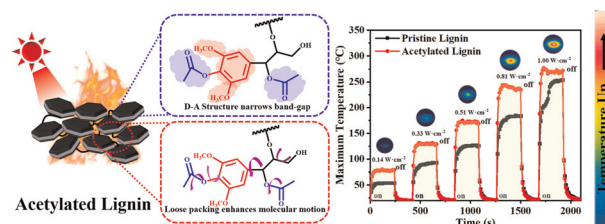
Atomic-layered metal–organic framework on NiFe LDH for enhanced electrocatalytic oxygen evolution reaction

Dan Xu, Yingying Gao, Sheng Qian, Yu Fan and Jingqi Tian*



PAPERS

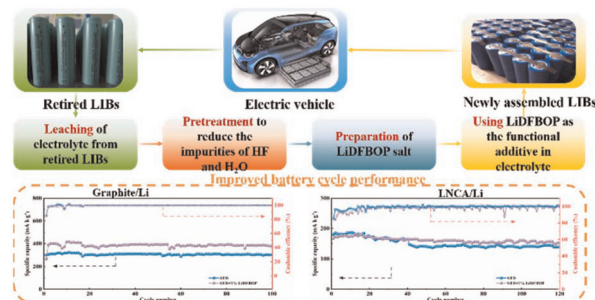
2143

Mechanism study of the photothermal function of lignin: the effect of electron-withdrawing groupsJunjie Lei, Liheng Chen, JinXin Lin, Weifeng Liu,*
Qingang Xiong and Xueqing Qiu*

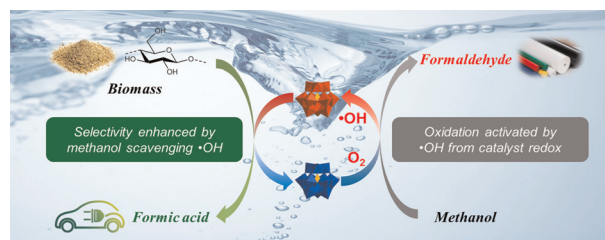
2157

Seminormal-BrCH₂CH₂OH-mediated electrochemical epoxidation of unactivated olefinsHong He, Yanxia Lv, Jing Hu, Zhong-Wei Hou* and
Lei Wang*

2162

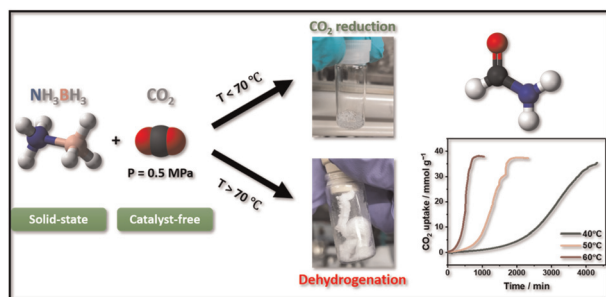
High-value utilization of recovered LiPF₆ from retired lithium-ion batteriesJie Wang, Xiaoling Cui, Linhu Song, Junlong Zhu,
Yinong Wang, Feifei Zong, Ningshuang Zhang,
Dongni Zhao and Shiyu Li*

2170

Efficient catalytic oxidation of biomass to formic acid coupled with low-energy formaldehyde production from methanolZhuosen He, Yucui Hou, Jian Wei, Shuhang Ren and
Weize Wu*

PAPERS

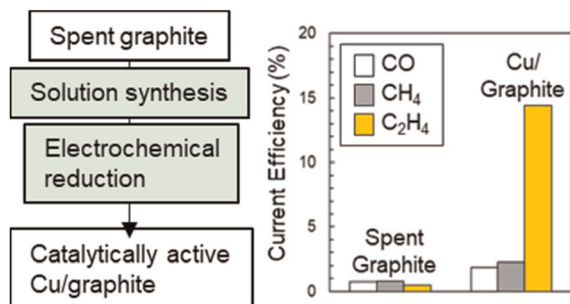
2183



Solvent- and catalyst-free reduction of CO₂ with ammonia borane

Loris Lombardo,* Taichi Nishiguchi, Youngdon Ko, Liping Zhong, Nao Horike, Andreas Züttel and Satoshi Horike*

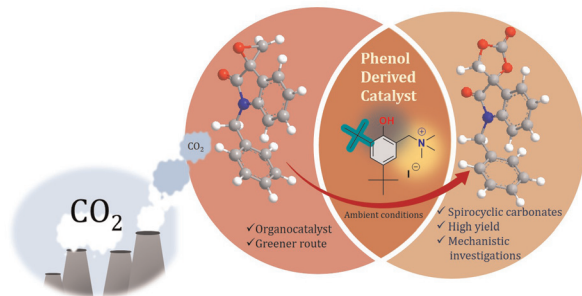
2190



Facile synthesis of electrocatalytically active Cu/graphite using the negative electrode of spent Li-ion batteries

Hiroshi Itahara,* Naonari Sakamoto, Naoko Takahashi, Satoru Kosaka and Yasuhiro Takatani

2198



Modular synthesis of spirocyclic carbonates: unravelling the synergistic interplay of electronic and electrostatic sites on phenolic catalyst

Shilpa Dabas, Brijesh Patel, Sanjay Mehra, Manas Barik, Prabhakar Murugan, Arvind Kumar* and Saravanan Subramanian*

2207



Transition-metal-free access to benzyl ethers via aerobic cross-dehydrogenative coupling of benzylic C(sp³)–H bonds with alcohols

Xiao Zhang, Wenjie Li, Yang Yu, Min Luo, Hua Bai, Lei Shi and Hao Li*

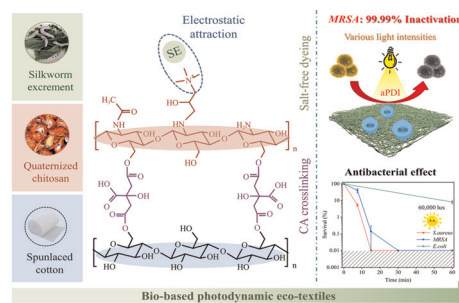


PAPERS

2213

A facile and scalable strategy for fabricating bio-based photodynamic antimicrobial nonwoven eco-textiles

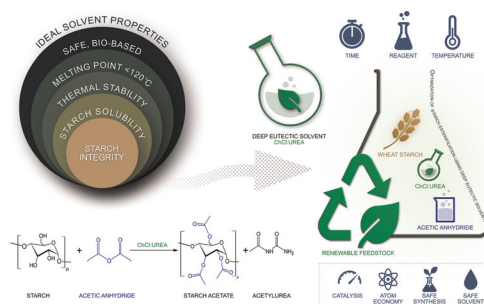
Zihao Lv, Qingqing Wang,* Yang Wang, Xiaohong Yuan, Xin Xia, Shiqin Liao and Qufu Wei



2225

Starch esterification using deep eutectic solvents as chaotropic agents and reaction promoters

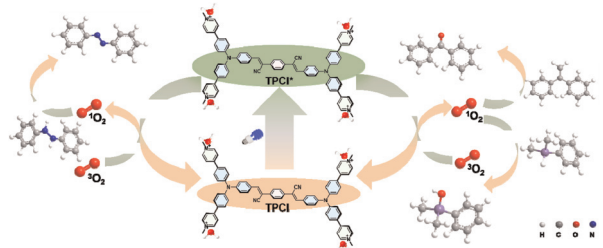
Guillermo A. Portillo-Perez, Kasper B. Skov and Mario M. Martinez*



2241

A water-soluble type II photosensitizer for selective photooxidation reactions of hydroazaobenzenes, olefins, and hydrosilanes in water

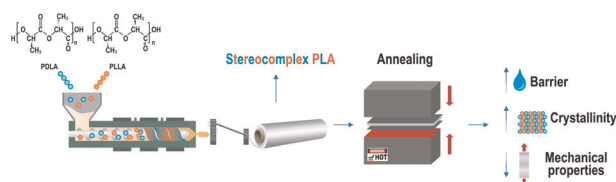
Rong-Zhen Zhang, Kai-Kai Niu,* Yu-Song Bi, Hui Liu, Sheng-Sheng Yu, Yue-Bo Wang and Ling-Bao Xing*



2248

Unlocking the secrets of high-water barrier stereocomplex polylactide blend extrusion films

James F. Macnamara, Jr., Maria Rubino, Matthew Daum, Ajay Kathuria and Rafael Auras*



The diagram illustrates the synthesis of a TEOA cut-off network. It begins with a **DMT network** (top left), which is **Crushed** (top right) and then subjected to **Hot-Pressure** (middle right) to form a network with **N-OH** and **HO-O** groups. This intermediate is then treated with **Dichloromethane Pretreatment** (middle left) to form a **TEOA cut-off network** (bottom left). The **TEOA cut-off network** is then subjected to **Heat-curing** (bottom right) to form the final **TEOA cut-off network** (bottom right). Chemical structures for **DMT**, **DMT network**, **TEOA cut-off network**, and the final **TEOA cut-off network** are shown.

Yunjian Wu, Yiran Hu, Hui Lin and Xiaoxing Zhang*

Vent gas

Heat stored

$\text{Me(Am)}_n + \text{heat} \rightarrow \text{Me(Am)}_{n+1} + \text{Am}$

CO_2 Absorption Enthalpy

$\text{Me(Am)}_{n+1} + \text{Am} \rightarrow \text{Me(Am)}_n + \text{heat}$

Heat liberated

Desorber

Steam

Absorber

$\text{Am} + \text{CO}_2 \rightarrow \text{Am-CO}_2 + \text{heat}$

$\text{Am-CO}_2 + \text{heat} \rightarrow \text{Am} + \text{CO}_2$

CO_2

Kangkang Li,* Jian Chen, Simeng Li, Yang Liu,
Paul Feron, Hai Yu, Hanming Liu, Yong Cai and
Kaiqi Jiang*

N-N single bond cleavage cascade initiated by EDA complex between two intermediates

Reaction scheme showing the formation of an EDA complex (a dimer of a substituted indole derivative) and its subsequent reaction under visible light to form a product with a new N-N bond, releasing a leaving group X.

EDA complex

Broad Functional Group Compatibility

Reaction scheme showing the compatibility of the reaction with various functional groups: CN, CO₂R, SO₂R, SO₂NHR, OR'', F, Cl, Br, I, OH, and alkenes.

Ya-Zhou Liu, Yu Chen, Amu Wang, Zhongke Shen,
Xueting Zhou, Jichao Zhang, Yinxiang Jian and
Xiaofeng Ma*

The diagram illustrates a photocatalytic cycle on a 2D material lattice. Light energy (represented by a sun icon) excites electrons within the lattice. These excited electrons are used to reduce carbon dioxide (CO_2) into carbon monoxide (CO). Simultaneously, the 2D material is regenerated by the oxidation of a sacrificial donor, which is represented by a molecule with R^1 and R^2 groups. The cycle is shown as a continuous process where the material's electronic state is restored after each reduction event.

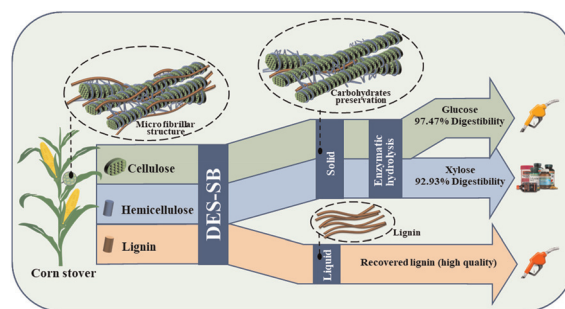
Peng Bai, Yicheng Zhao* and Yongdan Li

PAPERS

2300

A novel green biorefinery strategy for corn stover by pretreatment with weak alkali-assisted deep eutectic solvents

Zhaobao Wang,* Jie Zhou, Yating Yin, Mengqian Mu, Yanzhou Liu, Disheng Zhou, Weitao Wang, Xinyun Zuo and Jianming Yang*



2313

Rapid production of the anaesthetic mepivacaine through continuous, portable technology

Pablo Díaz-Kruik and Francesca Paradisi*

