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Cutting-edge research for a greener sustainable future

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IN THIS ISSUE

ISSN 1463-9262 CODEN GRCHFJ 27(24) 6909–7392 (2025)



Cover

See Tom Breugelmans et al., pp. 7137–7146.

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Inside cover

See Giacomo Trapasso and Fabio Aricò, pp. 6925–6966.

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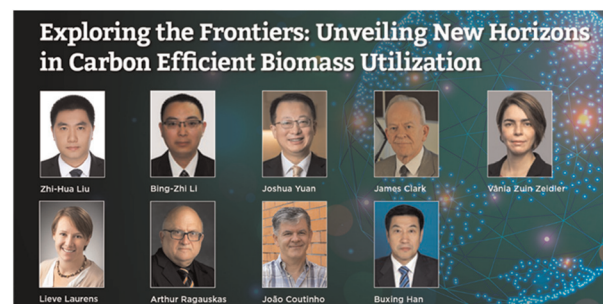
The authors would like to thank Davide Brunelli for creating this cover art.

EDITORIAL

6922

Introduction to 'Exploring the frontiers: unveiling new horizons in carbon efficient biomass utilization'

Zhi-Hua Liu, Bing-Zhi Li, Joshua S. Yuan, James Clark, Vânia Zuin Zeidler, Lieve Laurens, Arthur J. Ragauskas, João A. P. Coutinho and Buxing Han



CRITICAL REVIEWS

6925

Organic carbonates as green media: from laboratory syntheses to industrial applications

Giacomo Trapasso* and Fabio Aricò*



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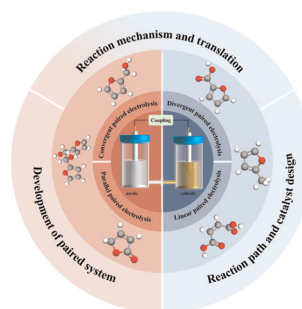
Fundamental questions
Elemental answers

CRITICAL REVIEWS

6967

Advances in paired electrolysis for furfural conversion: from design principle, mechanisms to perspectives

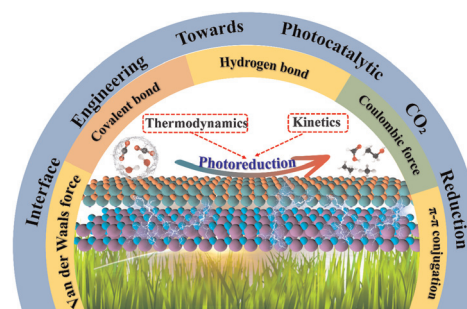
Zhikang Zhang, Jianan Li, Shuyi Yang, Tao E* and Chong Peng*



6989

Advances in molecular interfacial engineering of heterojunctions for photocatalytic CO₂ reduction

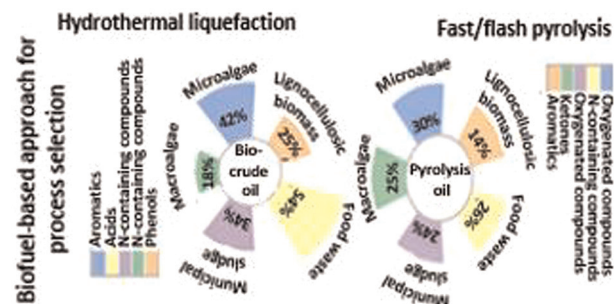
Haopeng Jiang, Jun Shen,* Lijuan Sun, Jinhe Li, Weikang Wang, Lele Wang and Qinqin Liu*



7009

Hydrothermal liquefaction vs. fast/flash pyrolysis for biomass-to-biofuel conversion: new insights and comparative review of liquid biofuel yield, composition, and properties

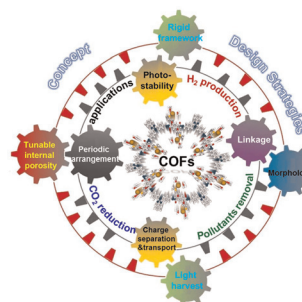
Farid Alizad Oghyanous and Cigdem Eskicioglu*



7042

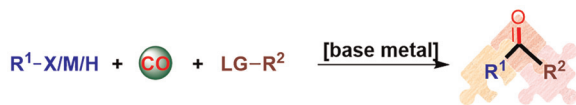
Shedding light on covalent organic framework photocatalysts: concept, design strategies, and applications—a review

Irshad Ahamd, Gao Li,* Marwan M. Abduljawad, Mohammed Qasem Alfaifi, Yousef I. Alrashed and Fahad M. Albaqi



TUTORIAL REVIEWS

7082

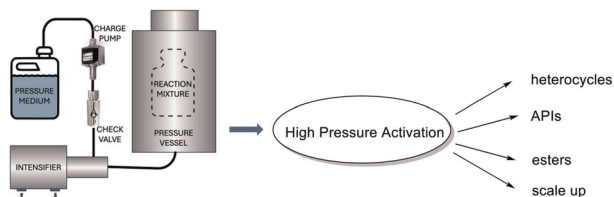


- Avoids the usage of high-loading noble metal catalysts like Pd, Ru, Rh etc.
- Avoids the usage of toxic and environmental unfriendly CO or metal carbonyl complexes

Developments in CO surrogates for base-metal-catalyzed carbonylation

Wenjing Li, Shentong Xie and Renyi Shi*

7096

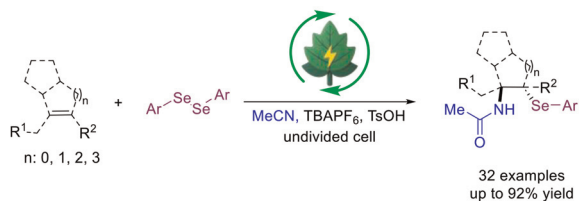


Green synthesis of building blocks, drug candidates and fine chemicals by barochemistry: application of high pressure in organic synthesis

Guoshu Xie, Valerie Wright, Alexander Lazarev, Gary Smejkal, Vera Gross and Béla Török*

COMMUNICATIONS

7114

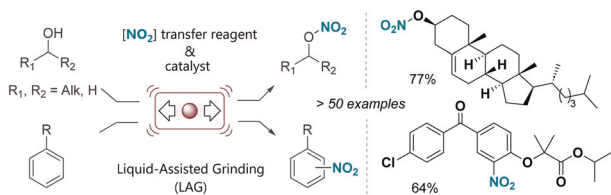


- Mild and green
- High atom economy
- Metal- & oxidant-free
- Wide scope
- Cheap amine sources
- Electro-promoted transformation

Electrochemical vicinal amidoselenation of unactivated olefins via a tandem Ritter reaction

Wei Xu, Nana Zhang, Chenyu Li, Haodong Ma, Bin Wang, Ziren Chen, Yu Xia, Shaofeng Wu, Weiwei Jin,* Penji Yan,* Chenjiang Liu* and Yonghong Zhang*

7122



- catalytic ball milling and bead milling nitration
- bench-stable, electrophilic nitrating reagent
- recyclable organic scaffold
- good selectivities
- high functional group tolerance

Mechanochemical nitration of arenes and alcohols using a bench-stable organic nitrating reagent

Vasiliki Valsamidou, Subrata Patra, Besa Kadriu, Michel Gaspard Metzger, Ludovic Gremaud and Dmitry Katayev*

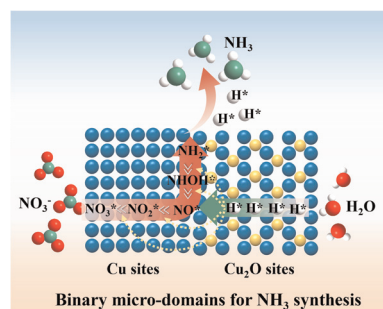


COMMUNICATIONS

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NaBH₄-assisted reconstruction of binary micro-domains on a Cu electrode for the selective production of green ammonia

Jincheng Zhang, Chengyong Xing, Shanna An, Fanshi Meng, Zhanning Liu, Ruixiang Ge, Min Ma,* Jiali Ren* and Jian Tian*

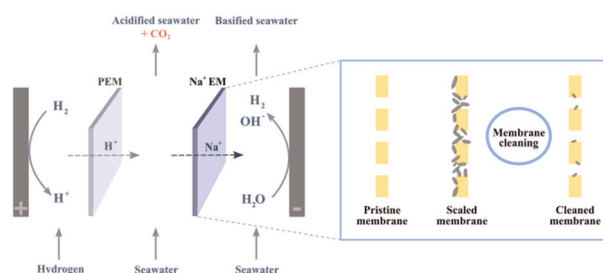


PAPERS

7137

Feasibility study of an electrochemical hydrogen looping system for indirect ocean capture

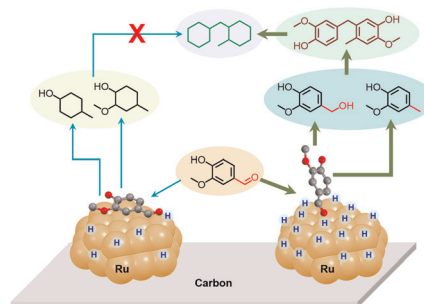
Siebe De Ley, Sven Arnouts, Kevin Van Daele, Jonas Hereijgers and Tom Breugelmans*



7147

Production of high-carbon-number hydrocarbon bio-aviation fuels *via* catalytic hydrogenation of vanillin and non-catalytic condensation: a mechanistic study with DFT and experimental insights

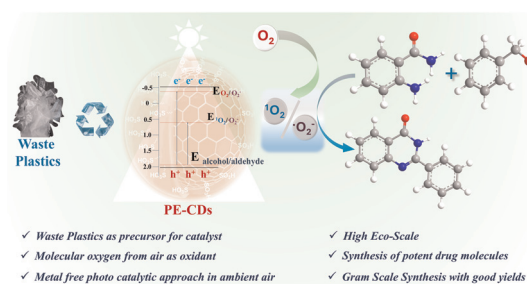
Jina Eun, Jeonghun Kim, Han Byeol Kim, Do Heui Kim, Jae-Wook Choi, Kwang Ho Kim, Chun-Jae Yoo, Seongmin Jin, Kyeongsu Kim, Hyunjoo Lee, Chang Soo Kim, Kwan-Young Lee, Jong Suk Yoo,* Seo-Jung Han,* Keunhong Jeong* and Jeong-Myeong Ha*



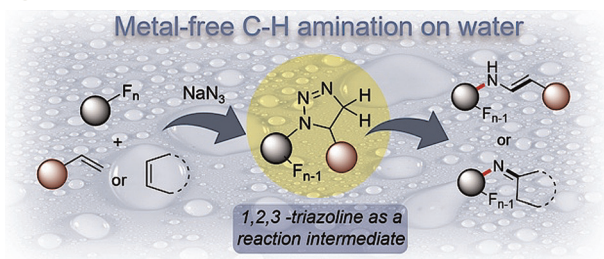
7160

Oxygen-harvesting carbon dot photocatalysts for ambient tandem oxidative synthesis of quinazolin-4(3H)-ones

Bidyutjyoti Dutta, Bramhaiah Kommula, Kiran Kanwar, Ankur K. Guha, Ujjal K. Gautam* and Diganta Sarma*



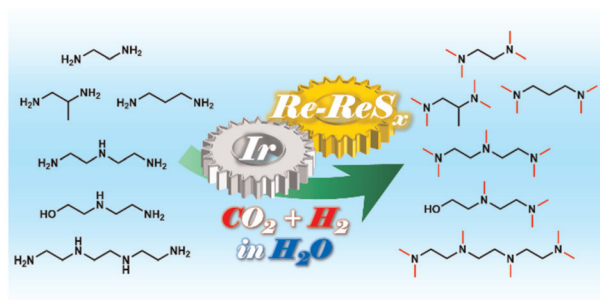
7167



“On water” metal-free direct C–H amination and imination of olefins via tandem S_NAr , click chemistry, and molecular nitrogen release

Sudripet Sharma, Seyedesahar Miraghaee and Sachin Handa*

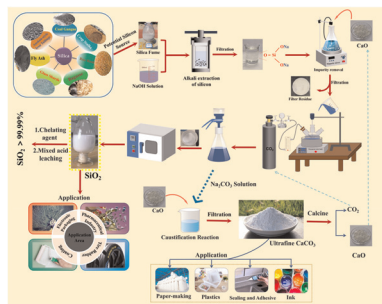
7174



Highly efficient sulfurized Re–Ir catalysts for multiple *N*-methylation of ethylenediamine and its homologous series with CO_2 and H_2 in water solvent

Min Wang, Mizuho Yabushita,* Kazuki Okuma, Tomohiro Shono, Yoshinao Nakagawa and Keiichi Tomishige*

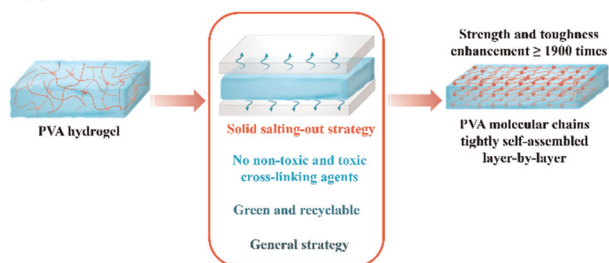
7191



A green route for producing high-purity nano- SiO_2 from silicon containing waste

Jiabao Deng, Dawei Luo,* Ke Rong, Zijie Gao, Jianghua Chen, Ke Zhao and Zhongxiang Yu

7208



A general strategy for strengthening and toughening physical hydrogels via anti-Hofmeister sequence solid salting-out

En-Jiang Liu, Ding-Ding Lü, Bai-Chuan Lu, Run-Ze Hu, Shi-Wen Guo, Chen-Man Zong, Xiao-Hui Yao, Xue-Yang Wang, Tao Chen, Ai-Jun Wan and Dong-Yang Zhang*

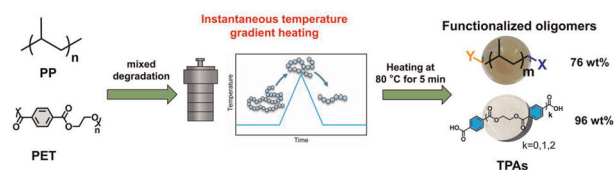


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Co-upcycling of mixed polypropylene and polyesters

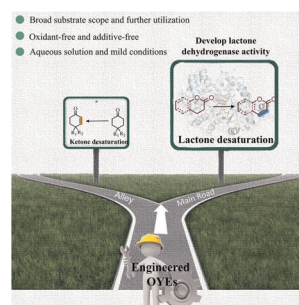
Xiangyue Wei, Qiang Zhang, Chengfeng Shen, Pengbo Ye, Jiaying Xu, Xuehui Liu, Zhishan Su, Shimei Xu* and Yu-Zhong Wang*



7229

Enabling desaturation of lactones by reversible catalytic activity of 'ene'-reductases

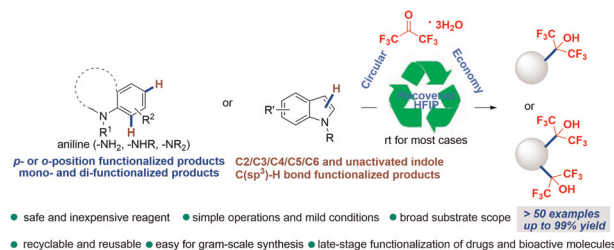
Fengxi Li, Yihang Dai, Shenhan Xie, Xinjia Yu, Xinyan Shi, Zhengqiang Li, Chuang Du,* Zhi Wang* and Lei Wang*



7234

Facile and rapid access to hexafluoroisopropanol (HFIP)-group-functionalized aniline and indole derivatives using hexafluoroacetone trihydrate in HFIP

Xindi Li, Yuhao Wu, Jinshan Li,* Jialin Xie, Juanzu Liu, Zhenchang Wen, Zhendong Zhao and Chunman Jia*

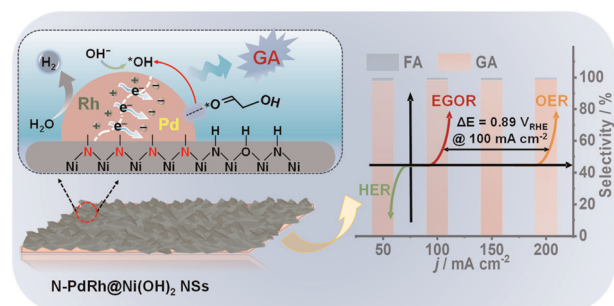


- safe and inexpensive reagent
 - simple operations and mild conditions
 - broad substrate scope
 - recyclable and reusable
 - easy for gram-scale synthesis
 - late-stage functionalization of drugs and bioactive molecules
- > 50 examples up to 99% yield

7242

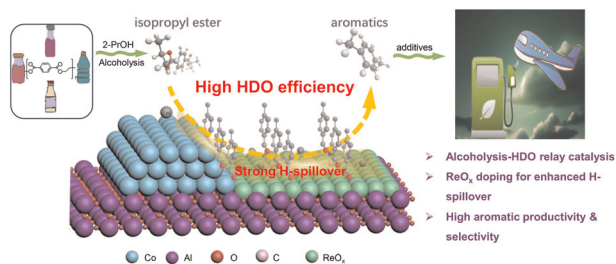
N-Coordinated Pd–Rh synergy for highly selective ethylene glycol oxidation and efficient hydrogen evolution

Hai-Yan Guo, Jin-Wei Kang, Yun-Yan Du, Lu Zhang,* Jiu-Ju Feng and Ai-Jun Wang



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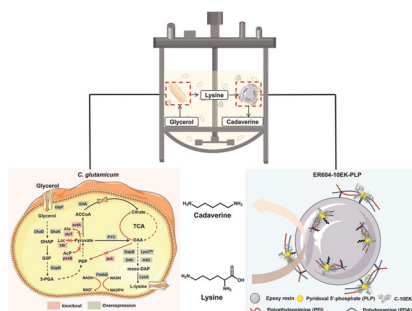
7254



Hydrogen spillover boosts PET upcycling to aviation fuel additives over Co–ReO_x catalysts

Xin Zhao, Hui Wang, Zhecheng Fang, Zixu Ma, Shuzhuang Sun,* Dan Wu, Yongsheng Zhang, Chunbao Charles Xu, Shengyong Lu, Renfeng Nie* and Jie Fu*

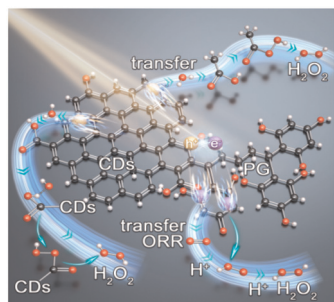
7263



Engineering a hybrid system of *Corynebacterium glutamicum* and co-immobilized enzymes for efficient cadaverine production from glycerol

Yunpeng Lv, Simin Liu, Liang Wei,* Lei Zhang and Haishan Qi*

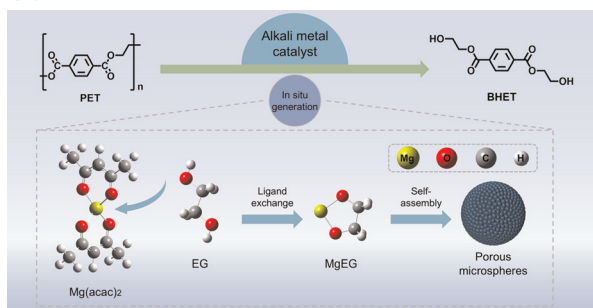
7281



Carbon-dot-modified phloroglucinol–glutaraldehyde resin photocatalysts for hydrogen peroxide production

Jiarong Wang, Ning Li, Weijie Ren, Jie Wu, Qing Chang, Jinlong Yang, Shengliang Hu* and Haolan Xu*

7290



Depolymerization of polyesters by *in situ* generated alkali metal alkoxides

Junyan Wu, Qingqing Zhao, Diandian Shi, Yiguo He, Zhen Miao, Haijiao Xie, Dianyu Wang,* Shuzhuang Sun and Yadong Zhang*

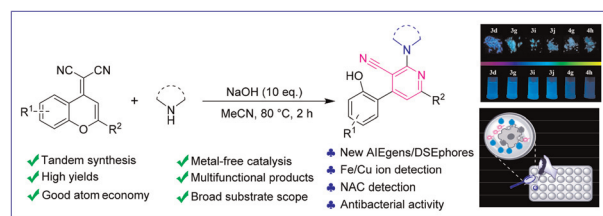


PAPERS

7300

Multifunctional 3-cyanopyridine compounds: synthesis based on a tandem reaction with 100% atom economy and their applications

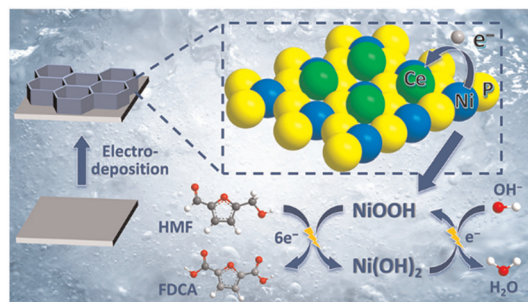
Xi-Ying Cao, Zhong-Hao Li, Xiao-Hui Cao,* Zong Li, Chu-Ming Pang,* Zu-Qi Zhang and Zhao-Yang Wang*



7307

Enhanced electrocatalytic hydrogen evolution reaction, oxygen evolution reaction and biomass oxidation over Ce-doped NiP_x via optimization of electronic modulation

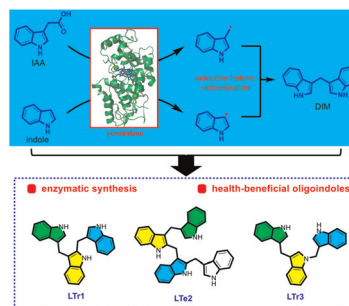
Shuhan Liu, Yifei Ye, Lele Gao, Zhen Yan, Haokun Pan, Zhaokun Wang, Guangrui Zhang and Xiubing Huang*



7319

Enzymatic synthesis of health-beneficial oligoindoles using peroxidase

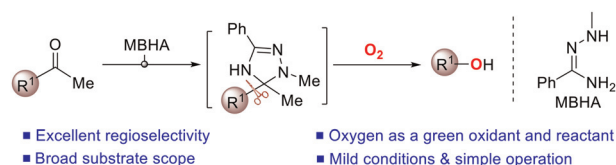
Dan Liu, Heng Peng Zhang, Jia Cheng Qian, Yi Wang, Su Juan Ren and Ren Xiang Tan*



7329

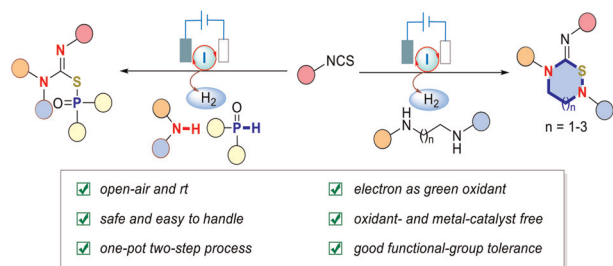
Aerobic alcoholization via aromatization driven C–C bond cleavage of unstrained ketones

Renzhi Liu and Huiying Zeng*



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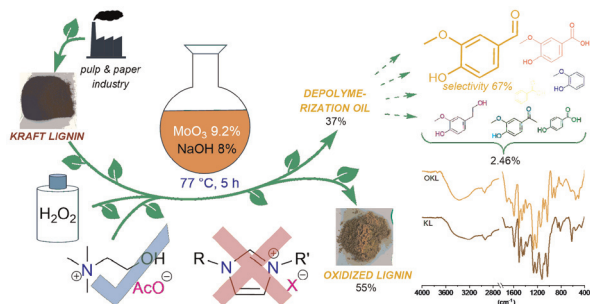
7336



Electrochemically driven tandem addition–cyclization: synthesis of thiadiazinanes and thiophosphonates

Honghao Zhou, Yike Zhang, Liting Ma, Xiangyang Liu, Chun Zhang, Feifei Tong, Dandan Hu,* Jun-Qi Zhang* and Jianguo Yang*

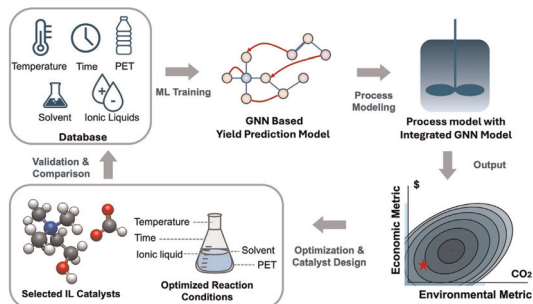
7344



Aqueous choline acetate as reaction medium for the oxidation of kraft lignin with hydrogen peroxide

Cosimo Annese,* Michele Casiello, Caterina Fusco, Antonio Monopoli and Lucia D'Accolti

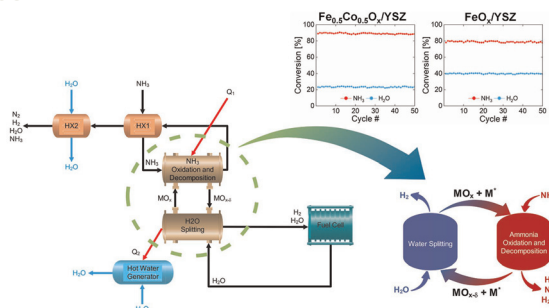
7357



Machine learning-guided optimization for ionic liquid-based polyethylene terephthalate waste recycling

Ji Gao, Wenbo Peng, Andres Galindo, Ethan Slaton, Jose Perez Martinez, Guanghui Lan and Zhaohui Tong*

7368



Chemical looping hydrogen production from ammonia and water: materials and techno-economics

Amirmohammad Arjomand Kermani, Kyle Shank and Shang Zhai*

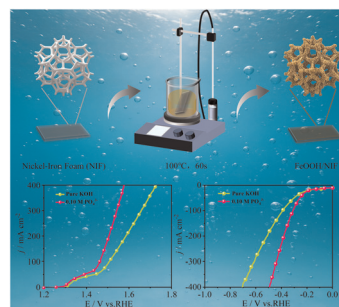


PAPERS

7380

Deciphering the synergistic role of chemisorbed phosphate on FeOOH for high-efficiency overall water splitting

Xiaoqian Du, Junjun Zhang,* Mengyuan Zhang, Huilong Wei, Xiu Lin, Wen Guo,* Pengfei Zhang* and Zhenghong Luo



CORRECTION

7389

Correction: Enhanced electrocatalytic CO₂ reduction to methane via synergistic Sb and F dual-doping on copper foil under pulsed potential electrolysis

Kuan Wang,* Xue Jiang, Xin-Peng Li, Zhe Cao, Zhen-Hong He, Weitao Wang, Huan Wang, Xiaojuan Lai* and Zhao-Tie Liu*

