

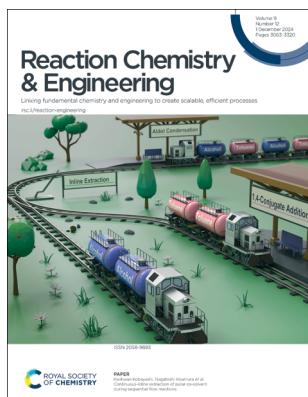
# Reaction Chemistry & Engineering

Bridging the gap between chemistry and chemical engineering  
[rsc.li/reaction-engineering](https://rsc.li/reaction-engineering)

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 2058-9883 CODEN RCEEBW 9(12) 3063–3320 (2024)



### Cover

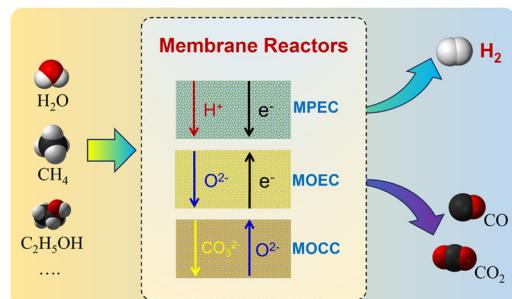
See Kwihiwan Kobayashi,  
Nagatoshi Koumura et al.,  
pp. 3116–3121.  
Image reproduced by permission  
of Kwihiwan Kobayashi from  
*React. Chem. Eng.*, 2024, 9,  
3116.

## REVIEW

3072

### Mixed-conducting ceramic membrane reactors for hydrogen production

Jingjing Tong, Peng Zhang,\* Fuwei Zhuang,  
Yanyan Zheng, Binyan Liu, Xiangping Qiao  
and Xuefeng Zhu\*



## PERSPECTIVE

3100

### ChemPren: a new and economical technology for conversion of waste plastics to light olefins

Anne Gaffney,\* Debnan Maiti, Debasish Kuila  
and Gennaro Mafia



# Advance your career in science

with professional recognition that showcases your **experience, expertise and dedication**

## Stand out from the crowd

Prove your commitment to attaining excellence in your field

## Gain the recognition you deserve

Achieve a professional qualification that inspires confidence and trust

## Unlock your career potential

Apply for our professional registers (RSci, RSciTech) or chartered status (CChem, CSci, CEnv)

## Apply now

[rsc.li/professional-development](https://rsc.li/professional-development)

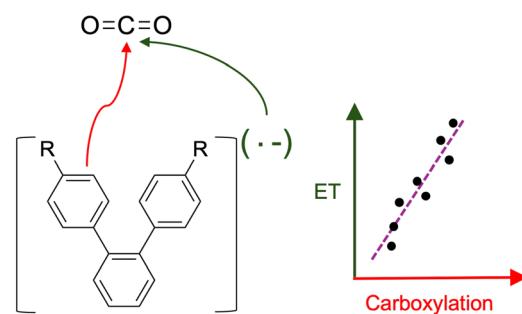


## COMMUNICATIONS

3105

## Linear scaling relationships in homogeneous photoredox catalysis

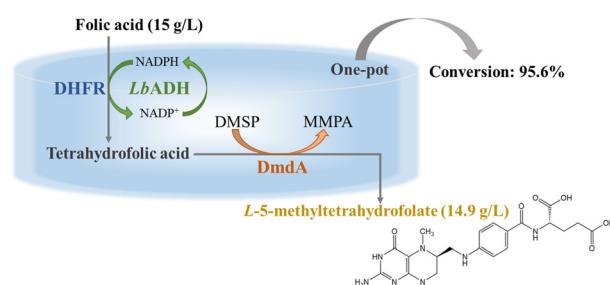
Kareesa J. Kron and Shaama Mallikarjun Sharada\*



3110

## One-pot enzymatic synthesis of L-5-methyltetrahydrofolate from folic acid using enzyme cascades

Linjiang Zhu, Yuxin Wang, Linyan Pan, Enyong Lin, Jiayan Wang and Xiaolong Chen\*

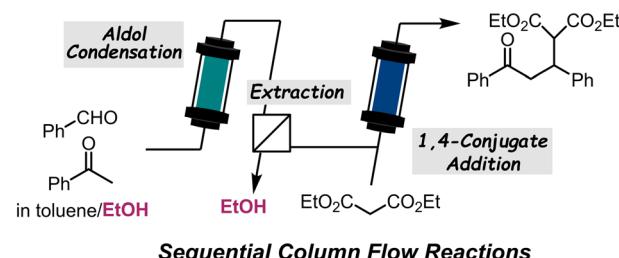


## PAPERS

3116

## Continuous-inline extraction of polar co-solvent during sequential flow reactions

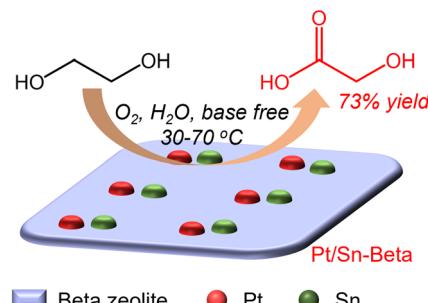
Kwhiwan Kobayashi,\* Jun Matsuzawa, Hajime Kawanami and Nagatoshi Koumura\*



3122

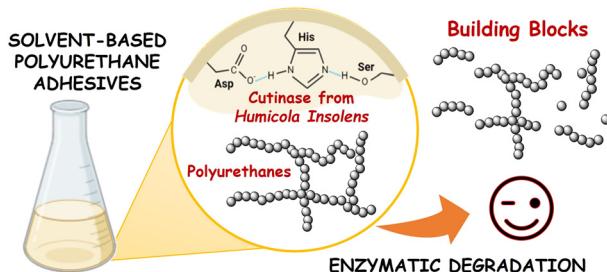
## Synthesis of glycolic acid by selective oxidation of ethylene glycol over Pt/Sn-Beta in a base-free medium

Yongming Xu, Wenzhao Liu, Bo Xu, Ke Wang, Jinchu Yang, Yueqi Si, Xuebin Zhao, Tingting Zhang, Zhan Zhang, Xueyi Qiao\* and Tianliang Lu\*



## PAPERS

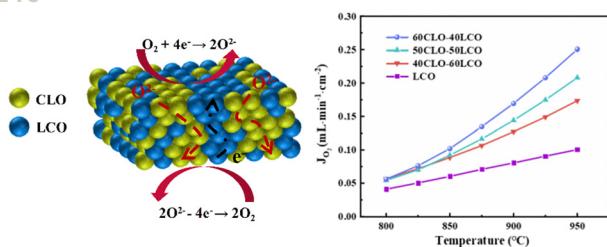
3133



### Enzyme-catalyzed polyurethane adhesive degradation

Angela Romano, Antonella Rosato, Laura Sisti,\* Giulio Zanaroli, Svajus Joseph Asadauskas, Paulina Nemaniutė, Dalia Bražinskienė, Asta Grigucevičienė and Grazia Totaro

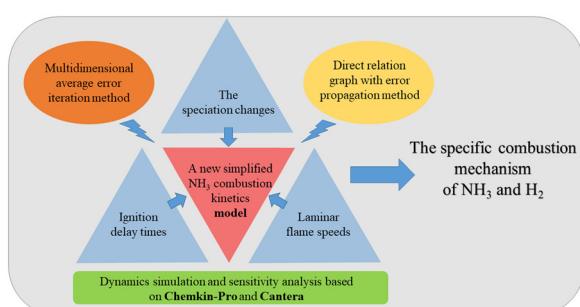
3146



### A mixed ionic and electronic conducting dual-phase oxygen permeable membrane with high CO<sub>2</sub> tolerance

Yihong Xu, Hengcheng Zhu, Song Lei, Zihua Wang and Jian Xue\*

3153

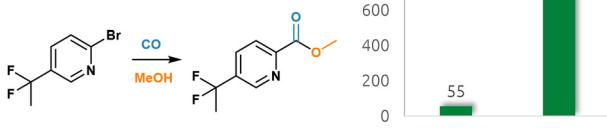


### A simplified chemical kinetic model with a reaction mechanism based on a multidimensional average error iteration method for ammonia and ammonia/hydrogen combustion

Daiyao Yue, Chongkai Zhao, Rui Sun, Jieyu Jiang, Chunjie Sui, Xin Zhong and Bin Zhang\*

3172

**Biphasic flow increases reaction throughput >10x**



### Carbonylations in flow: tube-in-tube reactor vs. gas-liquid slug flow

Agnieszka Ładosz, Astrid Friedli, Arnaud Lhuillary and Georg Rueedi\*

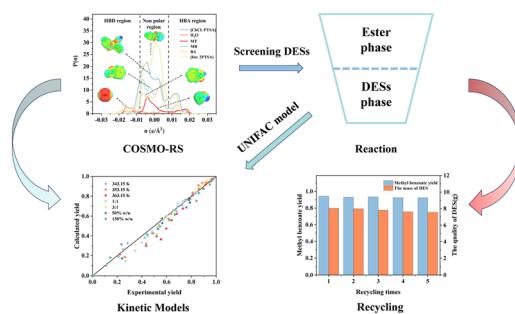


## PAPERS

3179

**Synthesis of methyl benzoate intensified by *p*-toluenesulfonic acid-based deep eutectic solvents**

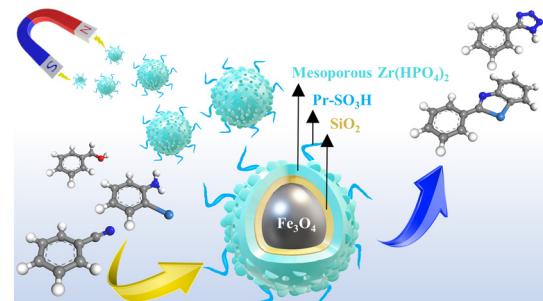
Dian Jin, Xindi Feng, Li Sun,\* Zuoxiang Zeng and Zhen Liu\*



3191

**Magnetic mesoporous zirconium phosphate (MMZP-Pr-SO<sub>3</sub>H): a highly efficient and reusable catalyst for sustainable preparation of phenyl tetrazole and 2-substituted benzoazoles**

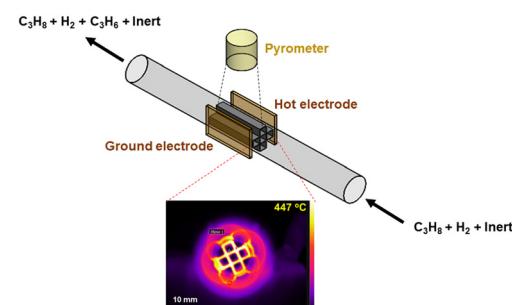
Maryam Tukhani, Abdolreza Hajipour and Alireza Najafi Chermahini\*



3211

**Radio-frequency heating for catalytic propane dehydrogenation**

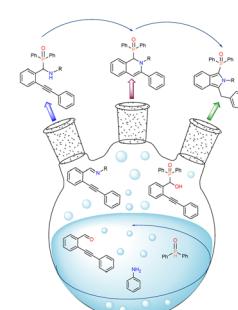
Ankush Rout, Somtochukwu Lambert, Aswin Nair, Kailash Arole, Debalina Sengupta, Mark A. Barteau, Benjamin A. Wilhite\* and Micah J. Green\*



3222

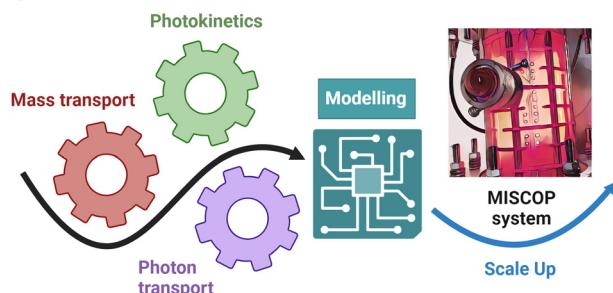
**Synthetic and mechanistic studies of the multicomponent reaction of 2-(phenylethynyl) benzaldehyde, primary amine and diphenylphosphine oxide**

Kármen Szabó, Zsolt Kelemen, Pál Tamás Szabó and Erika Bálint\*



## PAPERS

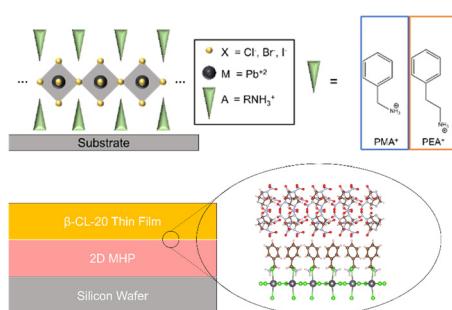
3231



### Modelling the impact of mass transport in a miniplant photoreactor

Florian Gaulhofer, Henning Becker, Alexander Peschl and Dirk Ziegenbalg\*

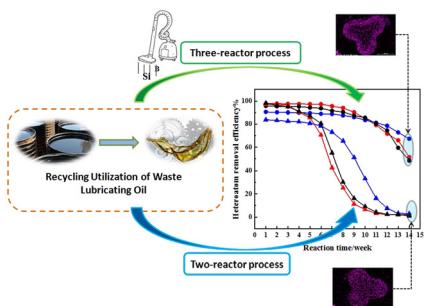
3248



### Utilizing 2D metal halide perovskite thin films as highly tuneable surfaces for orientation control of energetic materials

Natalie Smith-Papin, Meagan Phister, Ashley Conley, Nathan Swami, Zbigniew Dreger and Gaurav Giri\*

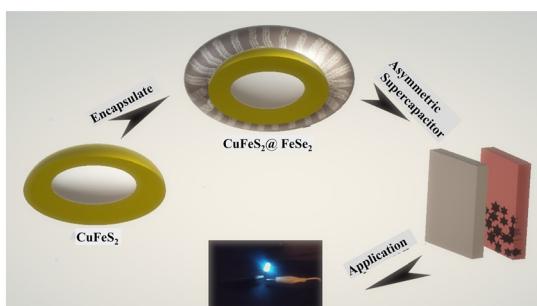
3257



### Application of the three-reactor hydrogenation process in the recycling utilization of waste lubricating oil and study on the catalyst deactivation mechanism

You Fang, Peng Zhang,\* Mengya Guo, Shuke Guo, Fujiang Wang and Mingxing Tang\*

3267



### Spherical CuFeS<sub>2</sub>@FeSe<sub>2</sub> structure as a binder-free electrode and its performance in asymmetric supercapacitors

Tahereh Nikkhah Amirabad\* and Ali A. Ensafi\*

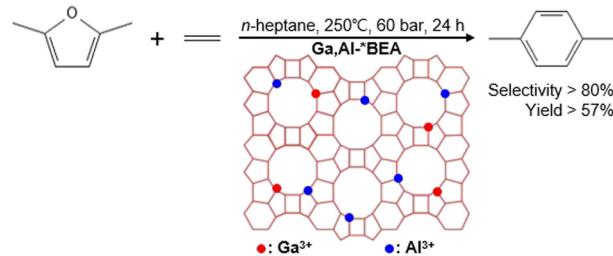


## PAPERS

3277

**Selective production of *para*-xylene from biomass-derived 2,5-dimethylfuran through tandem Diels–Alder/dehydration reactions with a bifunctional Ga, Al-zeolite catalyst**

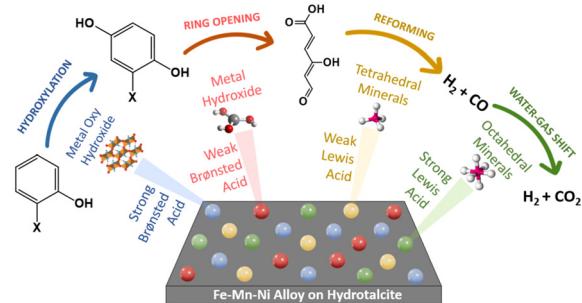
Jaeyul Kim, Sungmin Han and Jeffrey D. Rimer\*



3285

**Syngas production from phenolic pollutants via a series of hydroxylation, ring cleavage, and aqueous-phase reforming catalyzed by a hydrotalcite-supported Fe–Mn–Ni alloy**

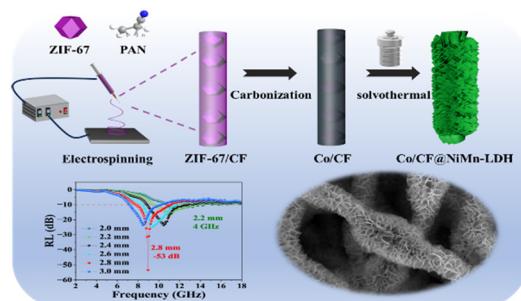
Hanifrahmawan Sudibyo,\* Daniela V. Cabrera, Rodrigo Labatut, Calvin J. Supriyanto, Budhijanto Budhijanto and Adhika Widayaparaga



3299

**Flexible carbon fibres with magnetic ZIF-67 as a core layer and *in situ* grown NiMn-LDH nanosheets as a shell layer for microwave absorption**

Xiaofang Ma, Ying Huang,\* Xiaoxiao Zhao, Meng Yu, Yan Gao, Bing Gao and Sijiao Xiang



3311

**Application of a simple rule for the design of micro- or meso-scale cooled reactors in a heat transfer limited regime**

Kishori Deshpande,\* Jianping Zeng, Ravindra Dixit, David West and David Jean

