

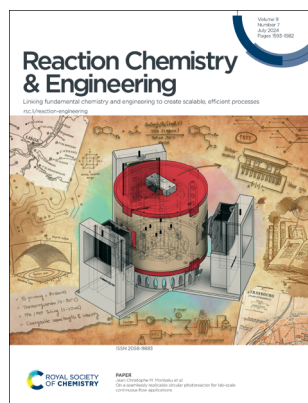
# Reaction Chemistry & Engineering

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(7) 1593-1982 (2024)



### Cover

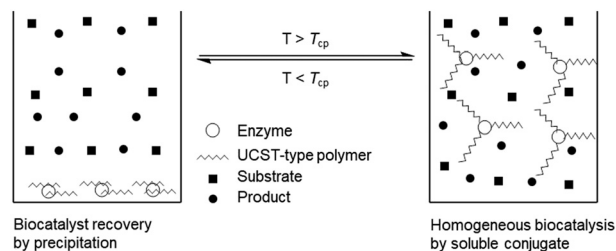
See Jean-Christophe M. Monbaliu *et al.*, pp. 1646–1655.  
Image reproduced by permission of Yi-Hsuan Tsai, Jean-Christophe Monbaliu from *React. Chem. Eng.*, 2024, 9, 1646.

## REVIEW

1605

### Immobilization of enzymes on polymers with upper critical solution temperature: promising engineering of enzymes for biocatalysis

Lin Huang,\* Xirui Li and Zhi Li

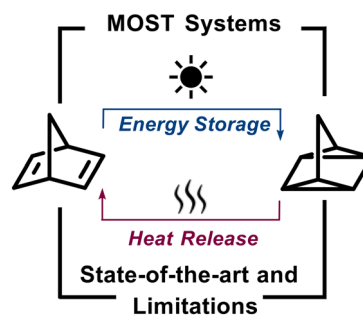


## MINI REVIEW

1629

### State-of-the-art and challenges towards a Molecular Solar Thermal (MOST) energy storage device

Alberto Giménez-Gómez, Lucien Magson, Cecilia Merino-Robledillo, Sara Hernández-Troya, Nil Sanosa, Diego Sampedro\* and Ignacio Funes-Ardoiz\*





# 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)

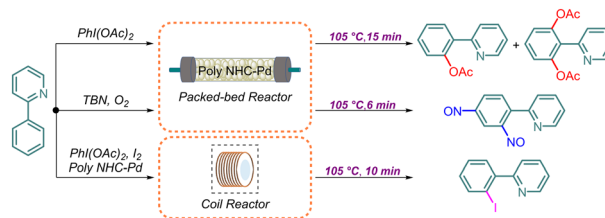


## COMMUNICATION

1641

## Selective C–H functionalizations of arenes catalyzed by poly NHC–Pd in flow

Shiqi Huang, Runqi Hao, Qiao Li, Li Wan\* and Fener Chen\*

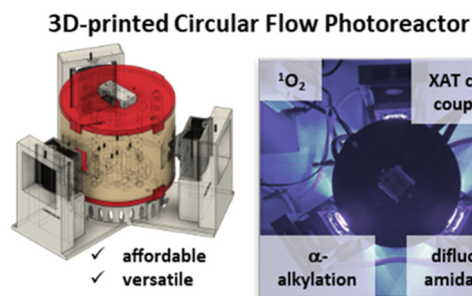


## PAPERS

1646

## On a seamlessly replicable circular photoreactor for lab-scale continuous flow applications

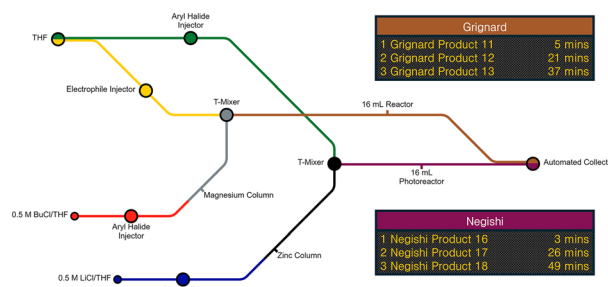
Yi-Hsuan Tsai, Martin Cattoen, Guillaume Masson, Gabrielle Christen, Lisa Traber, Morgan Donnard, Frédéric R. Leroux, Guillaume Bentzinger, Sylvain Guizzetti\* and Jean-Christophe M. Monbaliu\*



1656

## Enabling organometallic libraries by flow: a tale of two metals

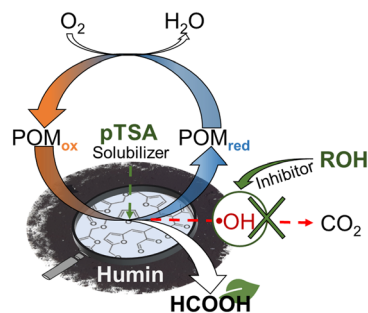
Daniel Maddox,\* Lucie Guetzoyan and Lee Walmsley\*



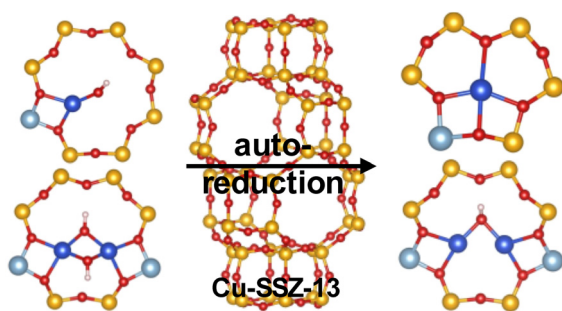
1666

Selective catalytic oxidation of humins to carboxylic acids using the H<sub>4</sub>[PVMo<sub>11</sub>O<sub>40</sub>] Keggin-type polyoxometalate enhanced by alcohol doping and solubilizer

Tobias Esser, André Wassenberg, Dorothea Voß and Jakob Albert\*



1685

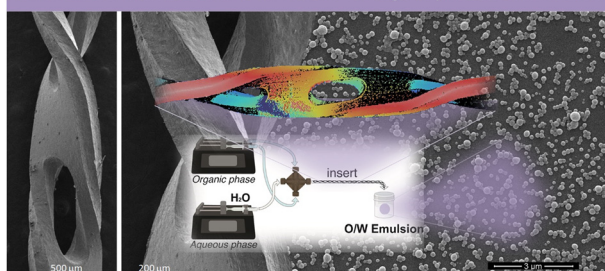


### Thermodynamic driving forces for autoreduction of Cu sites in the zeolite SSZ-13

Daniel J. Hutton, David H. Lopez and Florian Göttl\*

1696

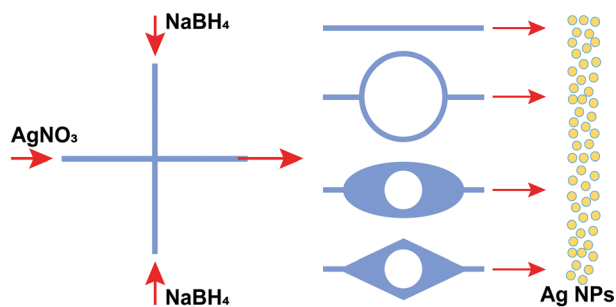
Helical inserts assembled in microfluidic tubings as passive micromixers



### Performance of a helical insert in a commercial tubing as a passive micromixer to produce nanoparticles using an emulsification approach

Lucia Abengochea, Santiago Pina-Artal, Víctor Gonzalez and Víctor Sebastian\*

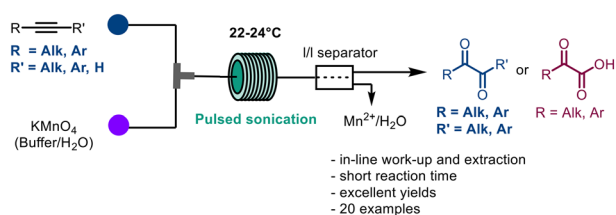
1707



### Intensification of silver nanoparticle synthesis through continuous flow split and recombine microreactors

Amritendu Bhuson Ghosh, Rakesh Kumar and Arnab Atta\*

1721



### Continuous flow oxidation of alkynes with KMnO<sub>4</sub> for the synthesis of 1,2-diketone derivatives

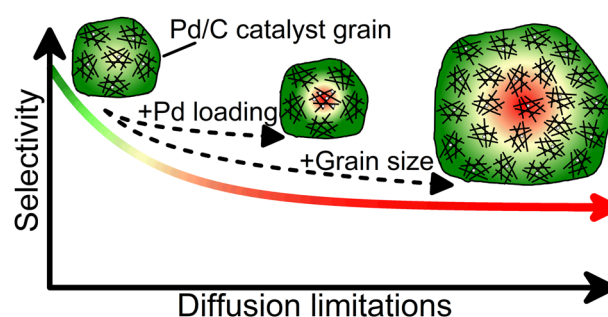
Viktoria Velichko, Dario Cambie\* and Francesco Secci\*



1726

### Mass transport effects in gas-phase selective hydrogenation of 1,3-butadiene over supported Pd

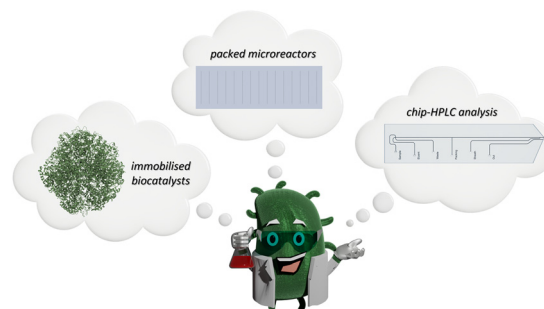
Oscar E. Brandt Corstius, M. Kikkert, S. T. Roberts, E. J. Duskocil, J. E. S. van der Hoeven and P. E. de Jongh\*



1739

### Development of an automated platform for monitoring microfluidic reactors through multi-reactor integration and online (chip-)LC/MS-detection

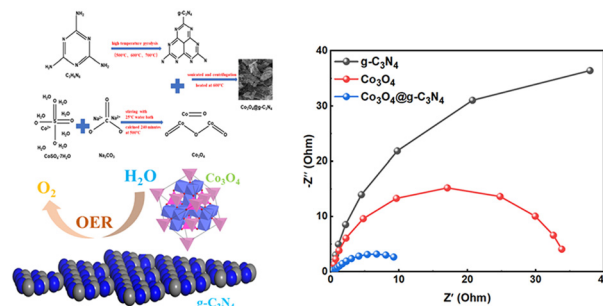
Hannes Westphal, Simon Schmidt, Sanjay Lama, Matthias Polack, Chris Weise, Toni Oestereich, Rico Warias, Tanja Gulder\* and Detlev Belder\*



1751

### Co<sub>3</sub>O<sub>4</sub> supported by ultrathin-layered graphitic carbon nitride for efficient electrocatalytic evolution of oxygen

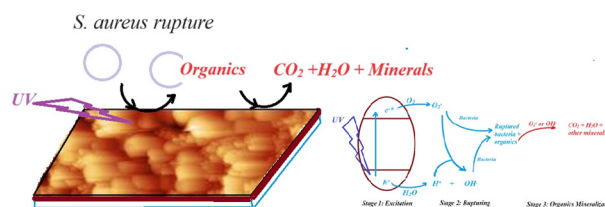
Ruixue Luo, Xi Li, Youping Guo and Renchun Fu\*



1762

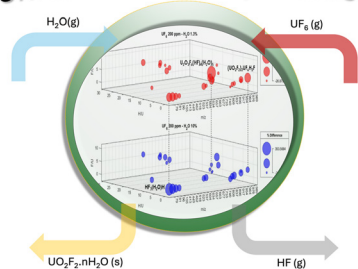
### TiO<sub>2</sub> nanopowder and nanofilm catalysts in the disinfection and mineralization of *S. aureus* with solar-simulated radiation

Raed Shqier, Ahd Zyoud, Muath H. S. Helal,\* Heba Nassar, Raed Alkowni, Mohyeddin Assali, Shafer Zyoud, Naser Qamhieh, Abdul Razack Hajamohideen, Shadi Sawalha, Samer H. Zyoud and Hikmat S. Hilal



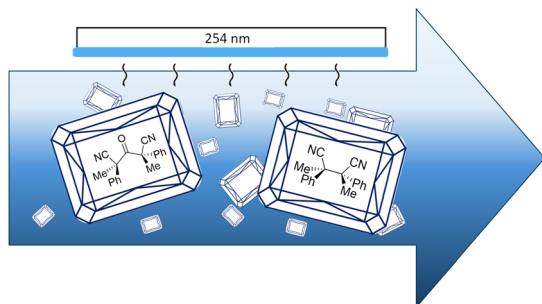
1776

## Formation of Uranyl Aerosol

Determination of intermediates and products of the uranyl aerosol formation in  $\text{UF}_6$  hydrolysis in the gas phase

Christian Mark Salvador,\* Jason M. Richards, Shannon M. Mahurin, Meng-Dawn Cheng\* and Joshua A. Hubbard

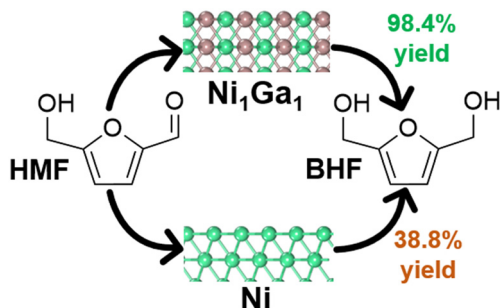
1784



## Merging inline crystallization and pulsed flow operation to enable enantiospecific solid state photodecarbonylation

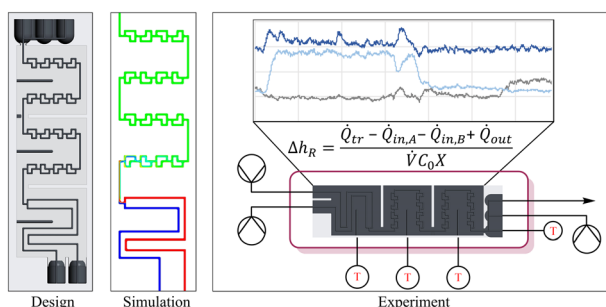
Bavo Vandekerckhove, Bart Ruttens, Bert Metten, Christian V. Stevens and Thomas S. A. Heugebaert\*

1796

Selective hydrogenation of 5-hydroxymethylfurfural to 2,5-bis(hydroxymethyl)furan over  $\text{Ni-Ga}$  intermetallic catalysts and its kinetic studies

Weixiao Sun, Fuzeyu Zhong, Xiaohu Ge,\* Wenyao Chen, Gang Qian, Yueqiang Cao, Xuezhi Duan, Xingguo Zhou and Jing Zhang\*

1805



## Thermokinetic analyses of metal-sensitive reactions in a ceramic flow calorimeter

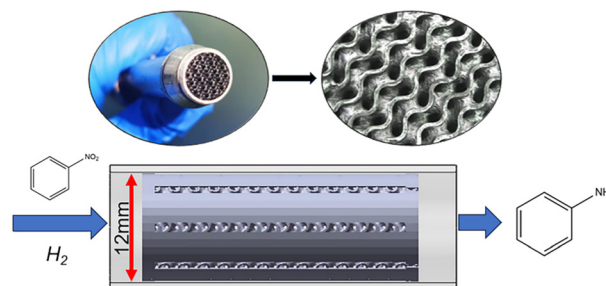
Soritz S.,\* Sommitsch A., Irndorfer S., Brouczek D., Schwentenwein M., Priestley I. J. G., Iosub A. V., Krieger J. P. and Gruber-Woelfler H.\*



1816

### Novel TPMS carbon-based monolithic catalysts by three-dimensional printing for enhancement of nitrobenzene hydrogenation reaction

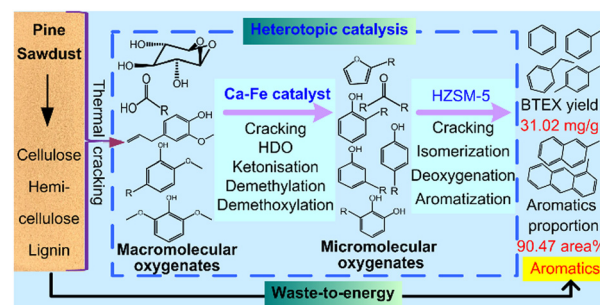
Haoyang Wang, Haoran Tian, Qi Zhang and Li Zhang\*



1824

### Catalytic degradation of pine sawdust over heterotopic Ca-Fe and HZSM-5 to produce aromatic hydrocarbons

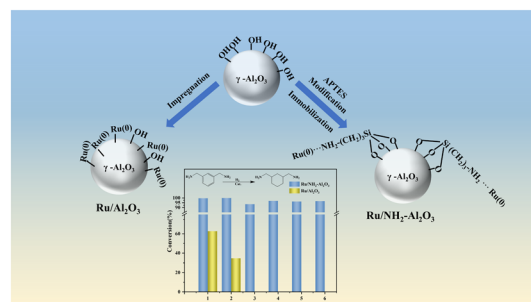
Huifen Kang, Xintong Guo, Mei An, Conghua Ma, Guozhang Chang,\* Qingjie Guo\* and Jingjing Ma\*



1836

### Efficient aqueous-phase hydrogenation of *m*-xylenediamine to 1,3-cyclohexanedimethylamine over a highly active and stable ruthenium catalyst

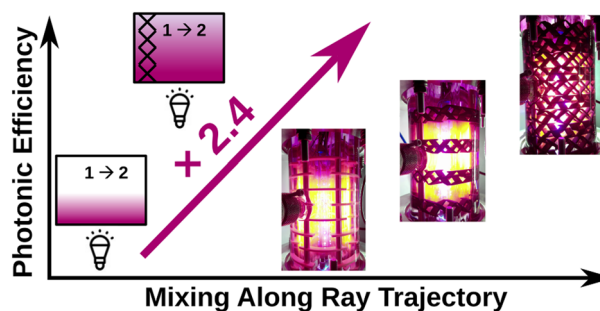
Jing Guo, Heng Shao, Le Gao, Wancheng Ma, Wei Zhang,\* Long Huang\* and Haibin Chu\*



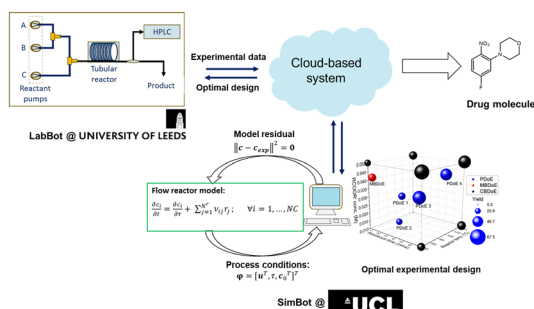
1845

### Enhancing mass transport to accelerate photoreactions and enable scale-up

Florian Gaulhofer, Markus Metzger, Alexander Peschl and Dirk Ziegenbalg\*



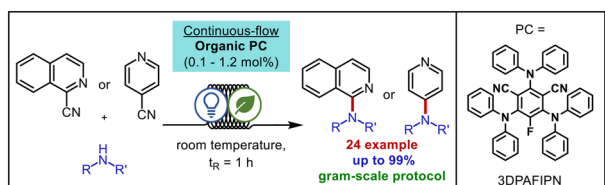
1859



### Automated kinetic model identification via cloud services using model-based design of experiments

Emmanuel Agunloye, Panagiotis Petsagkourakis, Muhammad Yusuf, Ricardo Labes, Thomas Chamberlain, Frans L. Muller, Richard A. Bourne and Federico Galvanin\*

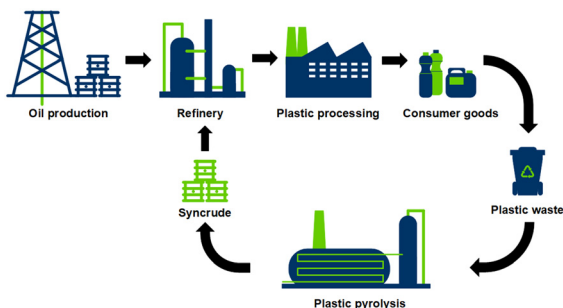
1877



### Photochemical organocatalytic heteroarylation of anilines and secondary alicyclic amines in continuous-flow

Egor N. Boronin, Milena M. Svetlakova, Ilya I. Vorobyov, Yulia B. Malysheva, Yuri V. Polushtaytsev, Sergey N. Mensov, Andrey V. Vorotyntsev, Alexey Yu. Fedorov, Timothy Noël and Alexander V. Nyuchev\*

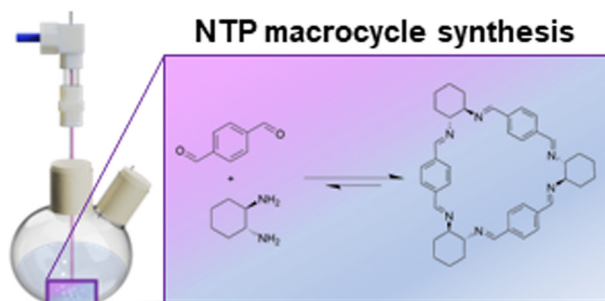
1883



### A sequential lumped kinetic modelling approach for the co-pyrolysis of plastic mixtures with a heavy refinery intermediate product in a tubular reactor

Sebastian-Mark Lorbach,\* Andreas E. Lechleitner, Teresa Schubert and Markus Lehner

1896



### High-efficiency non-thermal plasma synthesis of imine macrocycles

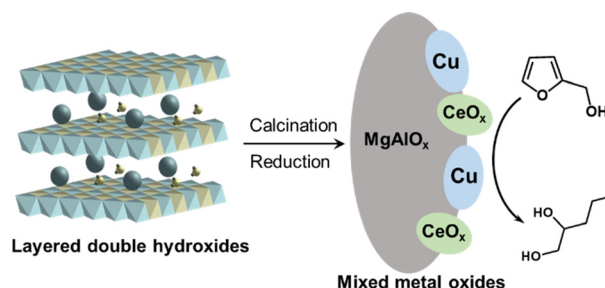
Patrycja Roszkowska, Abbie M. Scholes, James L. Walsh,\* Timothy L. Easun\* and Anna G. Slater\*



1904

### Hydrogenolysis of furfuryl alcohol over CuCeMgAl mixed metal oxide catalysts derived from layered double hydroxides

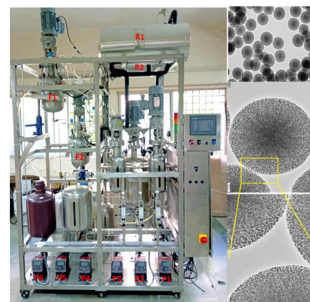
Zhihui Wang, Wenbo Li, Xinyao Fu, Chen Zhang,\*  
Wei Zhang, Long Huang and Cuiqing Li\*



1914

### Scaling-up continuous production of mesoporous silica particles at kg scale: design & operational strategies

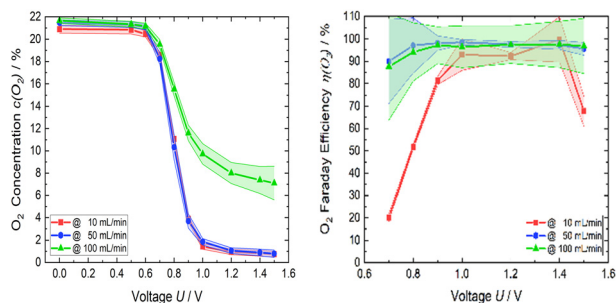
Rajashri B. Jundale, Jayesh R. Sonawane,  
Anil V. Palghadmal, Hemant Kumar Jaiswal,  
Hital S. Deore and Amol A. Kulkarni\*



1924

### Generation of nitrogen by means of electrochemical oxygen depletion

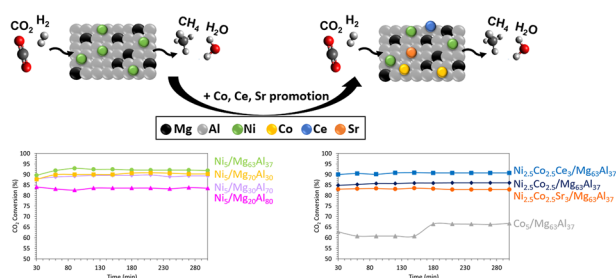
Dominik Sachse, Basil Noha Chelachottil,  
Andreas Glösen,\* Martin Müller, Uwe Rau and Ralf Peters



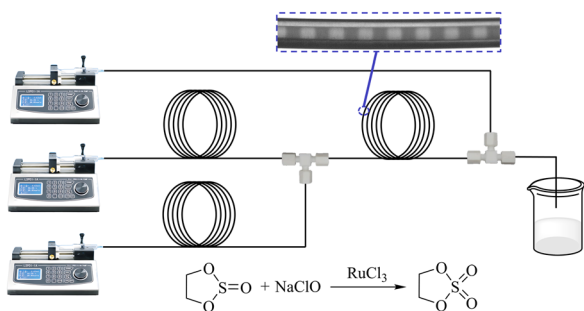
1933

### Optimizing CO<sub>2</sub> methanation: effect of surface basicity and active phase reducibility on Ni-based catalysts

Marie-Nour Kaydouh, Nissrine El Hassan,\*  
Ahmed I. Osman,\* Hamid Ahmed, Naif Alarifi,\*  
Anis H. Fakeeha, Abdulrahman Bin Jumrah  
and Ahmed S. Al-Fatesh\*



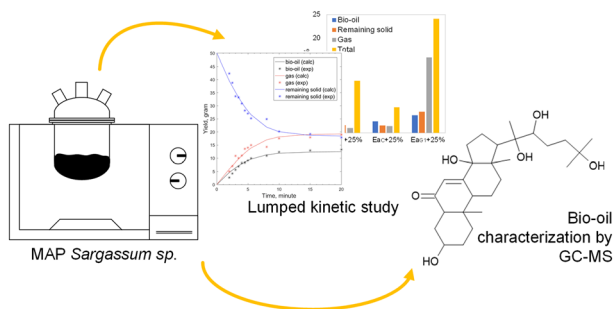
1947



### Synthesis and kinetic study of 1,3,2-dioxathiolane 2,2-dioxide in microreactors

Ting Wang, Junnan Wang, Chengxiang He, Zhongdong Wang, Yating Li, Chunying Zhu, Youguang Ma and Taotao Fu\*

1959



### Comprehensive study of lumped kinetic models and bio-oil characterization in microwave-assisted pyrolysis of *Sargassum* sp.

Teta Fathya Widawati, Muhammad Fuad Refki, Rochmadi, Joko Wintoko and Arief Budiman\*

