

# Catalysis Science & Technology

A multidisciplinary journal focussing on all fundamental science and technological aspects of catalysis  
[rsc.li/catalysis](http://rsc.li/catalysis)

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 2044-4761 CODEN CSTAGD 15(4) 951-1282 (2025)



### Cover

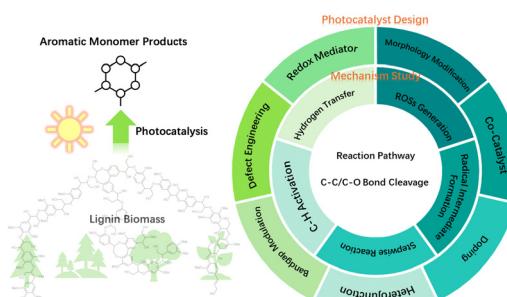
See Lu Shin Wong et al.,  
pp. 1009–1015.  
Image reproduced by  
permission of Lu Shin Wong  
from *Catal. Sci. Technol.*,  
2025, 15, 1009.

## REVIEWS

962

### A mini review on photocatalytic lignin conversion into monomeric aromatic compounds

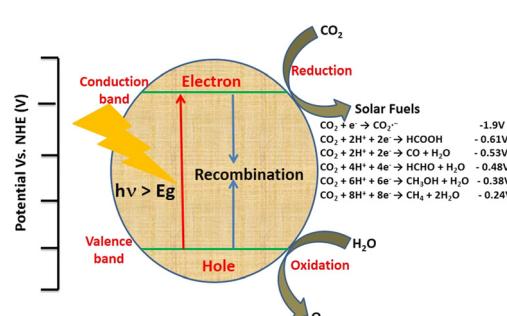
Shibo Shao, Xiangzhou Wang, Wenbing Li,\*  
Yiming Zhang, Shi Liu, Weisheng Xiao, Zongyang Yue,  
Xu Lu\* and Xianfeng Fan\*



988

### Innovations and fundamentals in visible light-driven photocatalysis for CO<sub>2</sub> reduction

Rajesh Sahu,\* Tarun Patodia, Sakshi Juyal,  
Fateh Singh Gill, Brijesh Prasad and Ankur Jain\*





# Royal Society of Chemistry approved training courses

Explore your options.  
Develop your skills.  
Discover learning  
that suits you.

**Courses in the classroom,  
the lab, or online**

Find something for every  
stage of your professional  
development. Search our  
database by:

- subject area
- location
- event type
- skill level

Members get at least 10% off

Visit [rsc.li/cpd-training](http://rsc.li/cpd-training)

**SAVE  
10%**

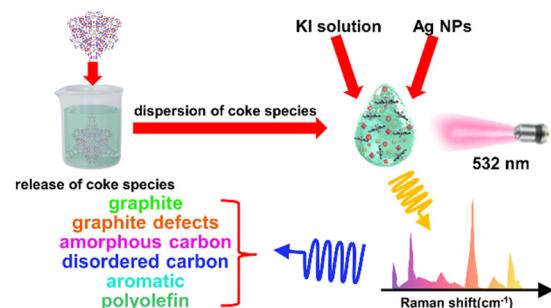


## COMMUNICATION

1003

**Surface-enhanced Raman scattering technique for comprehensive group-based structural identification of coke deposits on deactivated zeolite catalysts**

Guoliang Wu, Qiang Bao,\* Jian Zhang, Mingjian Luo, Zhirui Chen, Xue Qiao, Yi Hu, Wenlin Wang and Yunfeng Hu\*

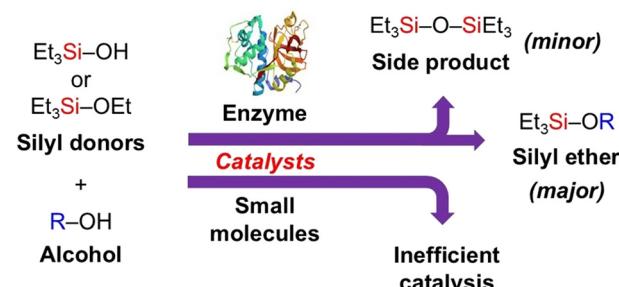


## PAPERS

1009

**Investigating silicatein selectivity and specificity in silicon–oxygen bond condensation and metathesis**

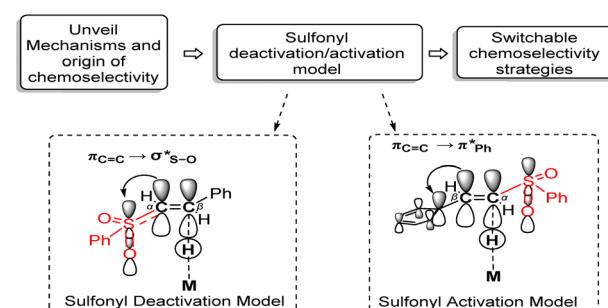
Chisom S. Egedeuzu, Peter G. Taylor and Lu Shin Wong\*



1016

**Nature of sulfonyl deactivation/activation by metal catalysts**

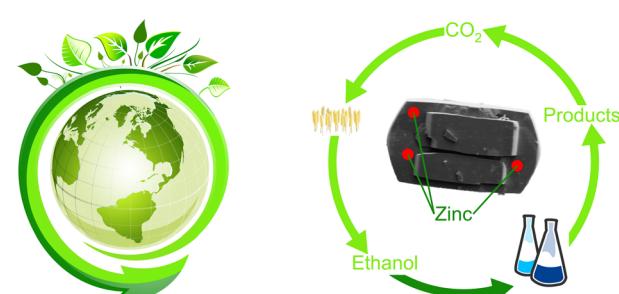
Zhihui Li, Lanbo Liu, Wan Li, Xueqing Song,\* Zheng Wang\* and Longfei Li\*



1028

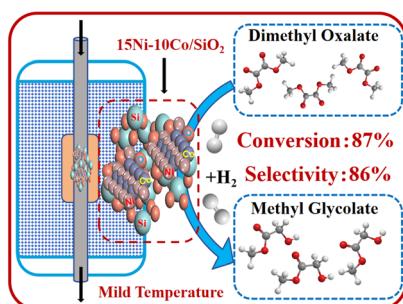
**Higher BTEX aromatic yield from ethanol over desilicated H,Zn-[Al]ZSM-5 catalysts**

Daniel Dittmann, Alime Ileri, Dennis Strassheim and Michael Dyballa\*



## PAPERS

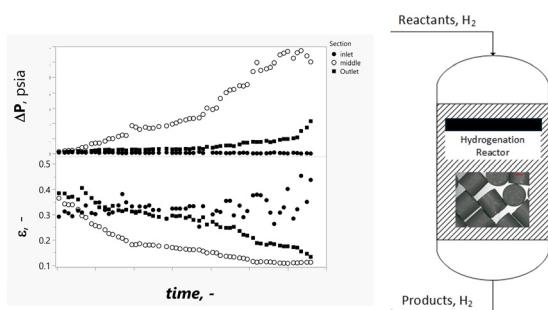
1041



### An examination of dimethyl oxalate hydrogenation to methyl glycolate on silica-supported Ni-Co alloy catalysts

Donghui Xiao, Shilong Xie, Xin Gao,\* Riguang Zhang and Chun-Ran Chang\*

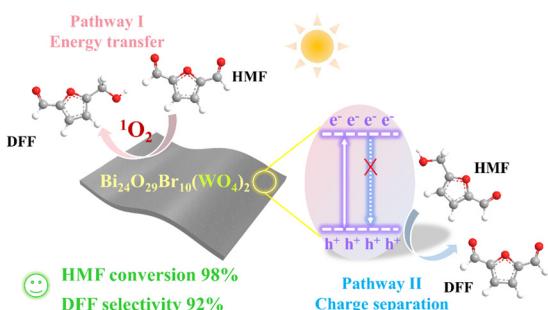
1055



### Unravelling the deactivation of CuZnO-based catalysts at the industrial scale: a micro to macro scale perspective

Vera P. Santos,\* Ewa Tocha, Jin Yang, Mark McAdon, Carla Schmidt, Stuart Leadley, David Yancey, Stefan van Bloois, Joost Depicker, Swati Naik, Linh Bui, Saurabh Bhandari, Daniel Grohol and David G. Barton

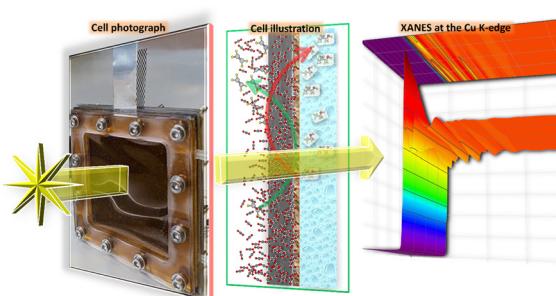
1061



### Efficient photocatalytic selective oxidation of 5-hydroxymethylfurfural on $\text{Bi}_{24}\text{O}_{29}\text{Br}_{10}(\text{WO}_4)_2$ solid solution via enhanced charge separation

Yingxin Guo, Ming Gong, Xin Xu, Yuming Dong\* and Guangli Wang

1070



### Operando X-ray absorption spectroscopic flow cell for electrochemical $\text{CO}_2$ reduction: new insight into the role of copper species

Santhosh K. Matam,\* P. K. Sharma, E. H. Yu,\* C. Drivas, M. D. Khan, M. Wilding, N. Ramanan, D. Gianolio, M. A. Isaacs, S. Guan, P. R. Davies and C. Richard A. Catlow

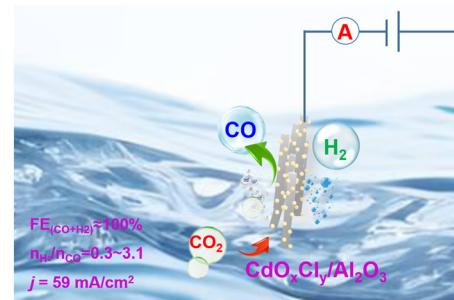


## PAPERS

1082

**Chlorine tailored  $\text{CdO}_x\text{Cl}_y/\text{Al}_2\text{O}_3$  for syngas formation in electrochemical  $\text{CO}_2$  reduction**

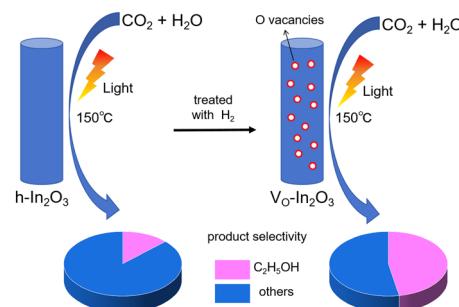
Xin Wang, Zhen-Hong He,\* Hui-Hui Cao, Yu-Xuan Ji, Xuan-Lu Fan, Rui-Peng Yan, Kuan Wang, Weitao Wang, Lu Li and Zhao-Tie Liu\*



1090

**Hexagonal  $\text{In}_2\text{O}_3$  short nanorods rich in O vacancy-defects toward promoting highly efficient photothermal  $\text{CO}_2$  reduction into  $\text{C}_2\text{H}_5\text{OH}$** 

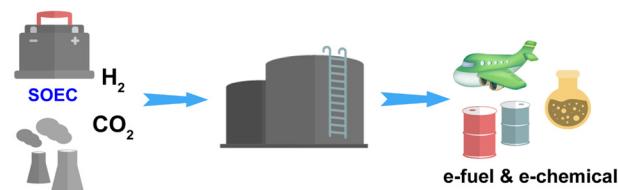
Kai Zhao, Qiutong Han,\* Zhe Lu, Yubin Zheng, Boye Zhou, Haoqiang Chi, Dawei Liu, Lu Wang, Zhigang Zou and Yong Zhou\*



1096

**Towards superior efficiency of the  $\text{CO}_2$ -derived Fischer-Tropsch synthesis process over iron-based metal-organic framework-derived multifunctional catalytic materials**

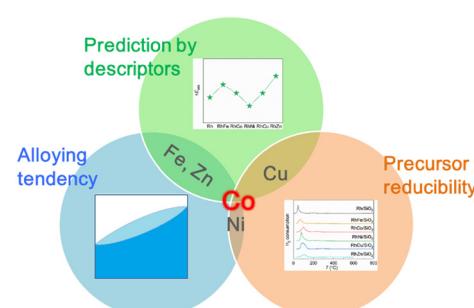
Shican Jiang, Zuozheng Liu and Abhishek Dutta Chowdhury\*



1113

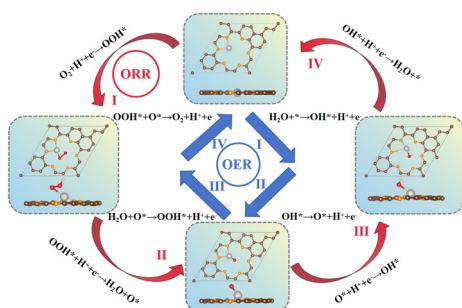
**Designing a Rh-based bimetallic catalyst for heterogeneous ethylene hydroformylation: combining theoretical predictions and experimental screening**

Ning Huang, Yue Ma, Boyang Liu, Letong Yang, Xiaocheng Lan, Xiaodong Wu\* and Tiefeng Wang\*



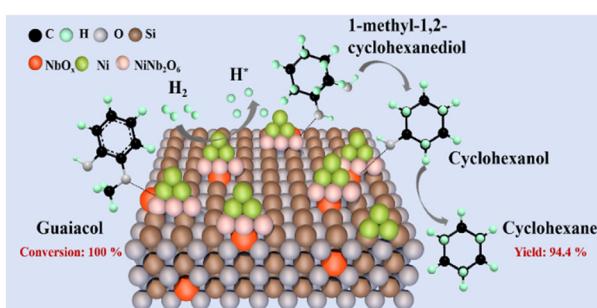
## PAPERS

1122

Transition metal atoms embedded in monolayer  $\text{C}_{13}\text{N}_3$  as OER/ORR bifunctional electrocatalysts

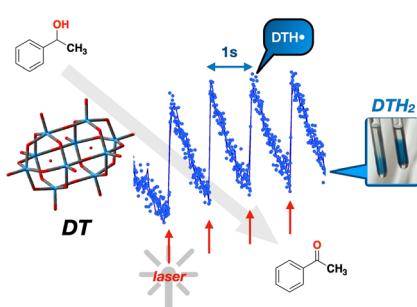
Xiaoxue Yu, Junkai Xu, Yunhao Wang, Jianjun Fang,\* Xianfang Yue,\* Breno R. L. Galvão\* and Jing Li\*

1134

The promoting effect of Nb on Ni/SiO<sub>2</sub> in the hydrodeoxygenation of lignin derivatives to cycloalkanes

Xiyue Lu, Hui Wang, Wei Liu, Mooeez ur Rehman, Lu Wang, Yan Xu, Shengnian Wang and Yujun Zhao\*

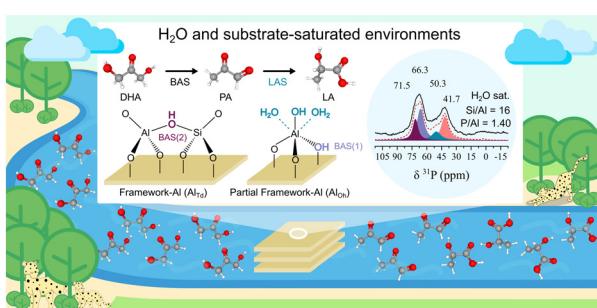
1149



## Kinetics, quantum yield and mechanism of the decatungstate-catalyzed photooxidation of C-H hydrogen donors: role of the persistent radical effect

Saba Didarataee, Julia Ong, Anastasiia Suprun, Neeraj Joshi and Juan C. Scaiano\*

1157



## Partial framework-Al in lamellar H-[Al]-RUB-18: acidity by probe TMPO adsorption and catalytic study in the presence and absence of water

Paula B. F. Sousa, Elise M. Albuquerque, Marco A. Fraga\* and Heloise O. Pastore\*

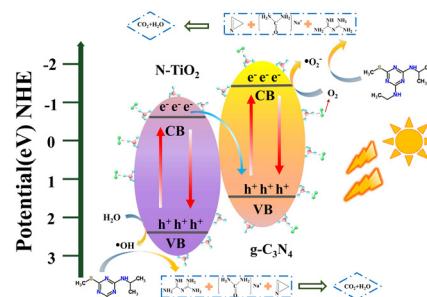


## PAPERS

1174

**Phosphate modulated nitrogen-doped titanium dioxide/carbon nitride heterogeneous photocatalysts with efficient O<sub>2</sub> activation for azmetry degradation**

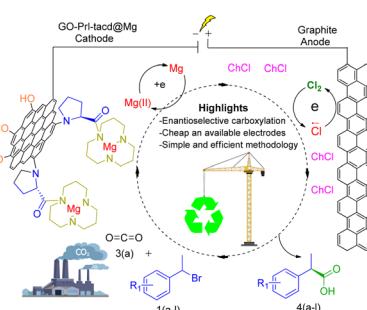
Xingyang Feng, Changmei Zhao, Junjie Zhou, Fangzhu Shi, Rui Yan\* and Zhiqiang Wang\*



1185

**Designing a reusable chiral SPE electrode with Mg nanoparticles on graphene oxide for efficient enantioselective Grignard carboxylation of (1-bromoethyl)benzenes in a deep eutectic solvent**

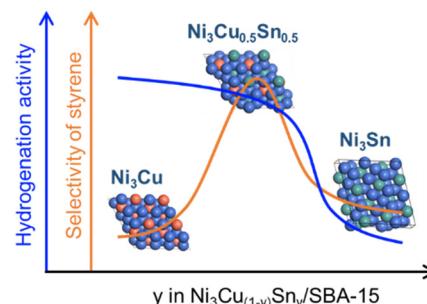
Amer Alhaj Zen, Zaman Abdalhussein Ibadi Alaridhee, Rafid Kamal Jameel, Morug Salih Mahdi, Aseel Salah Mansoor, Usama Kadem Radi, Ameer Hassan Idan, Hala Bahai, Elyor Berdimurodov, Ilyos Elboev and Abdulrahman A. Almehizia\*



1203

**Unraveling the synergistic mechanism of multimetals in Ni<sub>3</sub>Cu–Sn catalysts for selective hydrogenation of phenylacetylene**

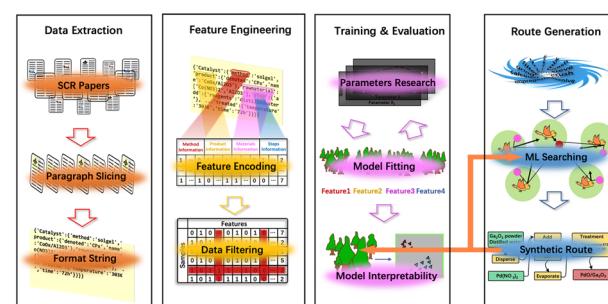
Aohui Xiao, Kehang Ruan, Yuqi Zhou, Hongjie Cui and Zhiming Zhou\*



1217

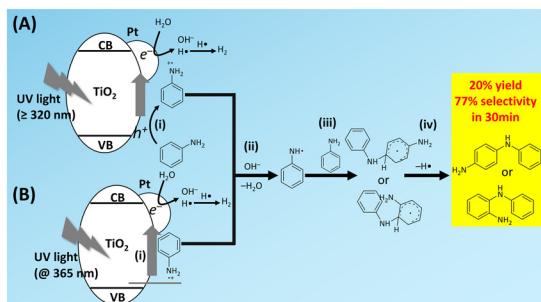
**Machine learning and text mining approaches to design selective catalyst reduction synthesis routes**

Shuyuan Li, Chenyu Huang, Yunjiang Zhang, Jing Li and Shaorui Sun\*



## PAPERS

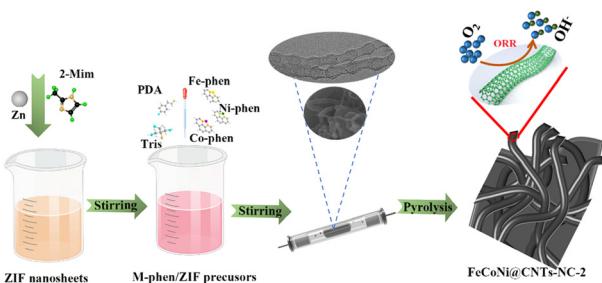
1228



## Direct C–N coupling of aniline to aminodiphenylamines with a platinum-loaded titanium oxide photocatalyst

Kexin Zou, Akira Yamamoto and Hisao Yoshida\*

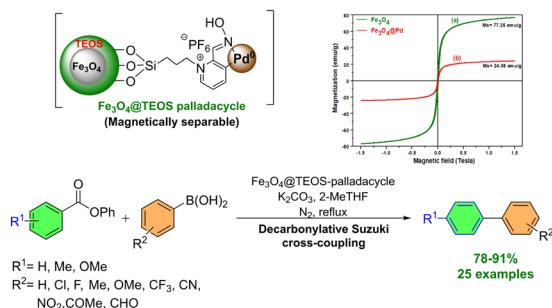
1238



## Fe, Co, and Ni co-doped nitrogen-doped carbon nanotubes for the electrocatalytic oxygen reduction reaction

Haitao Huang, Zhijie Chen, Haijin Li,\* Yongtao Li\* and Xiaolong Deng

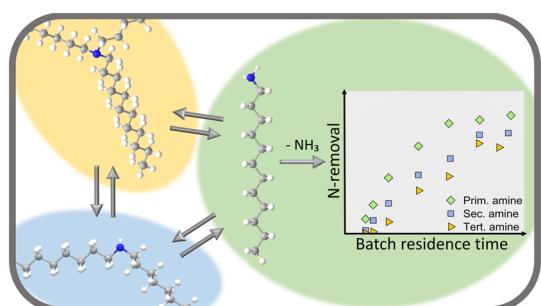
1247



## Oxime-palladacycle complex supported on magnetic nanoparticles: a recyclable catalyst for Suzuki-type decarbonylative cross-coupling of esters with aryl boronic acid

Tahshina Begum,\* Sazida Yasmin Sultana, Hasmita Hasin Mou and Nashreen S. Islam\*

1259



## Catalytic hydrodenitrogenation of primary, secondary, and tertiary C12-alkyl amines over a platinum on zirconia catalyst

Leoni-Franziska Klingelhöfer, Joakim Kattelus,\* Emma Verkama, Jorge A. Velasco, Leonhard Iser, Marcus Rose, Reetta Karinen and Riikka L. Puurunen



PAPERS

1272

# Tungsten-dioxo single-site heterogeneous catalyst on carbon: synthesis, structure, and catalysis

Amol Agarwal, Yiqi Liu, Miyuki Hanazawa, Jiaqi Li,  
Takayuki Nakamuro, Eiichi Nakamura, Yosi Kratish\*  
and Tobin J. Marks\*

