

# RSC Sustainability

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## IN THIS ISSUE

ISSN 2753-8125 CODEN RSSUAN 2(12) 3551–4064 (2024)



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**Inside cover**  
See Liza Abraham *et al.*, pp. 3788–3797. Image generated with Adobe Firefly. Image reproduced by permission of Madison West from *RSC Sustainability.*, 2024, 2, 3788.

## EDITORIALS

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### The role of the chemical sciences in 'decarbonizing' the conversion of energy and industrial and agricultural emissions

Stephen A. Matlin,\* Federico Rosei, Philippe Lambin and Lei Jin

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### Global essay competition: *Young Voices in the Chemical Sciences for Sustainability*



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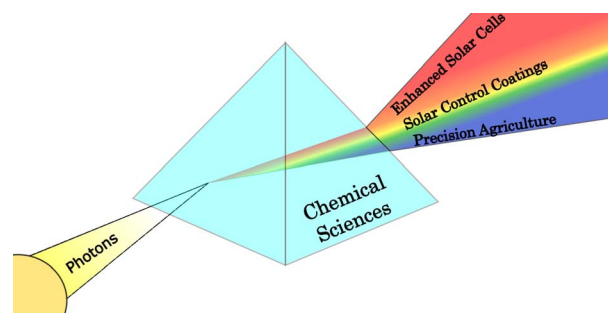
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## ESSAYS

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### Atoms and photons: how chemical sciences can catalyze the development of sustainable solutions powered by light

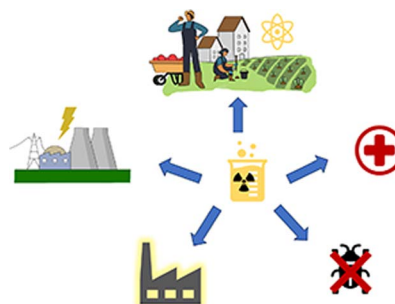
Govind Nanda\*



3575

### Chemical innovations in nuclear energy: paving the way for a carbon-neutral future

Sarah Geo

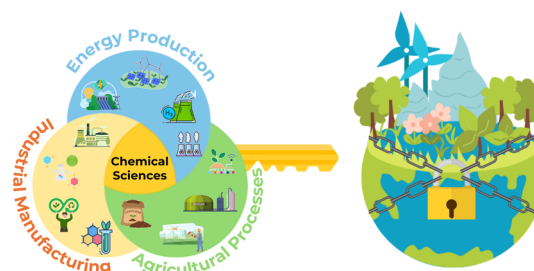


3579

### Chemical sciences: the key to a carbon-neutral future

Alexandre M. S. Jorge\*

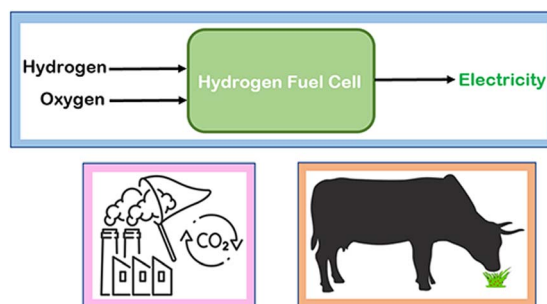
#### Chemical Sciences: The Key to a Carbon-Neutral Future



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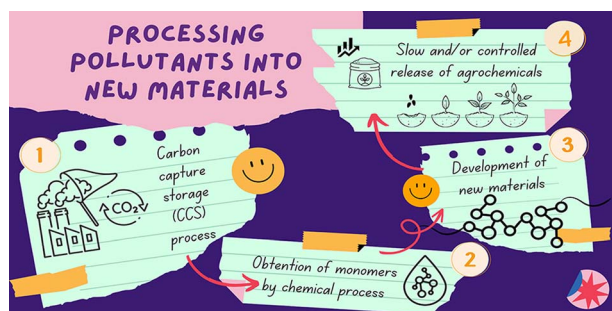
### From lab to landscape: the role of chemical sciences in sustainable technology

Yana Walia



## ESSAYS

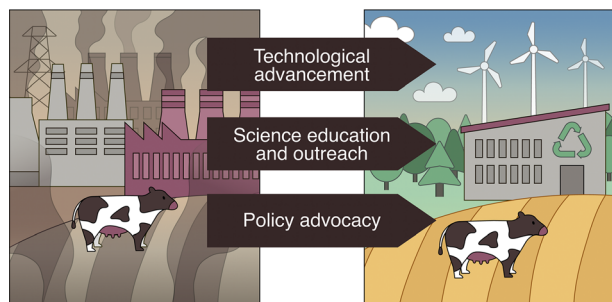
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### Chemical advances in transforming pollutants into new materials

Tales da Silva Daitx\*

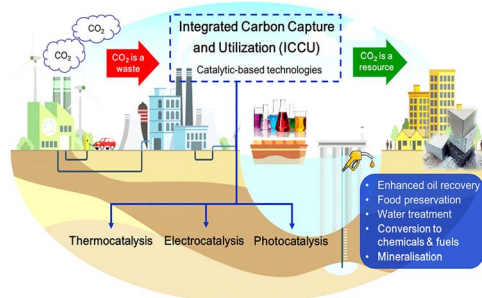
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### Towards a net-zero future: the chemical sciences across technology, education, and policy

Amanda Mikaela Celestine Tolentino

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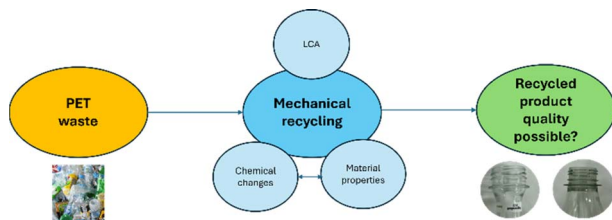


### Utilizing advancements in chemical sciences for decarbonization: a pathway to sustainable emission and energy reduction

Faith Mwende Johnson

## CRITICAL REVIEWS

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### Molecular and material property variations during the ideal degradation and mechanical recycling of PET

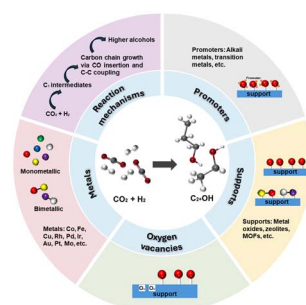
Chiara Fiorillo, Lynn Trossaert, Erion Bezeraj, Simon Debrie, Hannelore Ohnmacht, Paul H. M. Van Steenberge, Dagmar R. D'hooge\* and Mariya Edeleva\*



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## The engineering of CO<sub>2</sub> hydrogenation catalysts for higher alcohol synthesis

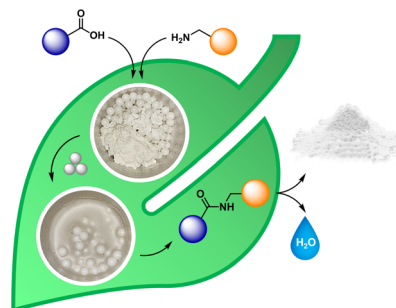
Angie F. J. Tan, Muhammad Dody Isnaini, Muenduen Phisalaphong and Alex C. K. Yip\*



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## Comparison of traditional and mechanochemical production processes for nine active pharmaceutical ingredients (APIs)

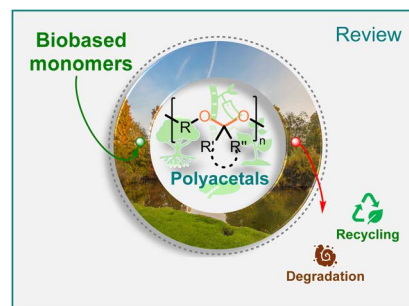
Emília P. T. Leitão\*



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## Synthesis of biobased polyacetals: a review

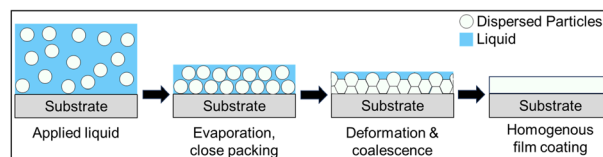
Anna C. Renner, Sagar S. Thorat and Mukund P. Sibi\*



3704

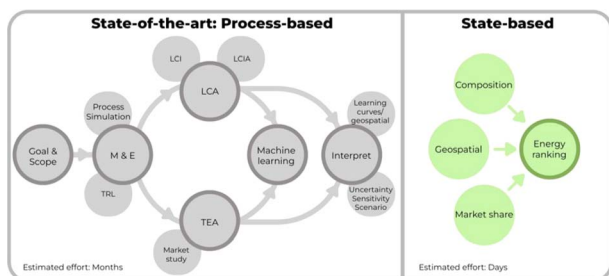
## Progress in waterborne polymer dispersions for coating applications: commercialized systems and new trends

Kyle Pieters and Tizazu H. Mekonnen\*



## TUTORIAL REVIEWS

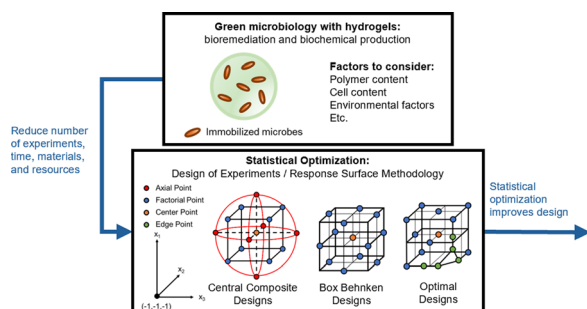
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### Lignocellulosic biomass valorisation: a review of feedstocks, processes and potential value chains and their implications for the decision-making process

Britt Segers, Philippe Nimmegeers, Marc Spiller, Giorgio Tofani, Edita Jasiukaitytė-Grojzdek, Elina Dace, Timo Kikas, Jorge M. Marchetti, Milena Rajić, Güray Yıldız and Pieter Billen\*

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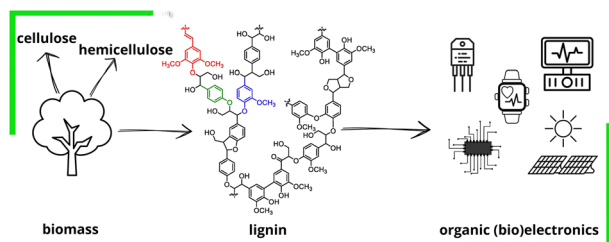


### Statistical optimization of cell–hydrogel interactions for green microbiology – a tutorial review

Conor G. Harris, Lewis Semprini, Willie E. Rochefort and Kaitlin C. Fogg\*

## PERSPECTIVE

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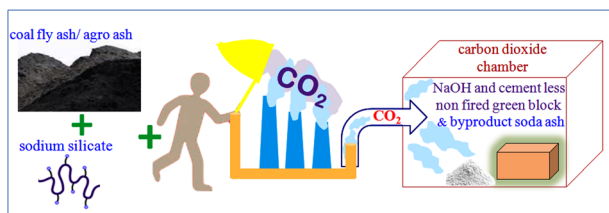


### Green gold: prospects of lignin in organic electronics and bioelectronics

Laura Tronci and Assunta Marrocchi\*

## COMMUNICATION

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### CO<sub>2</sub> assisted geo-polymerization: a win-win pragmatic approach for the synthesis of soda ash leading to reversal of the climate clock

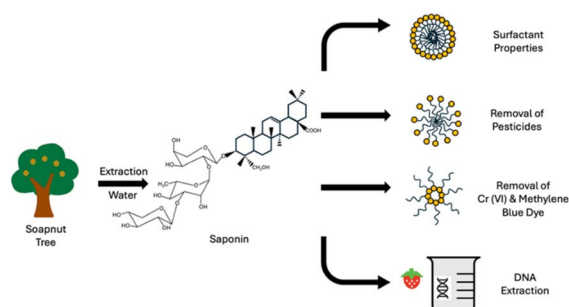
Sandeep Gupta\*



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## Using soapnut extract as a natural surfactant in green chemistry education: a laboratory experiment aligning with UN SDG 12 for general chemistry courses

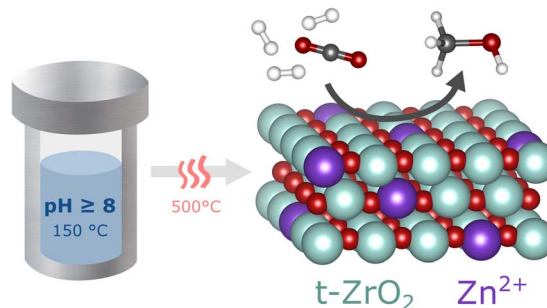
Zi Wang, Carter McLenahan and Liza Abraham\*



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## Hydrothermal synthesis of $\text{ZnZrO}_x$ catalysts for $\text{CO}_2$ hydrogenation to methanol: the effect of pH on structure and activity

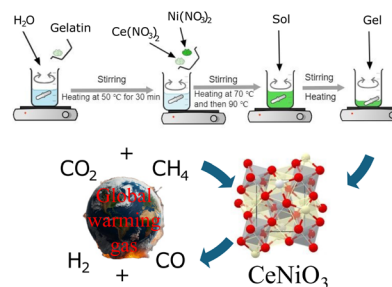
Issaraporn Rakngam, Gustavo A. S. Alves, Nattawut Osakoo, Jatuporn Wittayakun, Thomas Konegger and Karin Föttinger\*



3806

## $\text{CeNiO}_3$ perovskite nanoparticles synthesized using gelatin as a chelating agent for $\text{CO}_2$ dry reforming of methane

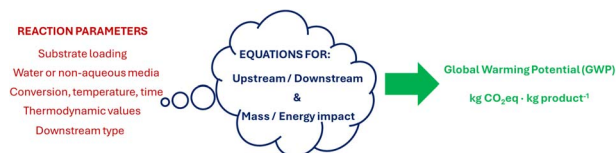
Usman Zahid, Wahid Sidik Sarifuddin, Abdul Hanif Mahadi, Holillah, Didik Prasetyoko and Hasliza Bahruji\*

Dry reforming of methane on  $\text{CeNiO}_3$  nanoparticles

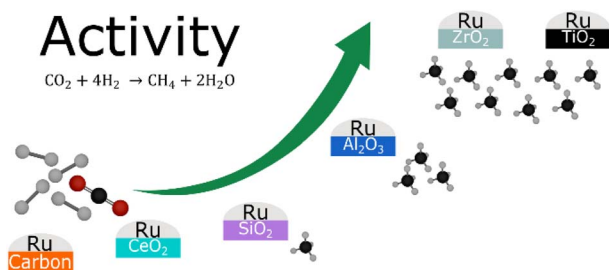
3817

## General equations to estimate the $\text{CO}_2$ production of (bio)catalytic reactions in early development stages

Pablo Domínguez de María\*



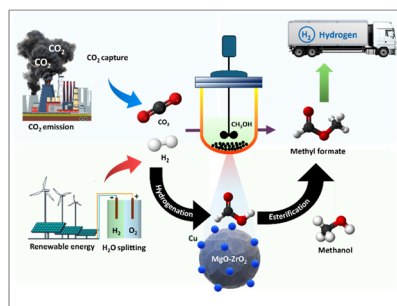
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### CO<sub>2</sub> hydrogenation on ruthenium: comparative study of catalyst supports

Göran Baade, Jens Friedland, Koustuv Ray and Robert Güttel\*

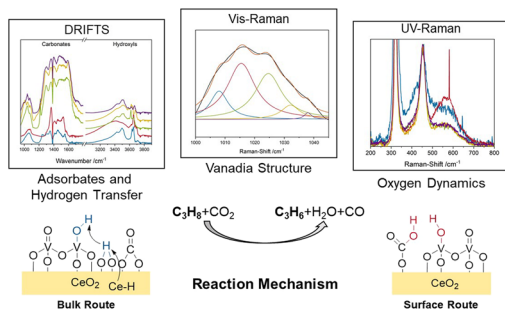
3835



### Cu–Mg synergy enhanced synthesis of methyl formate over noble metal-free heterogeneous catalyst systems

Jyotishman Kaishyop, Arpan Mukherjee, Abhay Giri Goswami, Tuhin Suvra Khan and Ankur Bordoloi\*

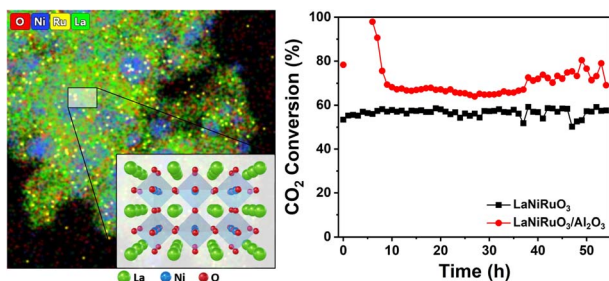
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### Unraveling the mechanism of the CO<sub>2</sub>-assisted oxidative dehydrogenation of propane over VO<sub>x</sub>/CeO<sub>2</sub>: an *operando* spectroscopic study

Leon Schumacher, Marius Funke and Christian Hess\*

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### Exsolved LaNiRuO<sub>3</sub> perovskite-based catalysts for CO<sub>2</sub> methanation reaction

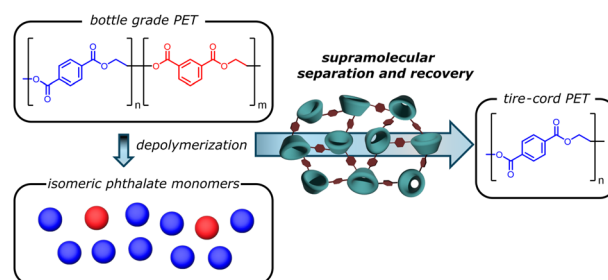
Ayesha A. Alkhoori, Eswaravara Prasadarao Komarala, Aasif A. Dabbawala, Aseel G. S. Hussien, Dalaver H. Anjum, Samuel Mao and Kyriaki Polychronopoulou\*



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### Supramolecular purification of aromatic polyester monomers from chemical depolymerization

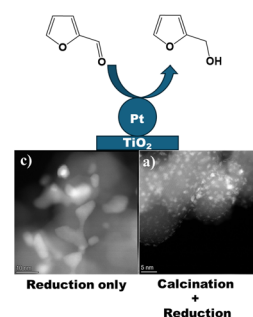
Gavan W. Lienhart, Thomas Palisin, William Gross, Amelia Moll and James M. Eagan\*



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### Controlling the nanoparticle size and shape of a Pt/TiO<sub>2</sub> catalyst for enhanced hydrogenation of furfural to furfuryl alcohol

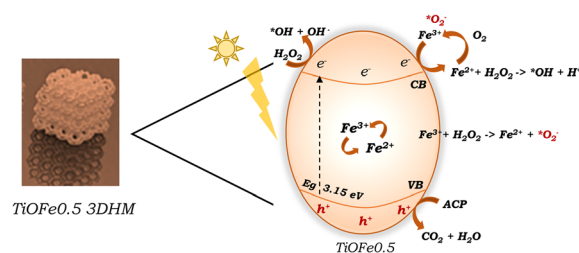
Heba Alsharif, Matthew B. Conway, David J. Morgan, Thomas E. Davies, Stuart H. Taylor and Meenakshisundaram Sankar\*



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### Additive manufacturing of hollow connected networks for solar photo-Fenton-like catalysis

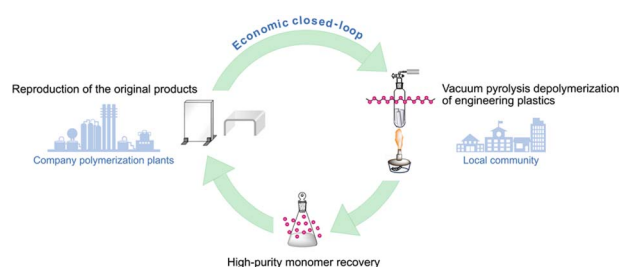
Miguel Ángel Gracia-Pinilla,\* Norma Alicia Ramos-Delgado,\* Cristian Rosero-Arias, Remco Sanders, Stephan Bartling, Jędrzej Winczewski, Han Gardeniers and Arturo Susarrey-Arcé\*



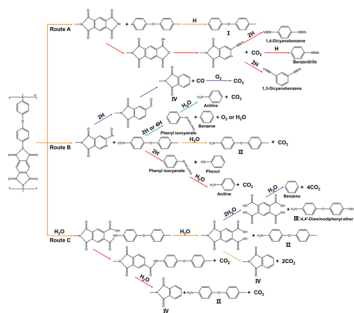
3909

### High-purity monomer recovery from commercial engineering plastics by vacuum pyrolysis

Eri Yoshida\*



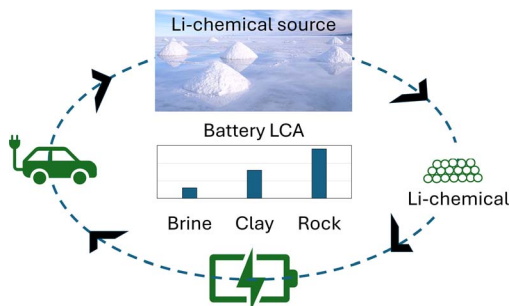
3916



### The thermal behavior and pyrolysis mechanism of a polyimide gas separation membrane

Qinxu Li, Bo Chen, Songyuan Yao, Chao Sang, Lu Lu, Shilong Dong, Hui Cao, Zhihao Si\* and Peiyong Qin\*

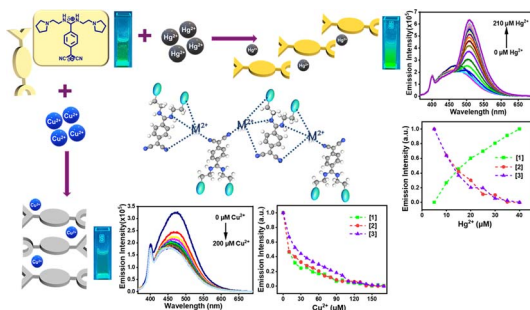
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### Life-cycle analysis of lithium chemical production in the United States

Rakesh Krishnamoorthy Iyer\* and Jarod C. Kelly

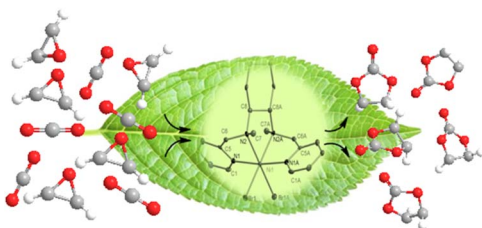
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### Self-assembled tetracyanoquinodimethane derivatives: differential fluorescent responses on sensing copper and mercury ions in an aqueous medium

Anuradha Suresh Rao Mohitkar, Nilanjan Dey and Subbalakshmi Jayanty\*

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### Efficient single-component nickel catalysts with tetradentate aminopyridine ligands for cycloaddition reactions of CO<sub>2</sub> and epoxides under mild conditions

Congcong Zhang, Minghui Shi, Ning Yu, Bowen Zhang,\* Feng Han\* and Chengxia Miao\*

- Single-component and efficient catalytic system
- Low amount of catalyst and 1 atm CO<sub>2</sub>
- Solvent-free conditions



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### Direct measurement of PFAS levels in surface water using an engineered biosensor

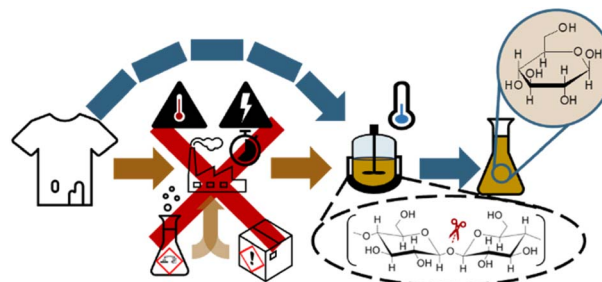
Madison Mann, Victoria Kartseva, Chelli Stanley, Maggie Blumenthal, Richard Silliboy and Bryan Berger\*



3973

### Effects of chemical pretreatment on the enzymatic hydrolysis of post-consumer waste viscose

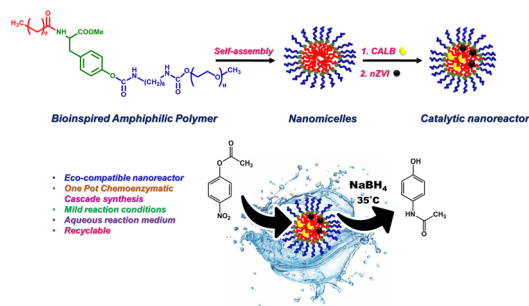
Edvin Bågenholm-Ruuth, Mahla Bagherigelvardi, Caroline Gustafsson, Miguel Sanchis-Sebastià\* and Ola Wallberg



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### Unifying *Candida antarctica* lipase B and nZVI in bioinspired polymer nanomicelles: a nanobiohybrid synergy for sustainable synthesis of acetaminophen

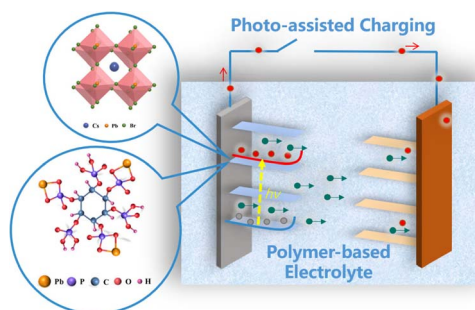
Falguni Shukla, Dilraj Singh and Sonal Thakore\*



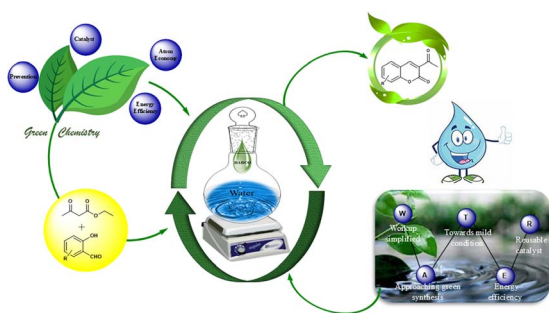
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### Photo-assisted (de)lithiation to enhance photoelectrochemical storage in quasi-solid-state Li-ion batteries

Xin Mi, Jun Pan, Menglin Duan, Fuqiang Huang\* and Peng Qin\*



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### Aqueous-mediated DABCO and DABCO-ionic liquid catalysed synthesis of 3-acetylcoumarins: exploration by kinetic, electrochemical and spectroscopic studies

Arpita A. Shanbhag, Lokesh A. Shastri\* and Samundeeswari L. Shastri

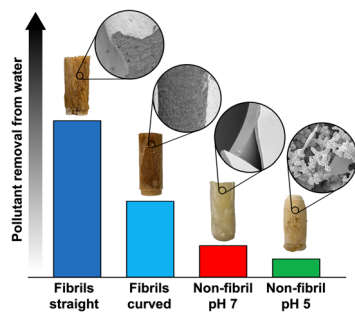
4028



### Beyond waste: cellulose-based biodegradable films from bio waste through a cradle-to-cradle approach

Mai N. Nguyen, Minh T. L. Nguyen, Marcus Frank and Dirk Hollmann\*

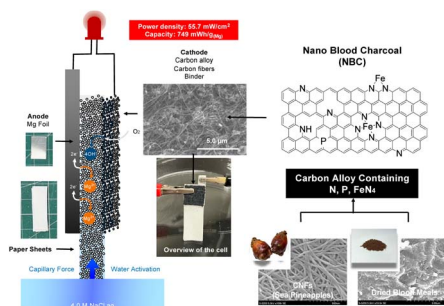
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### Elucidating the role of the nanostructure in protein aerogels for removal of organic water pollutants

Rodrigo Sanches Pires, Antonio J. Capezza, David Jonsson, Jessica Lyrner Morén, Mikael S. Hedenqvist and Christofer Lendel\*

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### Sustainable water-activated metal–air paper batteries based on waste biomass-based electrocatalysts

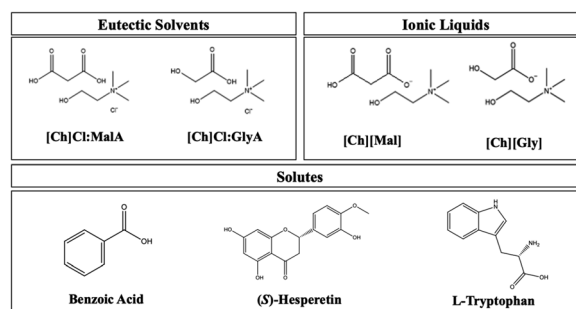
Kosuke Ishibashi and Hiroshi Yabu\*



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### What is better to enhance the solubility of hydrophobic compounds in aqueous solutions: eutectic solvents or ionic liquids?

Olga Ferreira,\* Liliana P. Silva, Heloísa H. S. Almeida, Jordana Benfica, Dinis O. Abranches, Simão P. Pinho and João A. P. Coutinho



## CORRECTION

4061

### Correction: Hydrothermal synthesis of ZnZrO<sub>x</sub> catalysts for CO<sub>2</sub> hydrogenation to methanol: the effect of pH on structure and activity

Issaraporn Rakngam, Gustavo A. S. Alves, Nattawut Osakoo, Jatuporn Wittayakun, Thomas Konegger and Karin Föttinger\*

