

# RSC Sustainability

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## EDITORIAL

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### Introduction to the circular economy themed collection

Matthew L. Davies

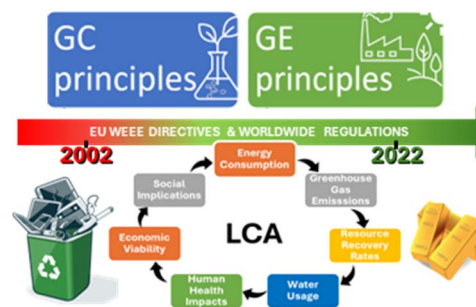


## CRITICAL REVIEWS

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### 2002–2022: 20 years of e-waste regulation in the European Union and the worldwide trends in legislation and innovation technologies for a circular economy

A. Serpe,\* D. Purchase,\* L. Bisschop, D. Chatterjee, G. De Gioannis, H. Garelick, A. Kumar, W. J. G. M. Peijnenburg, V. M. I. Piro, M. Cera, Y. Shevah and S. Verbeek



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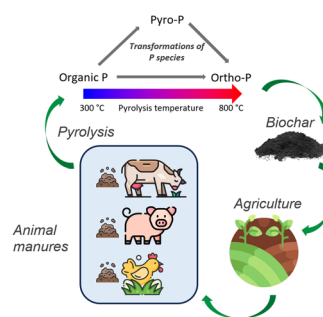
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## CRITICAL REVIEWS

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### Phosphorus recovery from animal manures through pyrolysis: phosphorus transformations, release mechanisms, and applications of manure biochars in agriculture

Jesper T. N. Knijnenburg, Siraprapa Suwanree, Duncan Macquarrie, Pornnapa Kasemsiri and Kaewta Jetsrisuparb\*

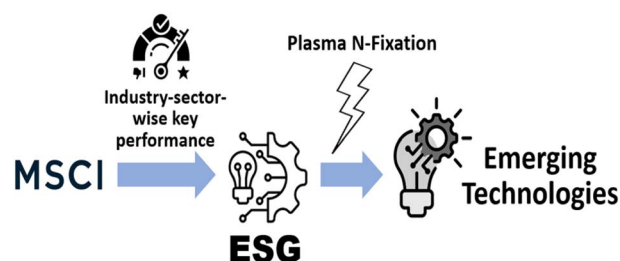


## PAPERS

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### ESG assessment methodology for emerging technologies: plasma versus conventional technology for ammonia production

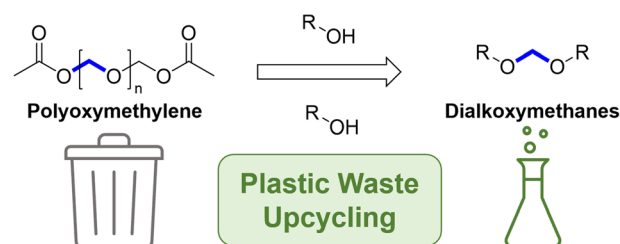
Le Yu,\* Amin Keilani, Nam Nghiep Tran, Marc Escribà-Gelonch, Michael Goodsite, Sukhbir Sandhu, Harpinder Sandhu and Volker Hessel\*



1114

### Valorization of polyoxymethylene (POM) waste as a C<sub>1</sub> synthon for industrially relevant dialkoxymethanes and cyclic aminals

Matthew J. Cullen, Matthew G. Davidson,\* Matthew D. Jones\* and Jack A. Stewart



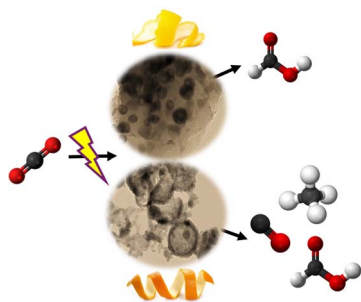
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### From citrus waste to value: optimizing sulfonated carbons for limonene upcycling into value-added products

Gabrielle M. Reis, Renan S. Nunes, Gabriela T. M. Xavier, Marina V. Kirillova, Alexander M. Kirillov, Dalmo Mandelli and Wagner A. Carvalho\*



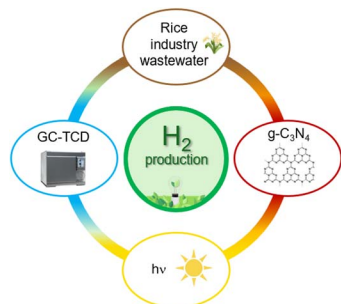
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### Valorisation of citrus waste for sustainable synthesis of carbon-supported copper nanoparticles active in CO<sub>2</sub> electroreduction

Federica De Luca, Palmarita Demoro, Izuchica Nduka, Cristina Italiano, Salvatore Abate\* and Rosa Arrigo\*

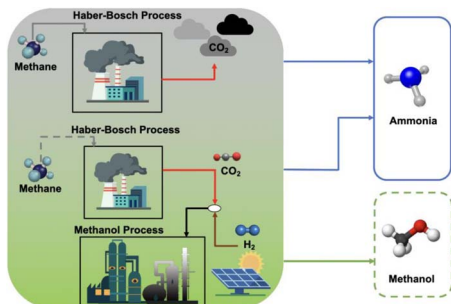
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### Exploiting rice industry wastewater for more sustainable sunlight-driven photocatalytic hydrogen production using a graphitic carbon nitride polymorph

Petra Bianchini, Antonella Profumo, Lorenzo Cerri, Costanza Tedesco, Lorenzo Malavasi and Andrea Speltini\*

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### Towards flexible large-scale, environmentally sustainable methanol and ammonia co-production using industrial symbiosis

Joshua Magson, Thérèse G. Lee Chan, Akeem Mohammed and Keeran Ward\*

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### LIGNOCELLULOSE SACCHARIFICATION: HISTORICAL INSIGHTS AND RECENT INDUSTRIAL ADVANCEMENTS TOWARDS 2ND GENERATION GLUCOSE



### Lignocellulose saccharification: historical insights and recent industrial advancements towards 2nd generation sugars

Jorge Bueno Moron, Gerard P. M. van Klink and Gert-Jan M. Gruter\*



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## A review on bio-inspired nanoparticles and their impact on membrane applications

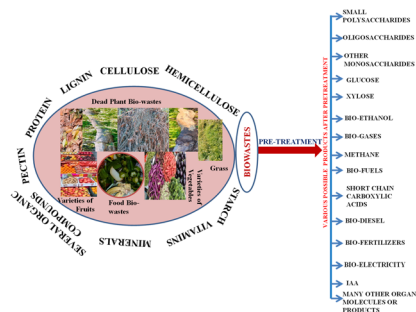
Sinki Puri, Swathi Divakar, K. Pramoda, B. M. Praveen\* and Mahesh Padaki\*



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## Fungal pretreatment methods for organic wastes: advances and challenges in biomass valorization

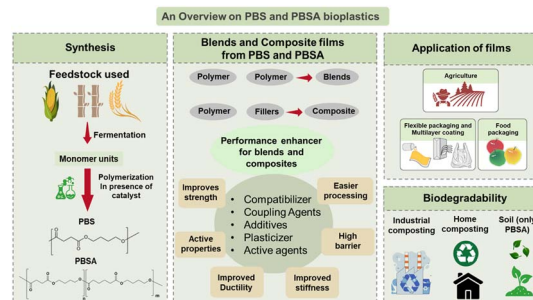
Pankaj Kumar Chaurasia\*, Shashi Lata Bharati\*, Sunita Singh, Azhagu Madhavan Sivalingam, Shiv Shankar and Ashutosh Mani\*



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## Studies on poly(butylene succinate) and poly(butylene succinate-co-adipate)-based biodegradable plastics for sustainable flexible packaging and agricultural applications: a comprehensive review

Debarshi Nath, Manjusri Misra\*, Fadi Al-Daoud and Amar K. Mohanty\*

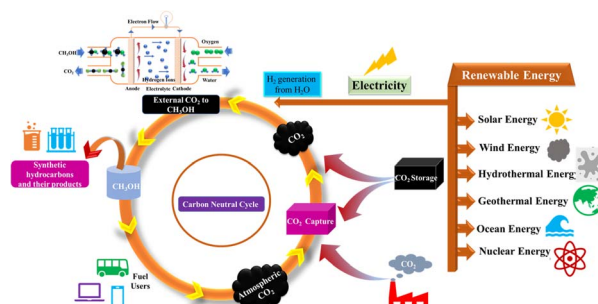


## PERSPECTIVE

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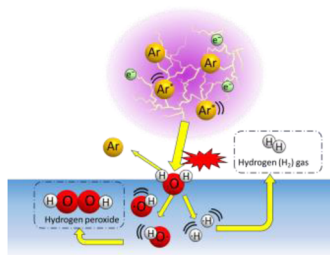
## Advanced catalytic strategies for CO<sub>2</sub> to methanol conversion: noble metal-based heterogeneous and electrochemical approaches

Soumalya Roy, Ezhava Manu Manohar, Sujoy Bandyopadhyay, Manik Chandra Singh, Yeji Cha, Soumen Giri\*, Sharad Lande\*, Kyungsu Na\*, Junseong Lee\* and Sourav Das\*



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## Noble gas Plasma-Collisional Splitting (NgPCS)

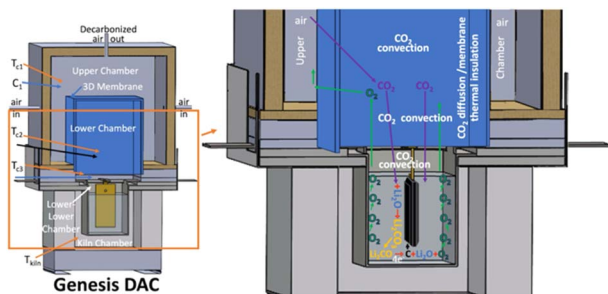


Collisional energy of noble gas plasma decomposes  $\text{H}_2\text{O}$  into  $\text{H}_2$  and  $\text{H}_2\text{O}_2$ .

## Hydrogen production via water splitting using noble gas plasma-collisional splitting (NgPCS)

Souma Yoshida, Yoshiyuki Takatsuji and Tetsuya Haruyama\*

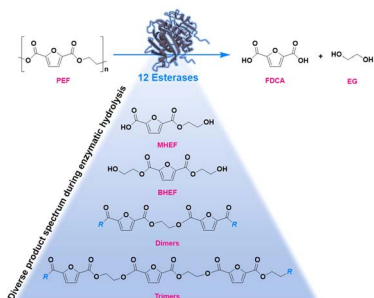
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Direct air capture (DAC): molten carbonate direct transformation of airborne  $\text{CO}_2$  to durable, useful carbon nanotubes and nano-ions

Gad Licht,\* Ethan Peltier, Simon Gee and Stuart Licht\*

## PAPERS

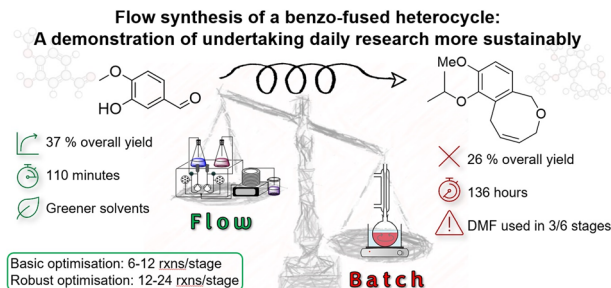
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## Analysis of the product-spectrum during the biocatalytic hydrolysis of PEF (poly(ethylene furanoate)) with various esterases

Tobias Heinks, Katrin Hofmann, Lennard Zimmermann, Igor Gamm, Alexandra Lieb, Luise Blach, Ren Wei, Uwe T. Bornscheuer, Julian Thiele, Christof Hamel and Jan von Langermann\*

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## Synthesis of an 8-membered oxygen-containing benzo-fused heterocycle using flow technologies – an exercise in undertaking research with sustainability as a driver

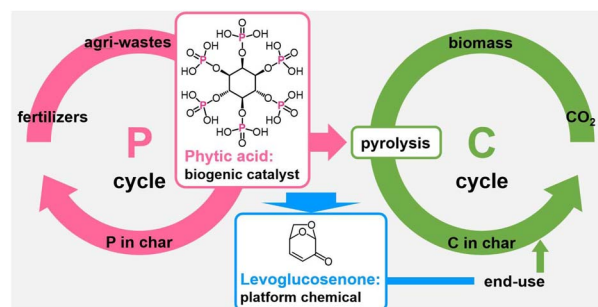
Bernice M. Currie, Nicole C. Neyt-Galetti, Tanya Olivier, Petra Van der Merwe, Lerato S. Dibokwane, A. Michelle Reinhardt, Lorinda T. van Wyk, Jenny-Lee Panayides\* and Darren L. Riley\*



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### Phytic acid as a biorenewable catalyst for cellulose pyrolysis to produce levoglucosenone

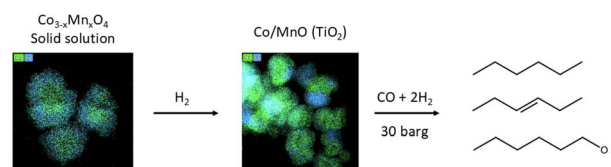
Tsinjo Nirina Rafenomananjara, Shinji Kudo,\*  
Jonathan Sperry, Shusaku Asano and Jun-ichiro Hayashi



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### Examining the effect of manganese distribution on alcohol production in CoMn/TiO<sub>2</sub> FTS catalysts

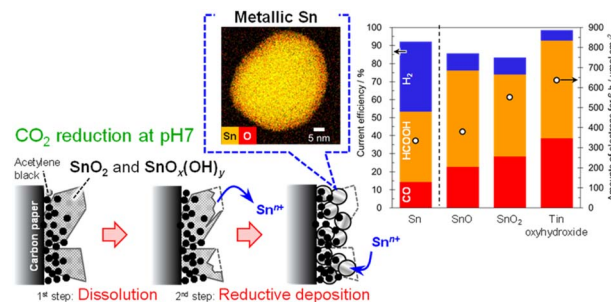
Jay M. Pritchard, Matthew Lindley, Danial Farooq,  
Urvashi Vyas, Sarah J. Haigh, James Paterson,  
Mark Peacock and Andrew M. Beale\*



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### Reduction behaviors of tin oxides and oxyhydroxides during electrochemical reduction of carbon dioxide in an aqueous solution under neutral conditions

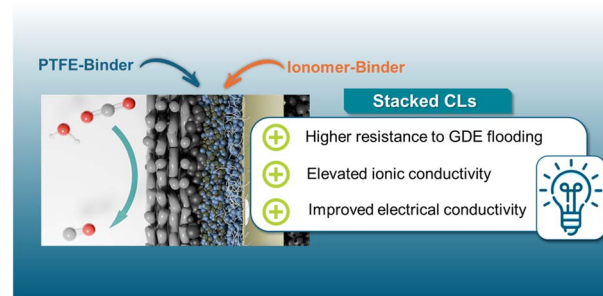
Etsushi Tsuji,\* Kaede Ohwan, Tomoki Ishikawa,  
Yuki Hirata, Hiroyuki Okada, Satoshi Suganuma  
and Naonobu Katada



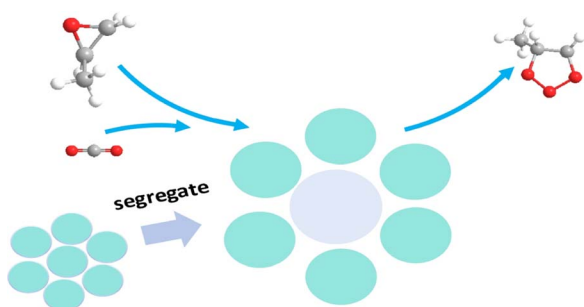
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### The best of both worlds: stacked catalytic layers for the electrocatalytic generation of CO in zero-gap electrolyzers

Lucas Hoof, Kevinjeorjios Pellumbi, Didem Cansu Güney,  
Dennis Blandszun, Franz Bommas, Daniel Siegmund,  
Kai Junge Puring, Rui Cao, Katharina Weber\*  
and Ulf-Peter Apfel\*



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### Spaced functionalization of poly(ionic liquid)s for boosting the catalytic conversion of CO<sub>2</sub> into cyclic carbonates

Qianmeng Zhao, Shaifei Liu, Wen Liu, Mengqian Fu, Zhenyang Xu, Qian Su\* and Weiguo Cheng\*

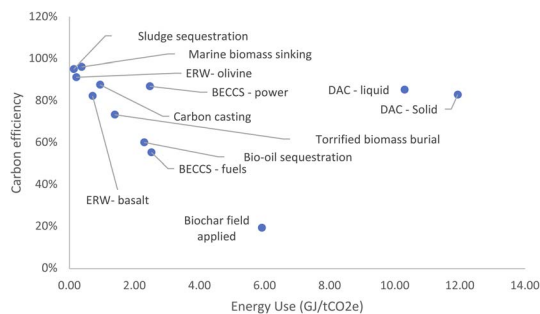
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### Life cycle assessment of industry wastewater treatment plant: a case study in Vietnam

Hung Van Tran, Hao Anh Phan and Ha Manh Bui\*

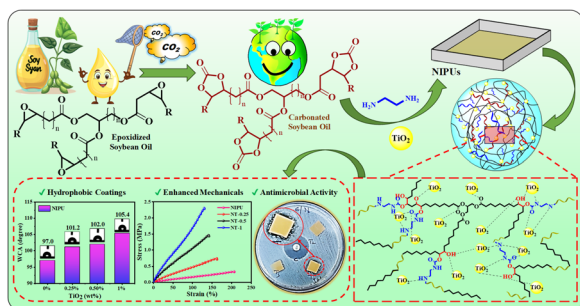
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### Carbon removal efficiency and energy requirement of engineered carbon removal technologies

Daniel L. Sanchez,\* Peter Psarras, Hannah K. Murnen and Barclay Rogers

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### Soybean oil-derived, non-isocyanate polyurethane-TiO<sub>2</sub> nanocomposites with enhanced thermal, mechanical, hydrophobic and antimicrobial properties

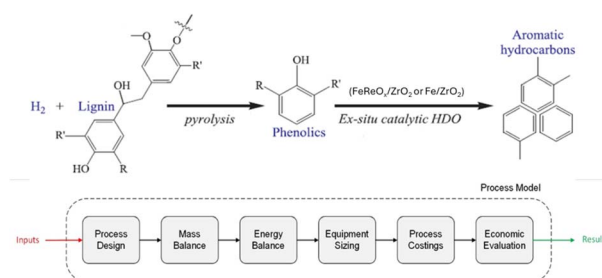
Jaydip D. Bhaliya, S. N. Raju Kutcherlapati,\* Nikhil Dhore, Neelambaram Punugupati, Kavya Lekha Sunkara, Sunil Misra and Shivam Shailesh Kumar Joshi



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## Techno-economic assessment of two-stage hydropyrolysis of lignin for BTX production using iron-based catalysts

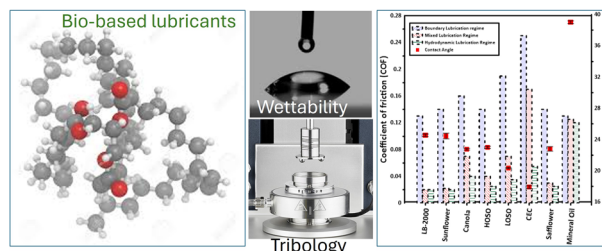
Giuseppe Bagnato, Jamie Horgan and Aimaro Sanna\*



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## Thermo-rheological and tribological properties of low- and high-oleic vegetable oils as sustainable bio-based lubricants

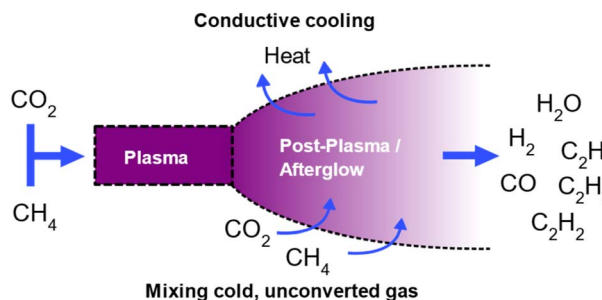
Abiodun Saka, Tobeckukwu K. Abor, Anthony C. Okafor and Monday U. Okoronkwo\*



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## Afterglow quenching in plasma-based dry reforming of methane: a detailed analysis of the post-plasma chemistry *via* kinetic modelling

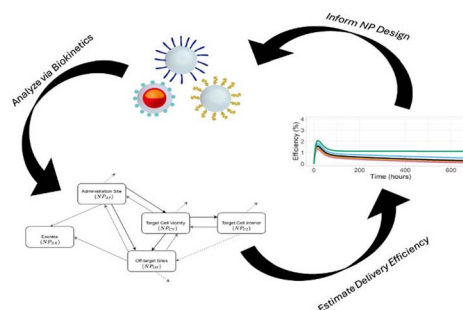
Joachim Slaets, Eduardo Morais and Annemie Bogaerts\*



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## Optimizing nanoparticle-mediated drug delivery: insights from compartmental modeling *via* the CompSafeNano cloud platform

Periklis Tsiros, Nikolaos Chimarios, Dimitrios Zouraris, Andreas Tsoumanis, Haralambos Sarimveis, Georgia Melagraki, Iseult Lynch and Andreas Afantitis\*



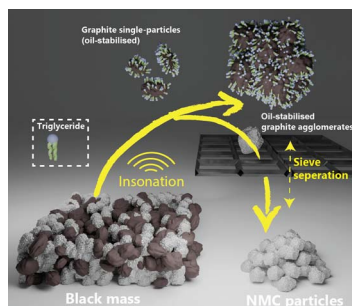
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### Activated carbon derived from rice husks enhanced by methylene blue and gamma irradiation for supercapacitor applications

Thannithi Anusonthiwong,  
Natavoranun Suwatanapongched,  
Jittiyada Surawattanawiset, Nattamon Chittreisin,  
Somlak Ittisanronnachai, Tanagorn Sangtawesin\*  
and Suranan Anantachaisilp\*

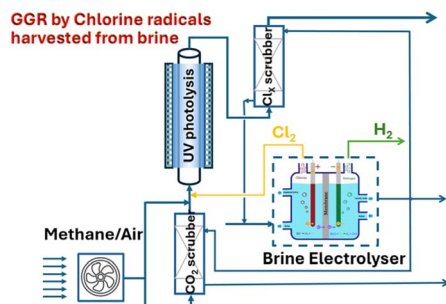
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### Using ultrasonic oil–water nano-emulsions to purify lithium-ion battery black mass

Chunhong Lei, Karl S. Ryder, Andrew P. Abbott  
and Jake M. Yang\*

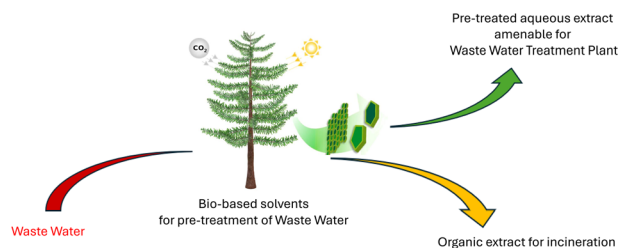
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### Tropospheric methane remediation by enhancing chlorine sinks

Qingchun Yuan,\* Bo Xiao, Renaud de Richter,\* Wei Li,  
Raul Quesada-Cabrera and Tingzhen Ming

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### Finding suitable biobased solvents for extractions from water

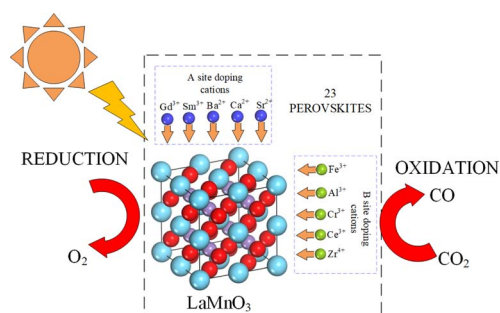
Gerhard König,\* Pascal Hauk and Fabrice Gallou\*



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## Fuel production capacity and DFT analysis of cation modified perovskites for enhanced thermochemical CO<sub>2</sub> dissociation

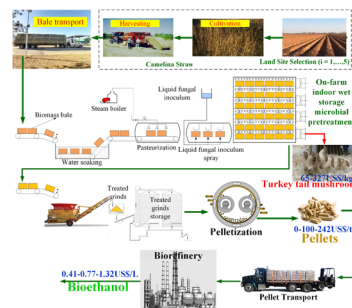
Jian Cong, Eric Beche and Stéphane Abanades\*



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## Technoeconomic analysis of an integrated camelina straw-based pellet and ethanol production system

Cuong N. Dao,\* Lope G. Tabil, Edmund Mupondwa, Tim Dumonceaux, Xue Li and Ajay K. Dalai



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## Correction: Carbon removal efficiency and energy requirement of engineered carbon removal technologies

Daniel L. Sanchez,\* Peter Psarras, Hannah K. Murnen and Barclay Rogers

