

Sustainable Energy & Fuels

Interdisciplinary research for the development of sustainable energy technologies

rsc.li/sustainable-energy

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 2398-4902 CODEN SEFUA7 9(18) 4763–5098 (2025)



Cover

See Kenji Miyatake et al., pp. 4882–4888. Image reproduced by permission of Kenji Miyatake from *Sustainable Energy Fuels*, 2025, 9, 4882.

EDITORIAL

4773

Introduction to the metal-free photo/electrocatalysts for sustainable energy solutions themed collection

Reiner Sebastian Sprick,* Menny Shalom* and Xinchun Wang*

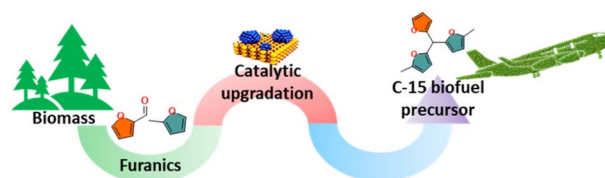


REVIEWS

4775

Renewable furfural and 2-methylfuran valorization: catalytic routes for the production of sustainable aviation C-15 fuel precursors

Arvind Singh Chauhan,* Omvir Singh and Pralay Das



EES Batteries

**Exceptional research on
batteries and energy storage**

Part of the EES family

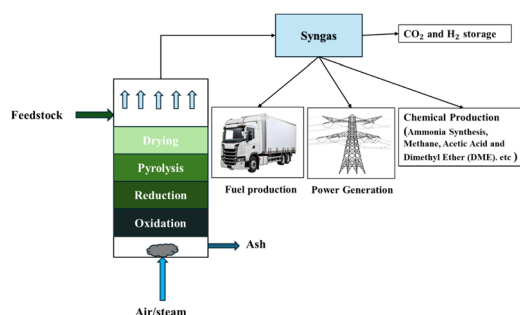
**Join
in** | Publish with us
rsc.li/EESBatteries

REVIEWS

4793

Advancements in gasification technologies: insights into modeling studies, power-to-X applications and sustainability assessments

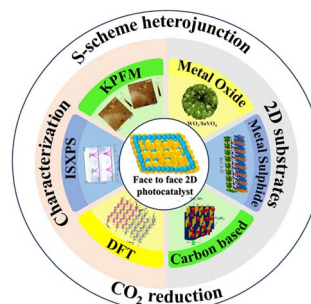
Sonu Kumar,^{*} Rupesh Palange and Cataldo De Blasio



4832

Flat meets functional: face-to-face 2D/2D S-scheme photocatalysts for efficient CO₂-to-fuel conversion

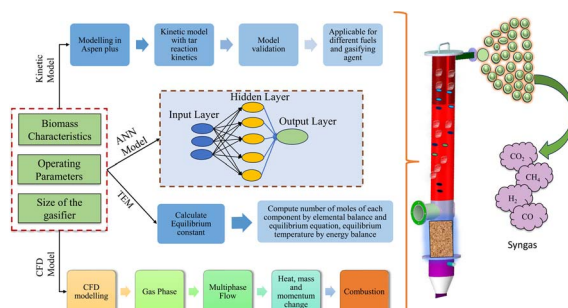
Parul Rana, Pardeep Singh, Vanita Puri, Quyet Van Le, Tansir Ahamad, Thi Thu Le, Van-Huy Nguyen^{*} and Pankaj Raizada^{*}



4858

Recent advances and computational approaches in biomass gasifier modeling: from thermodynamics to AI-driven techniques

Raj Kumar,^{*} Narayan Lal Panwar, Vinod Kumar, Manjeet Singh, Sanwal Singh Meena and Kalpana Jain

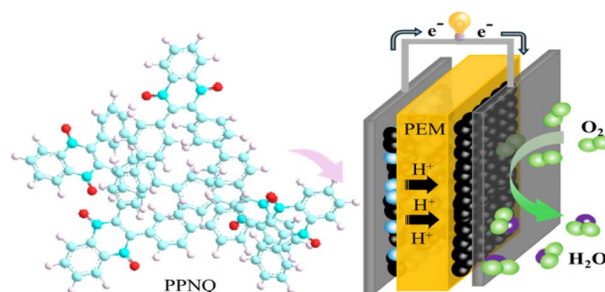


COMMUNICATIONS

4882

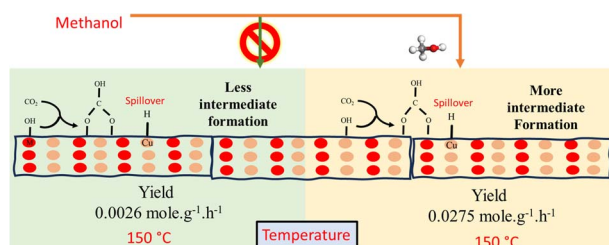
Enhanced performance of all-solid-state rechargeable air batteries with a redox-active naphthoquinone-based polymer electrode

Lin Guo, Kenji Miyatake,^{*} Fang Xian, Fanghua Liu, Ahmed Mohamed Ahmed Mahmoud, Vikrant Yadav and Chun Yik Wong



COMMUNICATIONS

4889

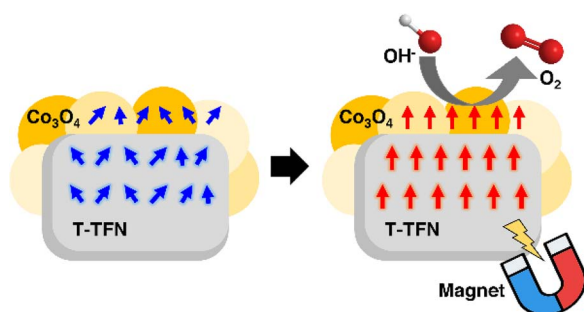


Low-temperature methanol-assisted CO₂ hydrogenation populates intermediates over a Ce-promoted Cu/ZnO/MgO catalyst in a three-phase slurry reactor

Vaibhav Pandey, Priyanshu Pratap Singh, Aakash Bhardwaj, Kamal Kishore Pant,* Sreedevi Upadhyayula* and Siddhartha Sengupta

PAPERS

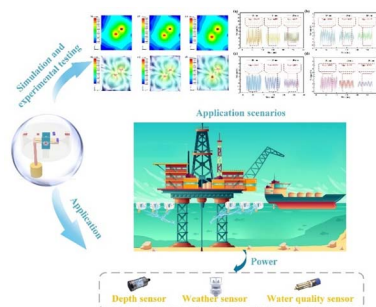
4894



Ferromagnetic–antiferromagnetic interfaces in MAX phase electrocatalysts: a spin-driven platform for enhanced oxygen evolution reaction

Deepak Vishnu S. K., Chih-Ying Huang, Cheng-Rong Wu, Bo-Yan Lin, Chia-Chun Chen, Huang-Ming Tsai, Jau-Wern Chiou, Raman Sankar,* Tsy-Yan Yu,* Chi-Kung Ni,* Way-Faung Pong and Chun-Wei Chen*

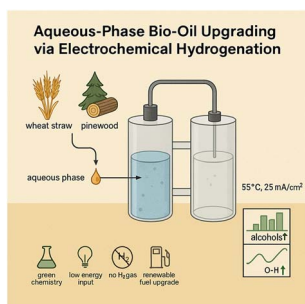
4902



A dual system piezoelectric energy harvester for harvesting low frequency ocean energy

Chensheng Wang, Xuesen Yuan, Luyang Tan, Zhenheng Li, Shuangjian Wang and Lipeng He*

4913



Pinewood and wheat straw bio-oil aqueous phase electrochemical hydrogenation utilising a PtRu/ACC catalyst

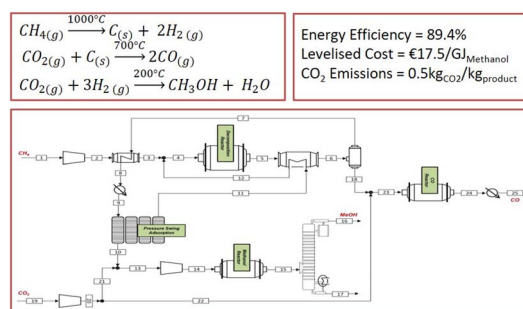
Cesar Catizane,* Ying Jiang, Scott Banks and Joy Sumner*



4923

Methanol and carbon monoxide co-production via methane decomposition: techno-economic and environmental analysis

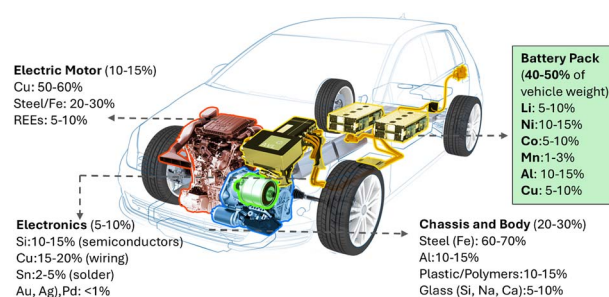
Aaditya Pandey, Farzeena Parayil Ayubkhan, Niharika Mylipilli, Amisha Thotakura and Navid Khallaghi*



4933

Material feasibility and environmental impacts of critical metals in NMC cathodes under a sustainable framework for electric vehicles

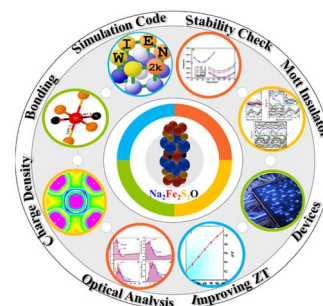
Nidhi Pandey, Gopa Nandikes, Pankaj Pathak,* Sadia Ilyas* and Rajiv Ranjan Srivastava*



4944

Unveiling Na₂Fe₂S₂O oxychalcogenide: a high-performance thermoelectric and optoelectronic material for sustainable energy conversion

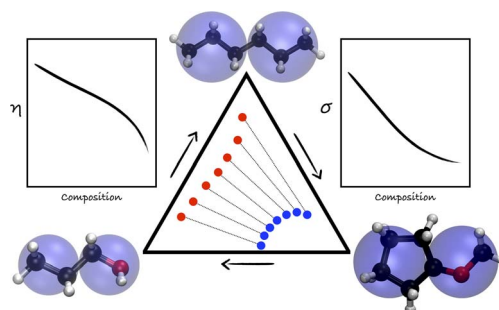
Muhammad Haseeb,* Muhammad Kashif Bashir, Athar Javed, Asma Munir, Muhammad Amir Rafiq and Altaf Hussain*



4959

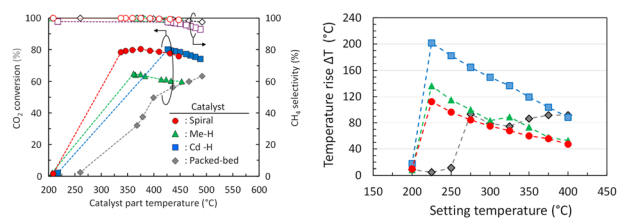
Toward sustainable fuel formulations: thermophysical assessment of a synthetic oxygenated blend formed from hexane + cyclopentyl methyl ether + propan-1-ol

Isaías Huenúvil-Pacheco, Marcela Cartes and Andrés Mejía*



PAPERS

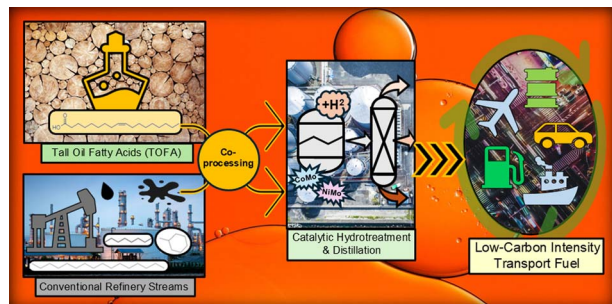
4974



Enhanced thermal management in CO₂ methanation using spiral-structured catalysts: a comparative study with honeycomb, monolith, and packed-bed systems

Ryo Watanabe,* Shota Ueda, Hiroshi Akama, Kazuhide Mino and Choji Fukuhara*

4989



Fractionation and catalytic upgradation of crude tall oil into sustainable transportation fuels via blending and co-refining

J. G. B. Churchill, G. K. Rath, V. B. Borugadda and A. K. Dalai*

5004



A sustainable anode for Na-ion batteries based on holm oak waste-derived hard carbon and lignin binder

Luca Bottoni,* Hamideh Darjazi, Leonardo Sbrascini, Antunes Staffolani, Genny Pastore, Luca Minnetti, Federico Verdicchio, Serena Gabrielli, Andrea Catorci and Francesco Nobili

5018



A vanillin bio-based redox polymer as a cathode material for lithium organic batteries

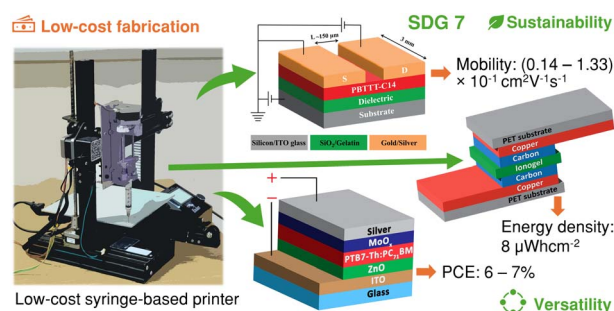
Tijs Lap, Gabriele Lingua, Daniele Mantione and David Mecerreyes*



5028

Wider manifestation of low-cost syringe-based printer for realizing printed organic electronic devices and supercapacitors

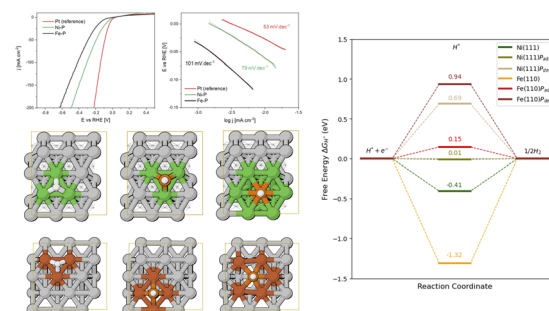
Donjo George, Aman Khatkar, Vamsi Krishna G, Lubna Khanam, Yogesh Yadav, Ramesh Gupta Burela and Samarendra Pratap Singh*



5044

Experimental and computational analysis of Ni–P and Fe–P metal foams for enhanced hydrogen evolution reaction in alkaline media

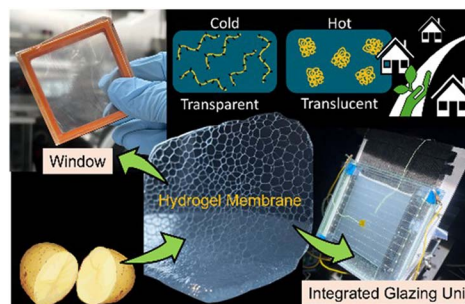
Natália Podrojková, Alexandra Gubóová, Magdalena Strecková, František Kromka and Renáta Oriňáková*



5057

Enhancing thermal comfort and photovoltaic efficiency through thermotropic starch–hydrogel composite membrane integration in sustainable building fenestration

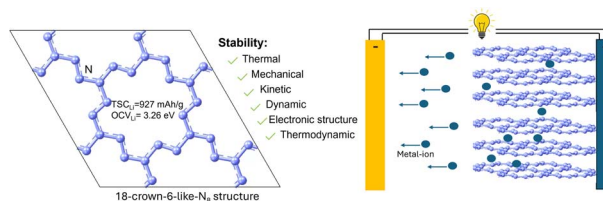
Anurag Roy,* Adeel Arshad, Tapas Kumar Mallick and Asif Ali Tahir*

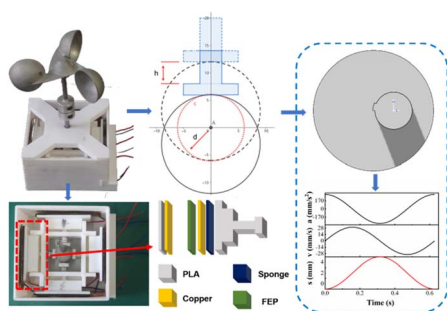


5075

A DFT study on an 18-crown-6-like-N₈ structure as a material for metal ion storage: stability and performance

Irina I. Piyanzina,* Regina M. Burganova, Sadeq Kaviani, Oleg V. Nedopekin and Hayk Zakaryan





3D-printed rotary triboelectric nanogenerators based on a cam-drive structure for wind energy harvesting

Shuyue You, Wei Zhao, Lisheng Du, Junyang Ma, Yaxiong Qin, Kun Du, Dan Zhao and Bo Zhang*

