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.

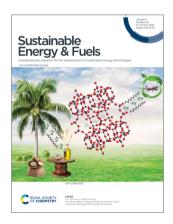
IN THIS ISSUE

ISSN 2398-4902 CODEN SEFUA7 9(20) 5391-5718 (2025)



Cover See Seerat Amin, Sailaja Krishnamurty, Manzoor Ahmad Dar, pp. 5589-5600. Image reproduced by permission of Manzoor Ahmad Dar from Sustainable Energy

Fuels, 2025, 9, 5589.



Inside cover See N. P. Nimisha, A. Sakthivel et al., pp. 5601-5611. Image reproduced by permission of A. Sakthivel and N. P. Nimisha from Sustainable Energy Fuels,

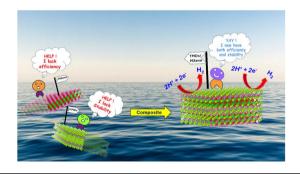
2025, 9, 5601.

REVIEWS

5399

A review on the cooperative effect of intimate interfacial TMD/MXene (2D/2D) heterostructures for an enhanced electrocatalytic hydrogen evolution reaction

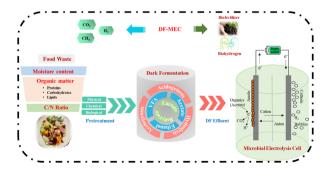
Umamaheswari Sekar, Jagan Radhakrishnan and Krishnendu Biswas^{*}



5432

Integrating dark fermentation and electrohydrogenesis for enhanced biohydrogen production from food waste

Anam Jalil, Hikmatullah Ahmadi, Fabrice Ndayisenga, Sohail Khan, Atif Ahmad, Xiangyang Wang and Zhisheng Yu*







At the heart of open access for the global chemistry community

Editor-in-chief

Russell J Cox

Leibniz Universität Hannover, Germany

We stand for:



Breadth We publish work in all areas of chemistry and reach a global readership



Quality Research to advance the chemical sciences undergoes rigorous peer review for a trusted, society-run journal



Affordability Low APCs, discounts and waivers make publishing open access achievable and sustainable



Community Led by active researchers, we publish quality work from scientists at every career stage, and all countries

Submit your work now

rsc.li/rsc-advances

@RSC_Adv

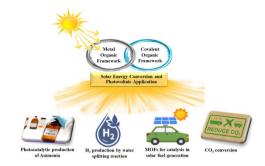
Article Online

REVIEWS

5458

Recent advances in metal-organic and covalent organic frameworks for solar energy conversion and their photovoltaic efficiency

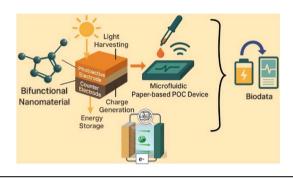
Umme Farwa, Faisal Haroon,* Zeshan Ali Sandhu, Muhammad Danish, Mir Waqas Alam, Safyan Mukhtar, Mohd Farhan and Muhammad Asam Raza*



5490

Bifunctional photoactive nanomaterials for sustainable paper-based photobatteries: powering point-of-care medical biosensors

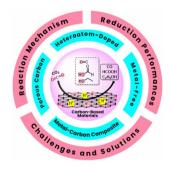
Natasha Ross,* Kayode Adesina Adegoke and Mieke Adriaens



5534

Advancements and challenges of tailored engineering of carbon materials for electrolytic CO₂ reduction to high-value carbon products

Sahil Kohli,* Lucky Panwar, Indrani Jha, Shelly Kujur, Disha Arora, Nitesh Kumar Singh and Garima Rathee*

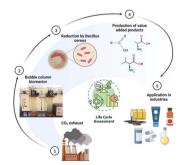


COMMUNICATION

5578

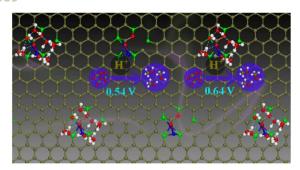
Sustainable CO₂ bio-mitigation: a life cycle perspective on chemolithotrophic conversion in bubble column bioreactors

Rachael J. Barla, Suresh Gupta and Smita Raghuvanshi*



PAPERS

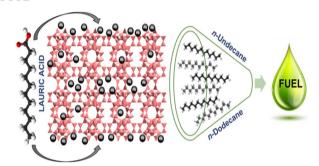
5589



Boosting the CO₂ reduction activity of Cu doubleatom catalysts through coordination environment engineering

Seerat Amin, Sailaja Krishnamurty* and Manzoor Ahmad Dar*

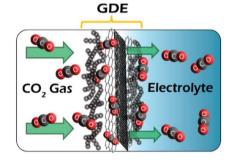
5601



Decarboxylation of fatty acids to fuel additives over a ruthenium-dispersed MWW zeolite framework

N. P. Nimisha, Soumya B. Narendranath, K. K. Shabana, C. P. Ansiya, C. K. Swetha, Anil Chandra Kothari, Adarsh Sahu, Rajaram Bal and A. Sakthivel*

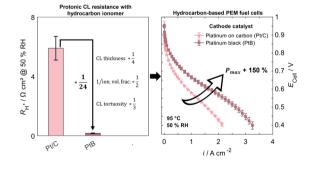
5612



Improving cycle stability and kinetics of rechargeable aluminum-CO₂ batteries using functional cathode materials

Gustavo Diaz and Shuya Wei*

5619



Back to black: utilizing unsupported Pt for thin cathodes in PFSA-free PEM fuel cells

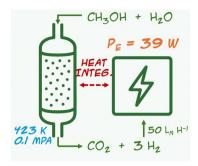
Hannes Liepold, Hendrik Sannemüller, Philipp A. Heizmann, Julian Stiegeler, Tym de Wild, Carolin Klose, Robert Alink, Severin Vierrath, Steven Holdcroft and Andreas Münchinger*

PAPERS

5627

Methanol-to-electricity *via* low-temperature steam reforming integrated with a high-temperature PEM fuel cell

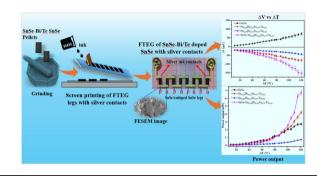
Muhammad Aziz Ur Rehman, Christian H. Schwarz, Sina Souzani, Christian Heßke and Marco Haumann*



5635

A co-doping strategy for p- to n-type transition and performance boost in SnSe-based flexible thermoelectric generators

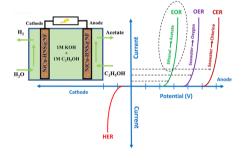
Manasa R. Shankar, A. N. Prabhu* and Ramakrishna Nayak



5648

A bifunctional electrocatalyst for energy-efficient hydrogen production and ethanol upgrading into acetate *via* hybrid seawater splitting

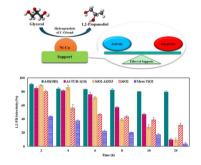
Faiza Zulfiqar, Farhan Arshad, Mohammed A. Gondal, Hatice Duran, Senem Çitoğlu and Falak Sher*



5657

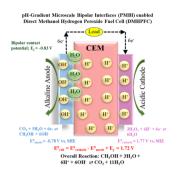
Enhanced 1,2-propanediol production from glycerol using bimetallic Ni-Cu catalysts on different supports

A. Ghorbani, P. Boahene and A. K. Dalai*



PAPERS

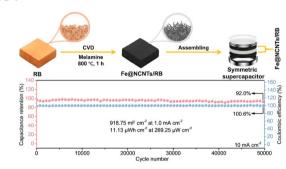
5673



Enhancing pH-gradient microscale bipolar interfaces (PMBI) enabled direct methanol hydrogen peroxide fuel cell (DMHPFC) performance under varying operating conditions

Kritika Sharma, Shrihari Sankarasubramanian, Zhongyang Wang and Vijay Ramani*

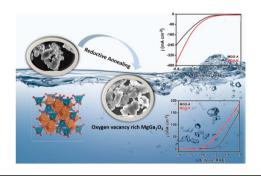
5684



Dense N-doped carbon nanotubes with encapsulated Fe nanoparticles directly grown within red brick as a sustainable monolithic electrode for high-performance supercapacitors

Mengjuan Xu, Kaige Xu, Yiming Li, Fang Wang, Zhengguo Zhang* and Shixiong Min*

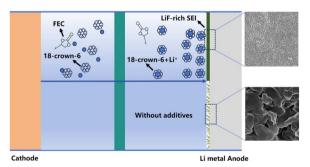
5697



Reductive annealing assisted enhanced oxygen vacancies in MgGa₂O₄ spinel towards improved OER and HER electrocatalysis

Reshmi T. Parayil, Sangeeta Jangra, Santosh K. Gupta,* Kalpana Garg, K. Sudarshan, M. Mohapatra and Tharamani C. Nagaiah*

5705



Tailoring the electrolyte/electrode interface with 18crown-6 and fluoroethylene carbonate for controlled and uniform lithium deposition

Bo zhang, Liguang Qin,* Jiaqing Tang, Minghe Zhu, Shiyu Hua, Qinyang Xue, Yunzeng Cui, Shangqi Sun* and Chang Guo*