

Sustainable Energy & Fuels

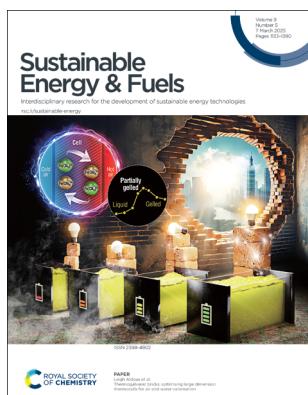
Interdisciplinary research for the development of sustainable energy technologies

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.

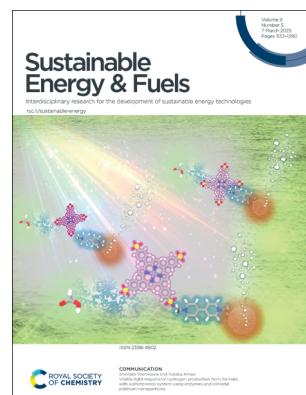
IN THIS ISSUE

ISSN 2398-4902 CODEN SEFUA7 9(5) 1133–1390 (2025)



Cover

See Leigh Aldous et al., pp. 1165–1172. Image reproduced by permission of Kaili Scientific Illustration Studio from *Sustainable Energy Fuels*, 2025, 9, 1165.



Inside cover

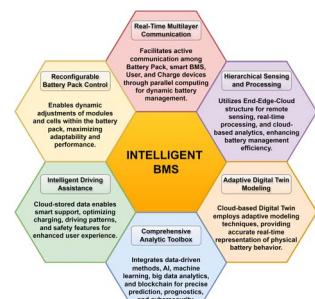
See Shintaro Yoshikawa and Yutaka Amao, pp. 1160–1164. Image reproduced by permission of Yutaka Amao from *Sustainable Energy Fuels*, 2025, 9, 1160.

PERSPECTIVE

1142

An intelligent battery management system (BMS) with end-edge-cloud connectivity – a perspective

Sai Krishna Mulpuri, Bikash Sah* and Praveen Kumar

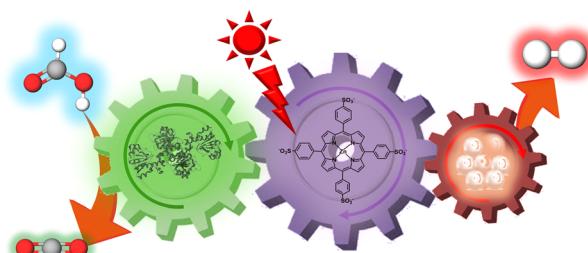


COMMUNICATION

1160

Visible-light responsive hydrogen production from formate with a photoredox system using enzymes and colloidal platinum nanoparticles

Shintaro Yoshikawa and Yutaka Amao*



EES Solar

**Exceptional research on solar
energy and photovoltaics**

Part of the EES family

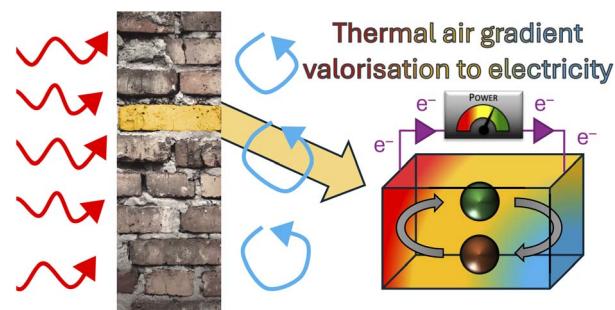
**Join
in** | Publish with us
rsc.li/EESSolar

PAPERS

1165

Thermogalvanic bricks: optimising large dimension thermocells for air and water valorisation

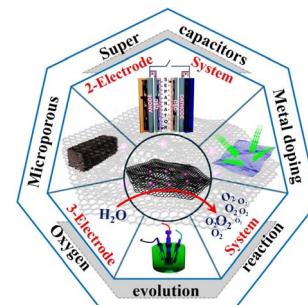
Rebecca Haughton-James, Sirenya Mesawang, Mark A. Buckingham, Robert Taylor, Patrick E. Phelan and Leigh Aldous*



1173

Elucidating the role of cobalt nanoparticles and Mn-phosphate in etched ZIF-67/phthalimide-NC and phthalimene oxide for supercapacitor and electrochemical oxygen evolution reaction applications

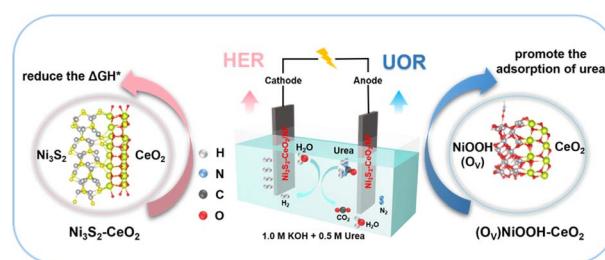
Tapan Dey, Nitish Kumar, Rahul Patil, Prakash Kumar Pathak, Sudip Bhattacharjee, Praveen Yadav, Asim Bhaumik, Rahul R. Salunkhe* and Saikat Dutta*



1183

CeO₂-enhanced surface reconstruction of Ni₃S₂ nanosheets for improved urea-assisted water splitting performance

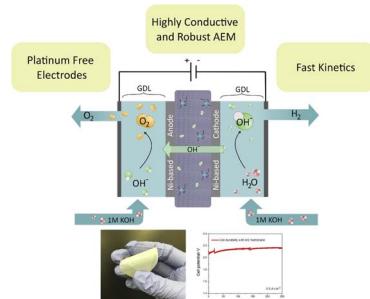
Jiale Shang, Tong Wei, Xiaoqing Yan, Zheng Fang, Leilei Du, Jichao Shi, Fozia Sultana,* Tongtong Li* and Renhong Li*



1196

Hydroxyl-conductive 2D hexagonal boron nitrides for anion exchange membrane water electrolysis and sustainable hydrogen production

Jasneet Kaur,* Matthew Schweinbenz, Kane Ho, Adel Malekhouyan, Kamal Ghotia, Franz Egert, Fatemeh Razmjooei,* Syed Asif Ansar and Hadis Zarrin*



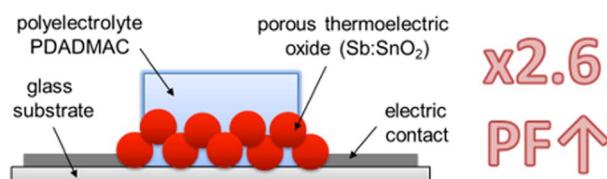
PAPERS

1207

**Li-doped 2D aza-fused covalent organic framework: a promising avenue for hydrogen storage**

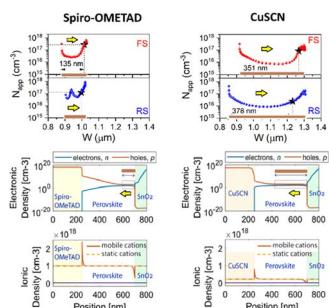
Preeti Beniwal and T. J. Dhilip Kumar*

1217

**Poly(diallyldimethylammonium)-based solid electrolytes to significantly enhance the power factor of a thermoelectric oxide film (Sb-doped SnO₂)**

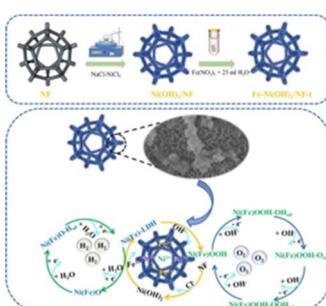
M. Solis-de la Fuente, S. Castro-Ruiz, L. Márquez-García, P. Rullière, S. Fantini, R. Del Olmo, N. Casado and J. García-Cañadas*

1225

**Impact of the hole transport layer on the space charge distribution and hysteresis in perovskite solar cells analysed by capacitance–voltage profiling**

E. Regalado-Pérez,* Evelyn B. Díaz-Cruz and J. Villanueva-Cab*

1236

**Low-temperature etch synthesis of Fe-doped Ni(OH)₂ for enhanced bifunctional water splitting**

Yanmei Xin, Xiaoru Dou, Qiling Yan, Ruiting Zhang, Shuaishuai Li,* Guoan Huang* and Zhonghai Zhang*

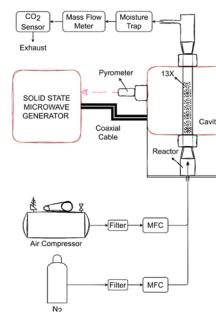


PAPERS

1247

An experimental study on microwave-assisted direct air capture of CO_2 under fluidized bed conditions

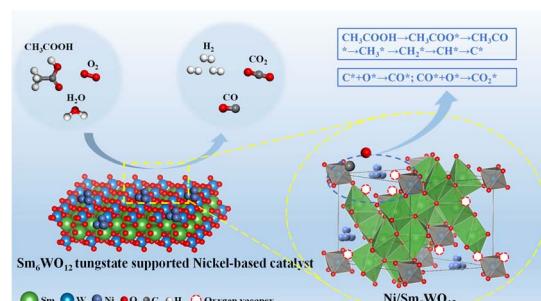
Mustafa Erguvan,* Rahim Boylu, Matheus Strobel
and Shahriar Amini*



1268

Sm₆WO₁₂ tungstate supported nickel-based catalysts with enhanced resistance to coking and oxidation in auto-thermal reforming of acetic acid

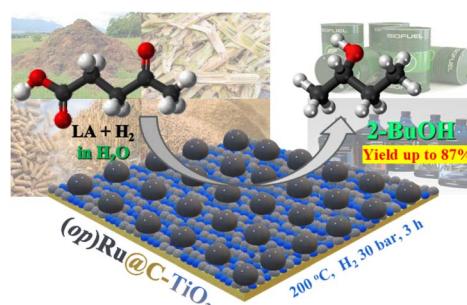
Xuemei Xie, Yingchun Xu, Mao Gan, Ying Su, Jinbo Liu
and Lihong Huang*



1279

Thermocatalytic synthesis of 2-butanol from biomass-derived levulinic acid using carbon-doped titania-supported ruthenium

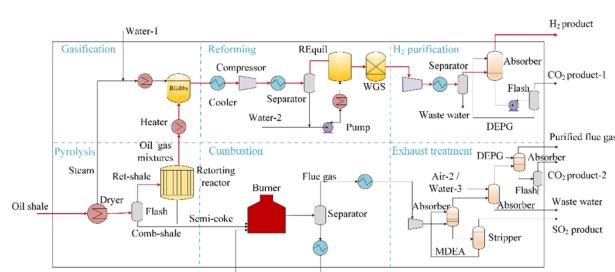
Atina Sabila Azzahra, Rodiansono,* Iryanti Fatyasari Nata, Kiky Corneliasari Sembiring, Indri Badria Adilina and Ahmad Afandi



1293

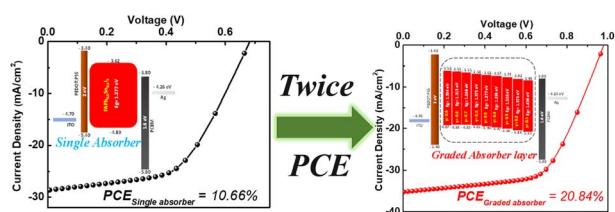
Complete hydrogen production from oil shale with carbon capture

Pu Zheng, Xiaoxiang Wang, Dandan Li, Zhongmin Wu,
Weijsa Huang, Yun Li, Jie Zhang and Xiaohui Chen*



PAPERS

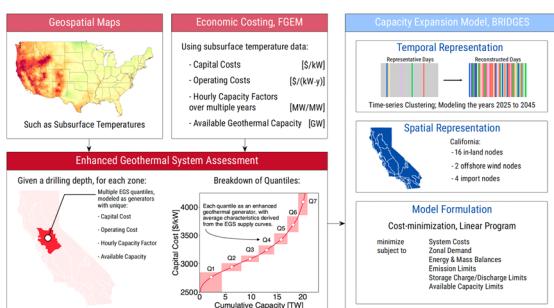
1305



Theoretical estimation to double the performance of perovskite solar cells using a graded absorber layer

Monisha Nayak, Abu Jahid Akhtar and Sudip K. Saha*

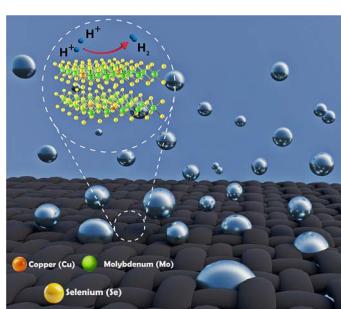
1317



The value of enhanced geothermal systems for the energy transition in California

Mohammad J. Aljubran,* Dimitri M. Saad, Mo Sodwatana, Adam R. Brandt and Roland N. Horne

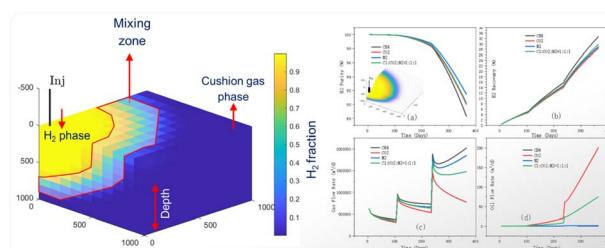
1338



Triggering the phase transition of molybdenum diselenide (MoSe₂) 1T@2H by introducing copper (Cu⁺): experimental insights and DFT analysis for the hydrogen evolution reaction

Gautham Kumar G, P. Balaji Bhargav,* C. Balaji and Shobana Priyanka D

1353



A sensitivity study of hydrogen mixing with cushion gases for effective storage in porous media

Junhan Lu, Nasiru Salahu Muhammed, Jude A. Okolie and Emmanuel I. Epelle*

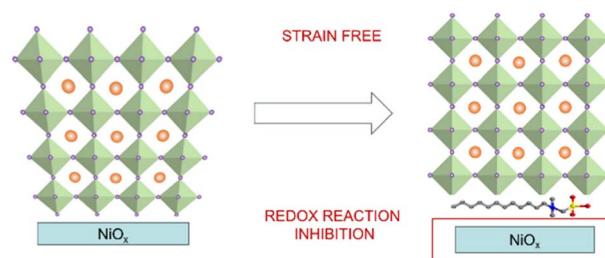


PAPERS

1371

Surface engineering to mitigate compressive stress and detrimental reactions in NiO_x -based inverted perovskite solar cells

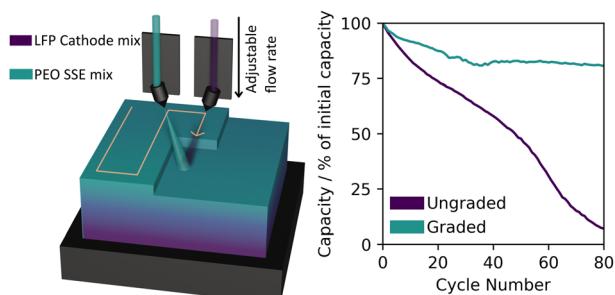
Zijin Qiao, Hongye Dong, Guibin Shen, Xiangning Xu, Wang Yao and Cheng Mu*



1379

Enhancing solid-state battery performance with spray-deposited gradient composite cathodes

Matt P. Tudball, Will J. Dawson, Joshua H. Cruddos, Francesco Iacoviello, Andrew R. T. Morrison, Alexander J. E. Rettie and Thomas S. Miller*



CORRECTION

1387

Correction: Photocatalytic CO_2 reduction to methanol integrated with the oxidative coupling of thiols for S–X (X = S, C) bond formation over an $\text{Fe}_3\text{O}_4/\text{BiVO}_4$ composite

Nitish Saini, Sandhya Saini, Santanu Majumder,* Kyra Sedransk Campbell and Suman L. Jain*

