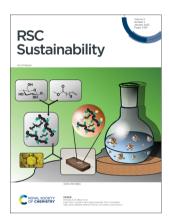
RSC Sustainability

rsc.li/rscsus

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 2753-8125 CODEN RSSUAN 3(1) 1-614 (2025)



Cover

See Michael A. R. Meier et al., pp. 291-299. Image reproduced by permission of Michael A. R. Meier from RSC. Sustainability., 2025, 3, 291.



Inside cover

See Alberto Mannu, Andrea Mele et al., pp. 300-310. Image created with Google Gemini. Image reproduced by permission of Alberto Mannu and Andrea Mele from RSC. Sustainability., 2025, 3, 300.

EDITORIALS

Reflecting on the successes of RSC Sustainability in 2024 and looking forward to 2025

Tom Welton



Energy materials redesign, reuse and repurpose

Cristina Pozo-Gonzalo, Bethan L. Charles, Xiaolei Wang and Erlantz Lizundia













Environmental Science: Atmospheres

Connecting communities and inspiring new ideas

rsc.li/submittoEA

Fundamental questions Elemental answers

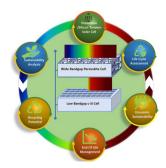


CRITICAL REVIEWS

21

A review of life cycle assessment and sustainability analysis of perovskite/Si tandem solar cells

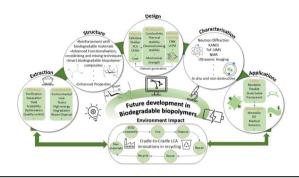
Waseem Akram, Xikang Li, Shakeel Ahmed, Zhengbiao Ouyang* and Guijun Li*



37

Biodegradable biopolymers for electrochemical energy storage devices in a circular economy

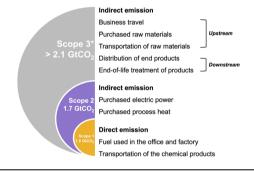
Mustehsan Beg,* Jeeva Saju, Keith M. Alcock, Achu Titus Mavelil, Prasutha Rani Markapudi, Hongnian Yu and Libu Manjakkal*



64

Technological and policy options for the defossilisation of chemical manufacturing

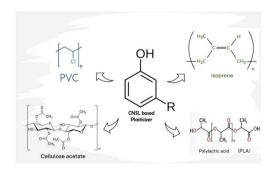
Qiuchi Pan, Martin Held* and Jan Backmann*



81

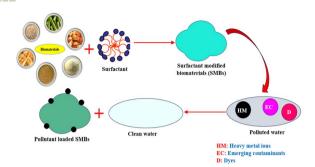
CNSL-based plasticizers, a promising and sustainable alternative to phthalates, a review

A. Gartili, V. Lapinte, S. Caillol, B. Briou* and L. Jego



CRITICAL REVIEWS

112



Surfactant-influenced biosorption as a sustainable and effective way for the eradication of environmental pollutants: a review

Subhadeep Biswas, Ashish Kumar Nayak and Anjali Pal*

134



Green hydrogen production for sustainable development: a critical examination of barriers and strategic opportunities

Juan Gabriel Segovia-Hernández, Salvador Hernández, Enrique Cossío-Vargas, Maricruz Juarez-García and Eduardo Sánchez-Ramírez

158



Hydroformylation, hydroaminomethylation and related tandem reactions of bio-derived renewable olefins: a step closer to sustainability

Rupali S. Prajapati and Bhalchandra M. Bhanage*

208



Pyrolysis of waste plastics for alternative fuel: a review of key factors

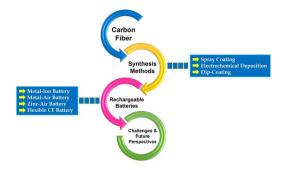
Haseeb Yaqoob,* Hafiz Muhammad Ali* and Umair Khalid

TUTORIAL REVIEWS

219

Recent progresses in the synthesis and strategic designs of sustainable carbon-based fibrous electrodes for flexible batteries

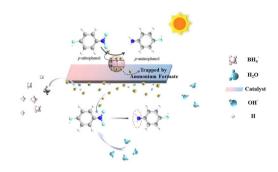
Susmi Anna Thomas, Jayesh Cherusseri* and Deepthi N. Rajendran*



243

Advances in the catalysis of reduction of nitroaromatics and its mechanism: a tutorial review

Wenjie Guo, Yisha Zheng, Wenlong Xiang and Yanhui Zhang*

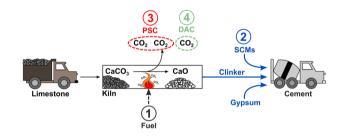


PERSPECTIVE

255

Cost-motivated pathways towards near-term decarbonization of the cement industry

Katelyn M. Ripley, Fadl H. Saadi* and Zara L'Heureux Burke*

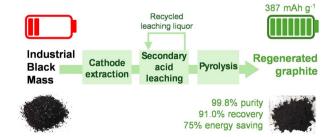


PAPERS

264

Recovery of graphite from industrial lithium-ion battery black mass

Xiaochu Wei, Zhenyu Guo, Yuanzhu Zhao, Yuqing Sun, Anna Hankin and Magda Titirici*



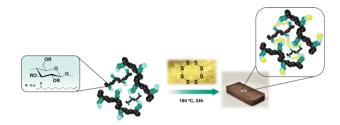
275



Environmental and life cycle assessment of lithium carbonate production from Chilean Atacama brines

Zijing He, Anna Korre,* Geoff Kelsall, Zhenggang Nie and Melanie Colet Lagrille

291



High sulfur content composite materials from renewable fatty acid cellulose esters (FACEs) via inverse vulcanization

Timo Sehn, Julian Fanelli, Lisa Wahl and Michael A. R. Meier*

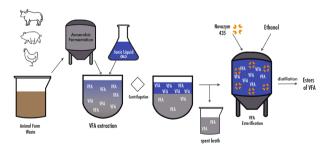
300



Sustainable production of raw materials from waste cooking oils

Alberto Mannu,* Pablo Almendras Flores, Francesco Briatico Vangosa, Maria E. Di Pietro and Andrea Mele*

311



Volatile fatty acid extraction from fermentation broth using a hydrophobic ionic liquid and in situ enzymatic esterification

Ramkrishna Singh, Nikhil Kumar, Prathap Parameswaran, Blake A. Simmons, Kenneth Sale and Ning Sun*

323

Leveraging molybdenum sulfur compounds as catalysts for the synthesis of biobased poly(ethylene 2,5-furandicarboxylate) and recycling

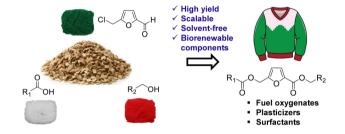
Dmitrii Razinkov, Beatriz Agostinho, Sigridur G. Suman* and Andreia F. Sousa*



331

Synthesis of novel diesters as potential fuel oxygenates and surfactants of renewable origin from carbohydrate-derived 5-(chloromethyl)furfural

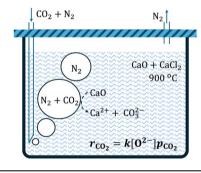
Sandeep Kumar Yadav and Saikat Dutta*



341

Advancing carbon dioxide capture: investigation into the kinetics and efficiency of absorption in molten calcium oxide—chloride

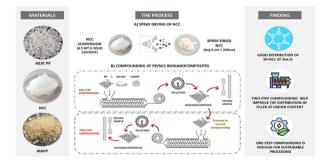
Melissa Hall, Sean P. Rigby and George Z. Chen*



352

Enhanced mechanical strength of polypropylene bionanocomposites through spray-dried nanocrystalline cellulose reinforcement

Fatimah Athiyah Sabaruddin, Hidayah Ariffin,* Siti Shazra Shazleen, Lawrence Ng Yee Foong, Pim-on Rujitanaroj, Kasinee Thitiwutthisakul, Patcharin Permpaisarnsakul and Phungjai Tinnasulanon



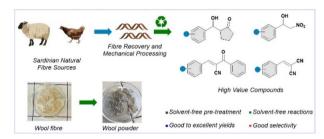
365



Concentration-dependent kinetic study of graphene oxide (GO) reduction using biophenol and electrochemical analysis

Saad Zafar, Sanjana Krishna Mani, Monisha Monisha and Bimlesh Lochab*

376



Mechanically processed Sardinian wool promotes C-C bond synthesis under solvent-free conditions

Sourav Behera, Federico Cuccu,* Francesco Basoccu, Stefano Barranco and Andrea Porcheddu*

383



Expanded polystyrene is not chemically degraded by mealworms

Zahra Mohammadizadeh Tahroudi, Gavin Flematti, Jitendra Joshi, Georg Fritz* and Rob Atkin*

395

Synthesis of *N*-formamides *via* oxidative carbonylation of amines with paraformaldehyde over a CoNC catalyst

Longfei Wang, Yuanyuan Hu, Qingqing Pu, Yongqiang Yao, Hao Zhang, Yong Guo, Yongsheng Li,* Bin Dai and Zhengang Ke*

403

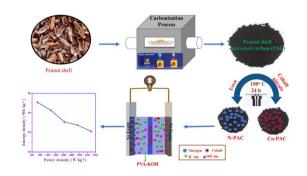
Solventless polyester synthesis using a recyclable biocatalyst magnetic nanoarchitecture

Francesco Papatola, Sawssen Slimani, Filippo Fabbri, Georg M. Guebitz, Davide Peddis* and Alessandro Pellis*

413

Peanut shell-derived activated carbon incorporated with nitrogen anode and cobalt cathode materials ("two-in-one" strategy) for asymmetric supercapacitor (N-PAC//PVA-KOH//Co-PAC) applications

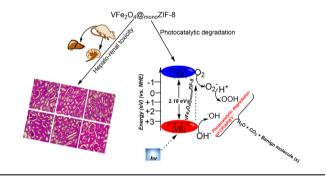
Esakkimuthu Shanmuqasundaram, Amos Ravi, Vigneshkumar Ganesan, Vimalasruthi Narayanan, Kannan Vellaisamy, Sowmiapratha Pandikannan, Suganya Bharathi Balakrishnan and Stalin Thambusamy*



427

Zeolitic imidazolate framework improved vanadium ferrite: toxicological profile and its utility in the photodegradation of some selected antibiotics in aqueous solution

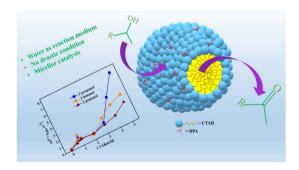
Adewale Adewuyi,* Wuraola B. Akinbola, Chiagoziem A. Otuechere, Adedotun Adesina, Olaoluwa A. Ogunkunle, Olamide A. Olalekan, Sunday O. Ajibade and Olalere G. Adeyemi



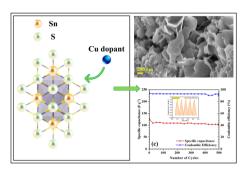
440

Unveiling the sustainable oxidation approach of homologous alcohols by DPA in a CTAB micellar environment

Sandip Kundu, Mandira Mitra, Priya Karmakar, Sk Mehebub Rahaman, Mousumi Layek, Pintu Sar* and Bidyut Saha*



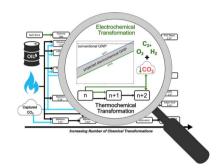
450



Effect of copper doping on the electrochemical behavior of SnS₂ electrodes for aqueous Al-ion hybrid supercapacitors

Debayan Chatterjee* and Sonali Das

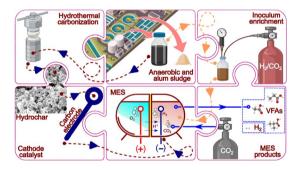
460



Decarbonizing specialty chemical manufacturing: opportunities for electrochemists

Robert J. Hacku, Thomas J. Henry, Michael A. Kane, Maxwell J. Vance, Zachary J. Sebastian, Glenn Cormack, Tyler J. Petek, Elisa Seddon and James R. McKone*

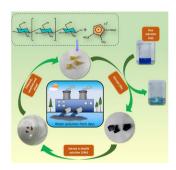
471



Sludge-derived hydrochar as a potential electrocatalyst for improved CO2 reduction in microbial electrosynthesis

Lakshmi Pathi Thulluru, Anil Dhanda, Manikanta M. Doki, Makarand M. Ghangrekar and Shamik Chowdhury*

486



Study of adsorption efficiencies of biopolymer-based composites of chitosan with a sulfonic acid functionalized imidazolium ionic liquid for elimination of organic dyes in wastewater

Subham Paul, Amlan Jyoti Gogoi, Krishna Dev, Prapti Priyam Handique, Debanga Bhusan Bora, Sangeeta Kalita and Ruli Borah*

503

Performance assessment of self-healing polyurethane elastomer as an additive in modified asphalt

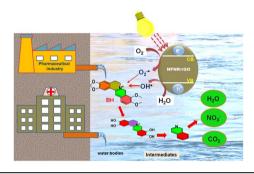
Yanling Wu,* Xingda Wang, Hao Li, Qingyuan Luo, Xuan Li, Xinlei Zheng, Kexin Xu, Yanteng Wu and Jin Li*



510

Photodegradation of berberine hydrochloride at the interface of 1D-2D nanohybrid of nickel ferrite supported on reduced graphene oxide

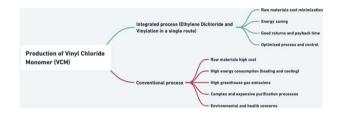
Sayanika Saikia, Salma A. Khanam, Priyanuj Kandali, Ankur Kanti Guha and Kusum K. Bania*



526

Optimization and techno-economic evaluation of an integrated process route for the synthesis of vinyl chloride monomer

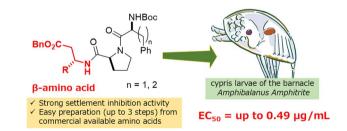
Joseph Akintola, Regina Patinvoh, Odunlami Moradeyo, Joseph Akpan,* Gabriel Umoh, Ekpotu Wilson, Queen Moses, Philemon Udom and Edose Osagie



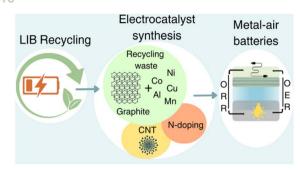
540

Novel settlement inhibition oligopeptides containing **β-amino acids**

Taiki Umezawa,* Ira Novita Sari, Erina Yoshimura and Yasuyuki Nogata*



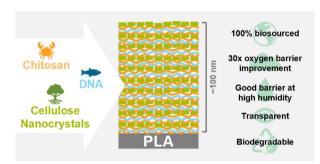
546



Utilizing waste lithium-ion batteries for the production of graphite-carbon nanotube composites as oxygen electrocatalysts in zinc-air batteries

Reio Praats, Jani Sainio, Milla Vikberg, Lassi Klemettinen, Benjamin P. Wilson, Mari Lundström, Ivar Kruusenberg and Kerli Liivand*

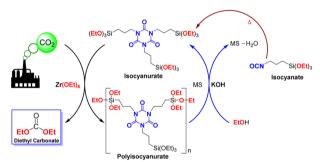
557



Fully biobased and biodegradable oxygen barrier coating for poly(lactic acid)

Sarah G. Fisher, Armaghan Amanipour, Maya D. Montemayor, Ethan T. Iverson, Edward Chang, Alexandra V. Moran, Reza Ovissipour and Jaime C. Grunlan*

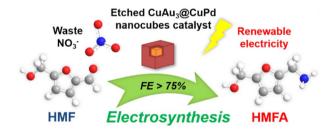
565



Breaking the equilibrium limit: synthesis of diethyl carbonate from CO₂ using regenerable bis-/tristriethoxysilane substrates

Wahyu S. Putro, Akira Ikeda, Toshihide Yamamoto, Satoshi Hamura, Jun-Chul Choi* and Norihisa Fukaya*

572



Electrochemical upgrade of 5-hydroxymethylfurfural by C-N coupling over etched CuAu₃@CuPd nanocubes

Zi-Yuan Li, Jiang Shao, Yi-Fei Zhang, Xiao-Yu Guo, De-Jiu Wang, Hao Dong and Ya-Wen Zhang*

580

Task-specific ionic liquids and ultrasound irradiation: a successful strategy to drive the alcoholysis of polycarbonate

Francesca D'Anna,* Giovanna Raia, Gianluca Di Cara, Patrizia Cancemi and Salvatore Marullo



592

Visible light promoted metal and oxidant-free stereoselective synthesis of functionalized succinimides from aza-1,6-enynes

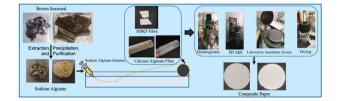
Shivam A. Meena, Deepika Thakur, Debanik Panda, Rahul Ranjan and Akhilesh K. Verma*



599

Preparation of marine-sourced alginate fibres to produce composite paper from both green and blue carbons

RM. Muhammad Nur Fauzan, Kotchaporn Thangunpai, Akiko Nakagawa-Izumi, Mikio Kajiyama and Toshiharu Enomae*



CORRECTION

611

Correction: Enhanced mechanical strength of polypropylene bionanocomposites through spray-dried nanocrystalline cellulose reinforcement

Fatimah Athiyah Sabaruddin, Hidayah Ariffin,* Siti Shazra Shazleen, Lawrence Ng Yee Foong, Pim-on Rujitanaroj, Kasinee Thitiwutthisakul, Patcharin Permpaisarnsakul and Phungjai Tinnasulanon