

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 4(4) 1637–1998 (2026)



Cover
See Genki Horiguchi and Yohei Okada, pp. 1649–1666. Image reproduced by permission of Yohei Okada from *RSC Sustainability*, 2026, 4, 1649.



Inside cover
See Alexander Dauth, Benjamin Kühne *et al.*, pp. 1833–1845. Image reproduced by permission of Alexander Dauth from *RSC Sustainability*, 2026, 4, 1833. Logo reproduced with permission from Merck. Image created with AI.

EDITORIAL

1647

The Guiding Principles of Responsible Chemistry

Francesca M. Kerton

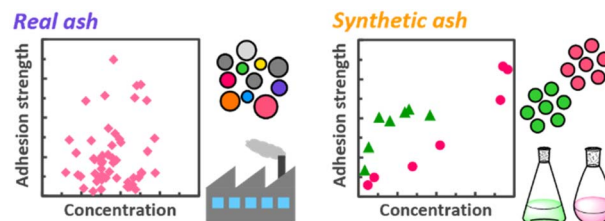


CRITICAL REVIEWS

1649

Toward stable operation for thermochemical conversion of biomass and waste: ash chemistry for understanding ash adhesion at high temperatures

Genki Horiguchi and Yohei Okada*



Synthetic ash is helpful for attaining a mechanistic understanding of the influence of ash chemistry on adhesion.



EES Catalysis

GOLD
OPEN
ACCESS

Exceptional research on energy
and environmental catalysis

Open to everyone. Impactful for all

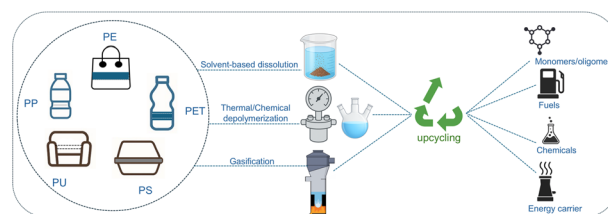
rsc.li/EESCatalysis

Fundamental questions
Elemental answers

1667

Recent advances in chemical recycling and upcycling of plastic waste into valuable materials, chemicals, and energy: a comprehensive review

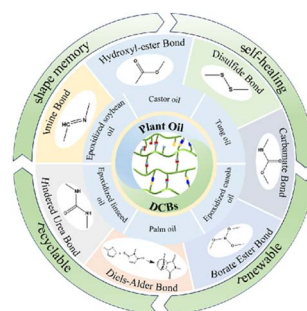
Kalsoon Jan, Dhruba Deka, Evan Yu, Taofeng Lu, Kai Li, Huixin Jiang, Kashif Nawaz, Erin Webb, Soydan Ozcan, Rongge Zou, Leilei Dai, Hanwu Lei, Roger Ruan, Xianhui Zhao* and Wan-Ting Chen*



1703

Advances in plant oil-based polymeric materials with dynamic covalent bonds

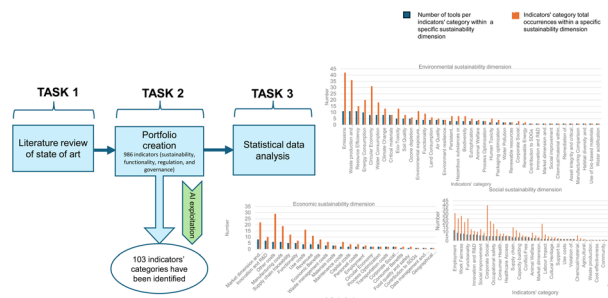
Xiaohui Huang, Yanlin Li, Jing Liu, Hang Zhou, Kashif Khan, Yi Tan* and Chengguo Liu*



1717

AI-based development of a portfolio of indicators for assessing environmental, social and economic impacts and technological functionality of chemicals and materials

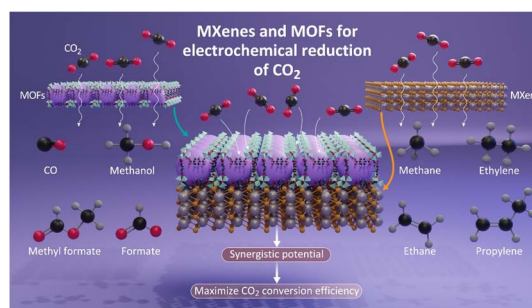
Lisa Pizzol,* Gloria Fortin, Arianna Livieri, Fabio Rosada, Sarah Devecchi, Elena Semenzin and Danail Hristozov



1731

MXenes and MOFs for electrochemical reduction of carbon dioxide (CO₂)

Elham Momtaz, Masoomeh Amoozadeh, Atefeh Zarepour, Arezoo Khosravi, Ali Zarrabi* and Siavash Irvani*



TUTORIAL REVIEW

1760

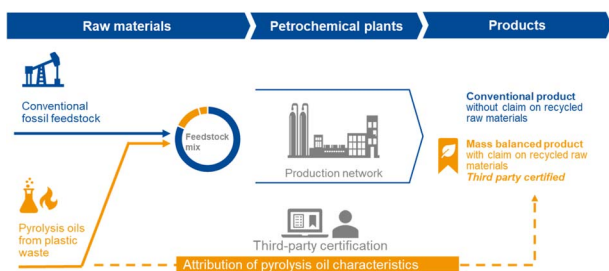


Colourful chemistry of anthocyanins: a tutorial review of applications of anthocyanins in school and university teaching

Iain A. Smellie,* Isobel Everest and Iain L. J. Patterson

PERSPECTIVES

1778



Chemical recycling: a new toolbox for materials recycling in industry and the application of the mass balance chain-of-custody approach

Christian Krueger,* Ivana Krkljuš and Jenny Reuber

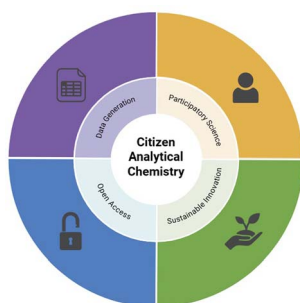
1792



Industrial operationalisation of safe-and-sustainable-by-design from business case to launch

Ayse Ay,* Roberto Chinchilla, Tobias Moss, Joséphine Munsch, Catherine Colin, Carla Caldeira, Pierre-Emmanuel Dufils, Timo Melchin, Eva Hahn and Wendel Wohlleben

1808



Citizen analytical chemistry: building a participatory and shared science through global data generation

Adrián Fuente-Ballesteros,* Victoria Samanidou and Vânia G. Zuin Zeidler*

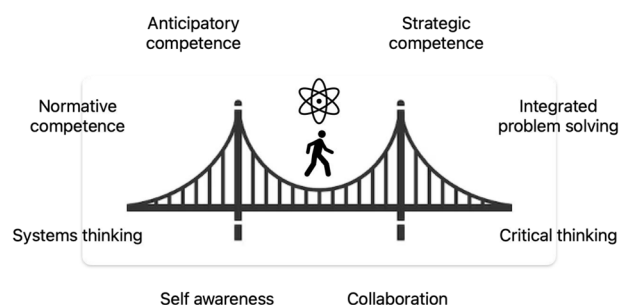


PERSPECTIVES

1822

Beyond molecular mastery: reimagining chemistry education for sustainability through knower-aware pedagogy

Margaret A. L. Blackie* and Lausanne Olvitt

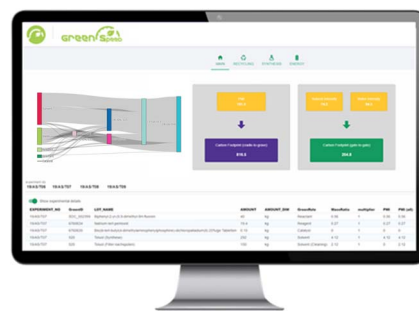


PAPERS

1833

Automating and improving GHG emissions calculation in pharma/fine chemicals synthesis RD: GreenSpeed as a digital tool to navigate complex value chains

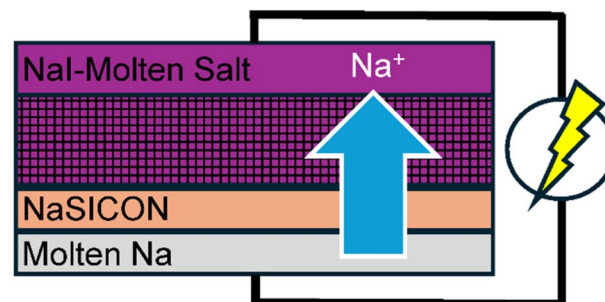
Alexander Dauth,* Benjamin Kühne,* Helmut Hänsel, Sara Wirsing, Kerstin Hell, Heinrich Becker, Isabelle Georg, Andreas Bathe and Bertram Cezanne



1846

A high power, low temperature molten sodium battery

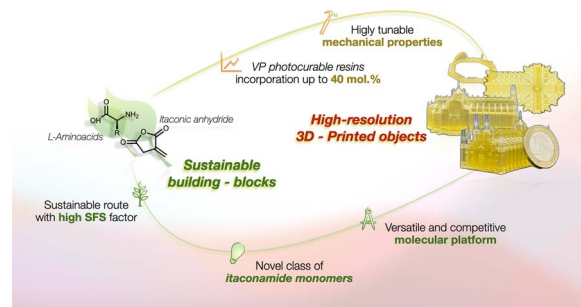
Michael E. Ureña, Amanda S. Peretti, Stephen J. Percival, Philip S. Mantos, Erik D. Spoeke and Leo J. Small*



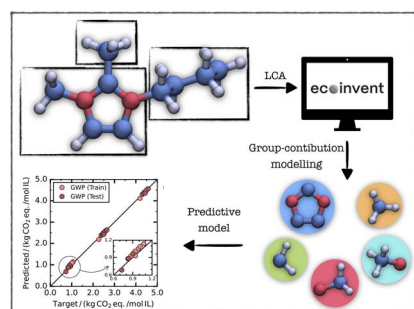
1857

Sustainable itaconamide monomers from amino acids for vat photopolymerization 3D printing

Rosario Carmenini, Filippo Capancioni, Mirko Maturi, Erica Locatelli, Sergio I. Molina, Letizia Sambri and Mauro Comes Franchini*



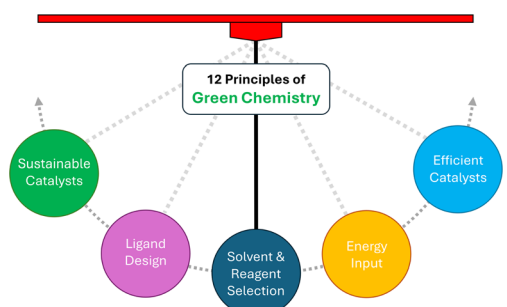
1867



A group contribution approach for predicting the environmental impacts of imidazolium-based ionic liquids

Mirco Volanti, Piya Gosalvittr, Carlos Avendaño, Adam J. Greer, Christopher Hardacre, Fabrizio Passarini and Rosa M. Cuéllar-Franca*

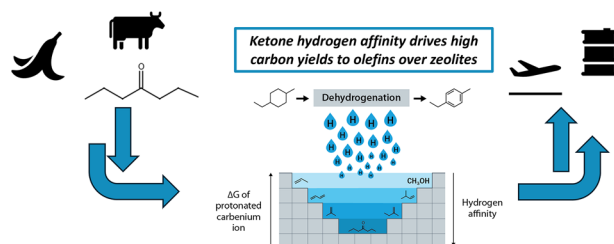
1886



Sustainable from the start—an exploration of green chemistry utilizing second-year inorganic principles

Greg Bannard, Jaelyn Bjornerud-Brown, Megan Fitzgerald, Kristen Perry, Emma C. Davy, Connor S. Durfy, Gagan Daliaho, Jasmine Hong and Marissa L. Clapson*

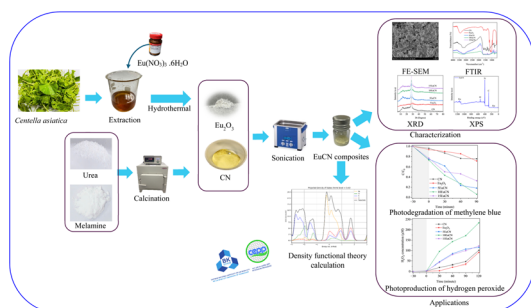
1901



Harnessing ketones as hydrogen acceptors for atom-efficient upgrading of oxygenates to fuels over H/ZSM-5

Jacob H. Miller, Caleb A. Coatney, Udishnu Sanyal, Karthikeyan K. Ramasamy, Hieu A. Doan, Rajeev S. Assary, Anh T. To and Cody J. Wrasman*

1912



Green synthesis of EuCN S-scheme photocatalysts via *Centella asiatica* extract for enhanced MB photodegradation and H₂O₂ photoproduction: DFT investigation and mechanistic insights

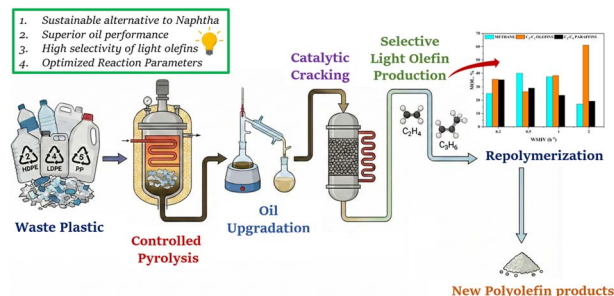
Tran Dang Khoa, Nguyen Phi Hao, Le Thanh Hoang Duc, Pham Duc Nghi, Nguyen Hung Vu, Dang Thanh Cong Minh, Tran Nguyen Cam Nhung, Nguyen Minh Phi, Tran Thi Thu Hanh, Nguyen Minh Hung and Nguyen Huu Hieu*



1933

Cracking behavior of upgraded waste plastic pyrolysis oil to lighter olefins (C_2-C_3): a study on performance, product distribution and outlook for a circular hydrocarbon economy

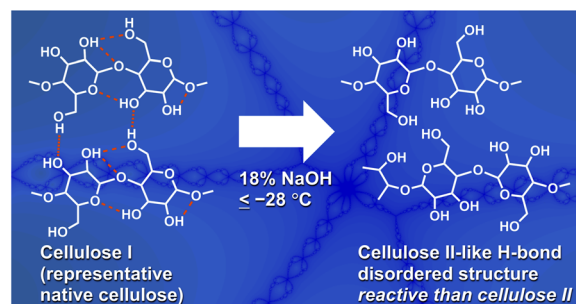
Abhishek G. Sarang, Aditya Bora, Syed Mohammed Razak, Karan Sharma, Chandan Kumar Munagala, Pratik Mali, Nettem V. Choudary and Vineet Aniya*



1943

Boosting the reactivity of crystalline cellulose by a cold base treatment for catalytic hydrolysis with a carbon-based catalyst

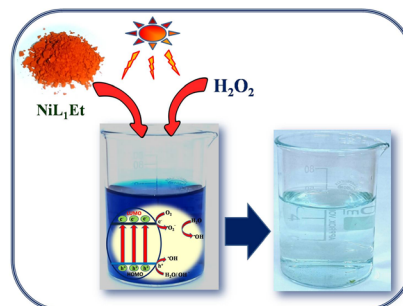
Naomi Nishimura, Yoichi Masui, Ryo Shimane, Shunsaku Yasumura, Tomohiro Iwai, Masaru Ogura and Hirokazu Kobayashi*



1949

A nickel(II) complex of a naphthaldehyde-derived bis-imine ligand for sunlight-driven dye remediation: mechanistic, intermediate identification, and recyclability studies

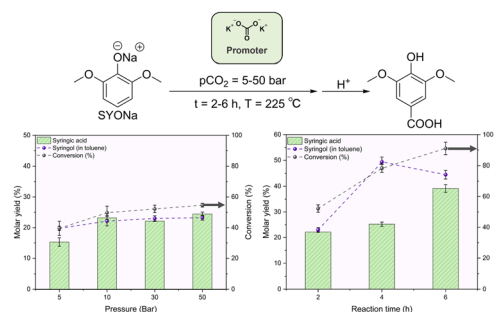
Nilotpals Goswami, Diganta Kumar Bharali, Nabajit Barman and Pranjit Barman*



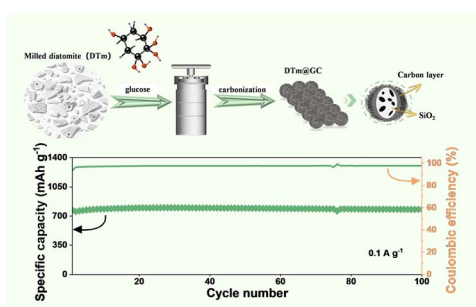
1964

Production of syringic acid by direct CO_2 insertion into syringol via a Kolbe–Schmitt type reaction

Omar Mohammad, Jude A. Onwudili* and Qingchun Yuan



1975



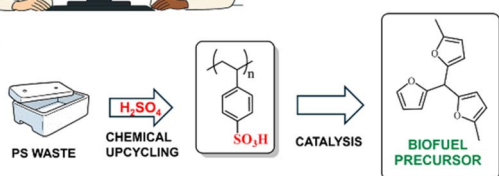
Constructing a covalently Si–O–C bonded diatomite-derived SiO₂@C anode for high-capacity lithium-ion batteries

Qiaofu Zheng, Licheng Wei,^{*} Lifeng Zhou, Guannan Peng, Dalei Sun^{*} and Yimin Chao^{*}

1986



- OPEN SCIENCE PLATFORM
- STUDENT CO-CREATION
- ACCESSIBLE PS UPCYCLING
- APPLICATION IN SUSTAINABLE CATALYSIS



RECOMPENSE: a student-led open science initiative for sustainable polystyrene waste upcycling in academic labs

Victoria Lageard, YuHan Yan, Jiayin Liu, Yuezhe Gong, Shuoxi Liu, Bob C. Schroeder and David Palomas^{*}

