

Chem Soc Rev

Chemical Society Reviews

rsc.li/chem-soc-rev

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 0306-0012 CODEN CSRVBR 54(24) 11371-12144 (2025)



Cover

See Elisa Chakraborty and Robin Weiss, pp. 11379–11397. Image reproduced by permission of Robin Weiss from *Chem. Soc. Rev.*, 2025, 54, 11379. The sphere was created using Blender and modified using AI.



Inside cover

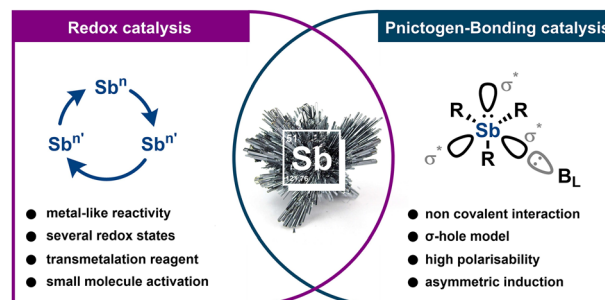
See Haitao Lei, Long Yan, Rui Cao *et al.*, pp. 11488–11544. Image reproduced by permission of Rui Cao from *Chem. Soc. Rev.*, 2025, 54, 11488.

TUTORIAL REVIEWS

11379

Organoantimony: a versatile main-group platform for pnictogen-bonding and redox catalysis

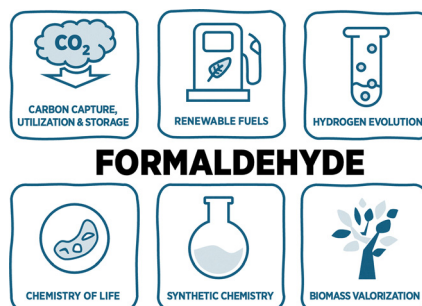
Elisa Chakraborty and Robin Weiss*



11398

Formaldehyde and its surrogates as a C1 platform for defossilised modern societies

Andrea Rodil, Jan Deska* and Martin H. G. PrechtI*



Advance your career in science

with professional recognition that showcases
your **experience, expertise and dedication**

Stand out from the crowd

Prove your commitment
to attaining excellence in
your field

Gain the recognition you deserve

Achieve a professional
qualification that inspires
confidence and trust

Unlock your career potential

Apply for our professional
registers (RSci, RSciTech)
or chartered status
(CChem, CSci, CEnv)

Apply now

rsc.li/professional-development

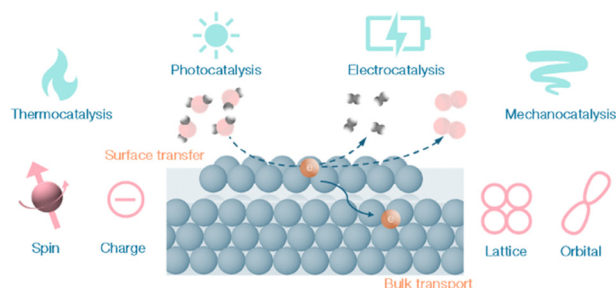


TUTORIAL REVIEWS

11423

Electron transfer in catalysis: from fundamentals to strategies

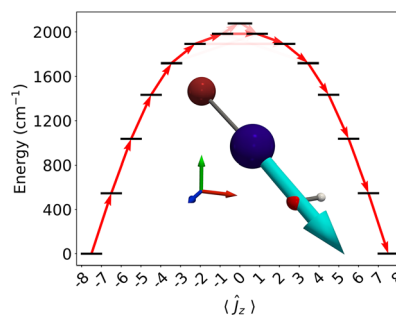
Xiaoning Li, Xinwei Guan,* Lingfeng Zhu, Hui Li, Xiaofeng Yin, Shujie Sun, Haimei Xu, Yameng Fan, Peng Li, Long Hu, Zhijun Wu, Hongge Pan, Xiaolin Wang, Zhenxiang Cheng,* Baohua Jia and Tianyi Ma*



11468

***Ab initio* electronic structure calculations of lanthanide single-molecule magnets; a practical guide**

Nicholas F. Chilton

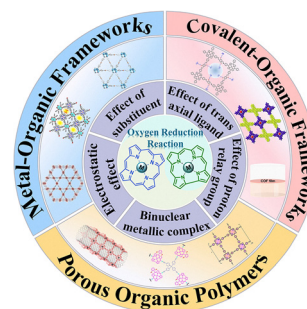


REVIEW ARTICLES

11488

Metalloporphyrin- and metallocorrole-based catalysts for the oxygen reduction reaction: from molecules to materials

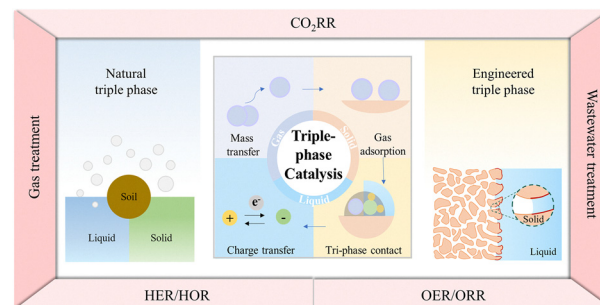
Haitao Lei,* Jinxiu Han, Qian Zhao, Jinkun Liu, Long Yan,* Wei Zhang and Rui Cao*



11545

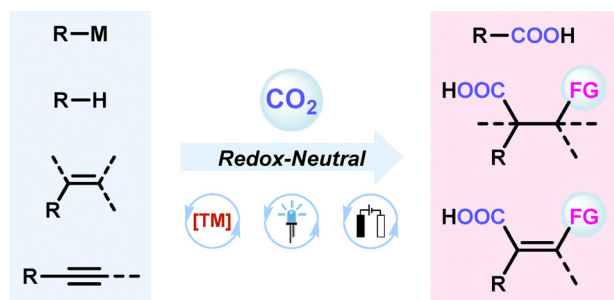
Advances in triple-phase catalysis for energy and environmental applications

Xiaoying Li, Jinwei Xu, Yusheng Ye, Baoliang Chen* and Xin Xiao*



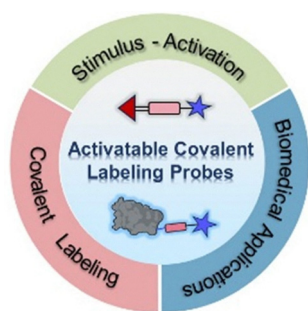
REVIEW ARTICLES

11583

**Catalytic redox-neutral carboxylation with CO_2**

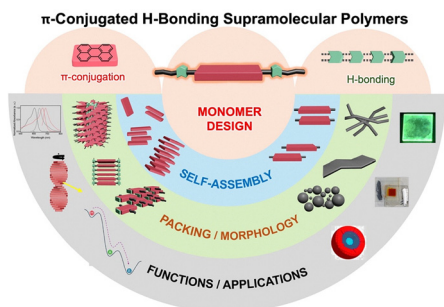
Si-Shun Yan, Tian-Yu Gao, Yi Liu, Yi-Fei Chen, Jun-Ze Zuo, Qin-Fang Zhang, Lei Song,* Wei Zhang, Jian-Heng Ye and Da-Gang Yu*

11624

**Activatable covalent labeling probes: design, mechanism, and biological applications**

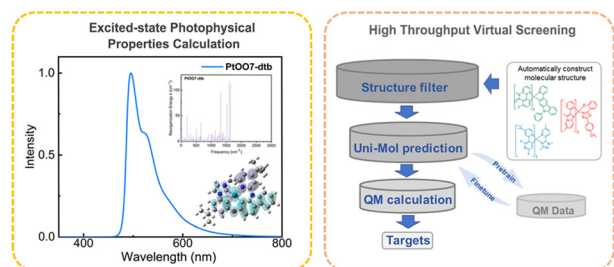
Yinxing Miao, Yuyang Tian and Deju Ye*

11659

**Hydrogen-bonded π -conjugated supramolecular polymers**

Pedro Ximenis, Daniel Martínez, Llorenç Rubert and Bartolome Soberats*

11699

Organic Luminescent Materials**Combining quantum chemistry, machine learning and rate theory for organic luminescent materials**

Rongrong Li, Qi Ou* and Zhigang Shuai*

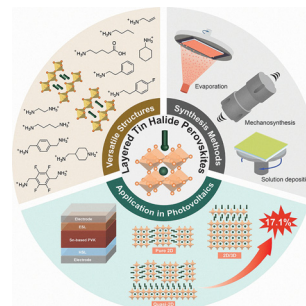


REVIEW ARTICLES

11719

Layered tin halide perovskites in photovoltaics

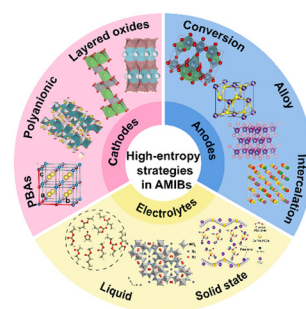
Mengqiong Zhu, Bhumika Chaudhary, Anamika Mishra, Michael Saliba and Jovana V. Milić*



11740

Recent advances in high-entropy materials for efficient alkali metal-ion batteries

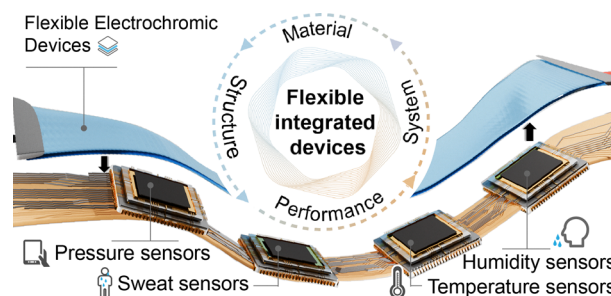
Liping Duan, Yichen Du, Yijiang Liu, Haowei Tang, Chi Zhou, Dong Ha Kim,* Zhiqun Lin* and Xiaosi Zhou*



11827

Electrochromic-based visualised flexible biosensing platforms: from single device to multifunctional device integration

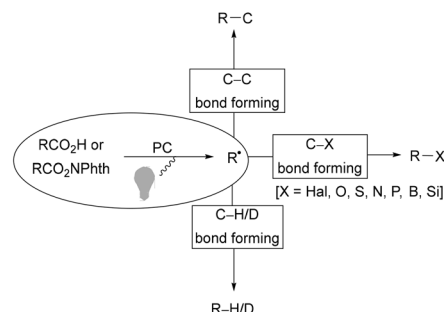
Yuxiao Zhang, Rongrong Bao, Jianbei Qiu, Yue Liu,* Zhengwen Yang* and Caofeng Pan*



11856

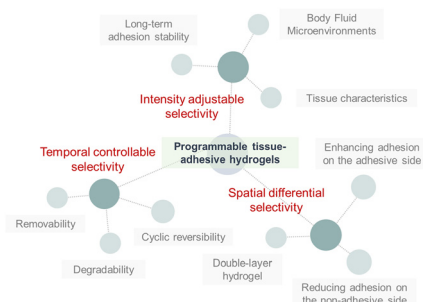
Decarboxylative photocatalytic transformations

Francisco Foubelo, Carmen Nájera,* M. Gracia Retamosa, José M. Sansano, Ana Sirvent and Miguel Yus



REVIEW ARTICLES

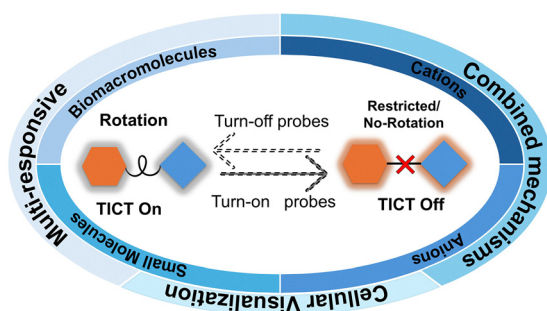
12043



Programmable tissue-adhesive hydrogels with temporal and spatial selectivity

Lei Liang, Hong Zhang, Fanglian Yao and Junjie Li*

12080



Twisted intramolecular charge transfer (TICT) based fluorescent probes and imaging agents

Yueci Wu, Han-Min Wang, Xi-Le Hu, Yi Zang, Jia Li,*
 Hai-Hao Han,* Xiao-Peng He,* Simon E. Lewis,*
 Hanafy M. Ismail* and Tony D. James*

