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EES Catalysis: embracing energy and environmental catalysis

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Welcome to the first issue of *EES Catalysis* in 2025! As we enter this new year, we reflect on the remarkable journey since our launch in 2023. With a strong year in 2024, *EES Catalysis* has grown into a dynamic platform for groundbreaking research and a thriving community dedicated to advancing energy and environmental catalysis. In this Editorial, we are excited to highlight recent achievements and share our vision for the promising future of *EES Catalysis*.

Addressing global challenges

As we step into 2025, the field of catalysis continues to be at the forefront of transformative scientific innovation, driving solutions for some of the most pressing global challenges. In response to this, we believe *EES Catalysis* is a genuinely distinctive journal which is successfully linking together a broad range of catalysis communities. The mission of *EES Catalysis* is to create an open-access platform where groundbreaking catalysis research is widely disseminated across the globe. From tackling climate change and enabling a sustainable energy transition to advancing green chemistry and novel materials development, catalysis remains pivotal in shaping a greener, more sustainable future. Therefore, our journal is the ideal platform to present cutting-edge research that will overcome the global challenges we are facing.

Publication highlights

At *EES Catalysis*, we celebrate breakthroughs rooted in both fundamental research and practical applications. Scientists across the globe continue to push the limits of knowledge, tackling the challenges of energy efficiency, environmental sustainability, and resource optimization with groundbreaking solutions.

I would like to highlight some influential works that have offered significant insights into catalytic processes and garnered widespread appreciation from the community. In the realm of material design for catalytic conversions, Xiangfeng Duan and his team published the inspiring article "Medium entropy alloy wavy nanowires as highly effective and selective alcohol oxidation reaction catalysts for energy-saving hydrogen production and alcohol upgrade" (**https://doi.org/10.1039/D4EY00090K**). This work presents a facile synthesis of medium entropy alloy catalysts for highly efficient alcohol oxidation reactions. The alloy design enhances the adsorption and desorption of intermediates, resulting in significantly improved mass activity for four-electron reactions, offering a promising pathway for efficient catalytic performance. In another notable study, Javier Pérez-Ramírez and colleagues reported the stabilization of iron atoms on defective boron nitride *via* mechanochemical activation. Their work, "Mechanochemically-derived iron atoms on defective boron nitride for stable propylene production" achieved an impressive 95% selectivity at 6% propane conversion (**https://doi.org/10.1039/D4EY00123K**). This study not only showcases a promising technology for sustainable propylene production but also promotes the broader use of mechanochemical activation as a method for synthesizing single-atom catalysts. The team around Yi Xie reported the inspiring study "Variable-valence element doping mediated photogenerated electron trapping for selective oxidation reactions" (**https://doi.org/10.1039/D4EY00024B**). Using Cu-doped Bi_2WO_6 as a proof-of-concept model, they revealed how Cu doping induces energetic disorder, enhancing exciton dissociation and carrier generation within the host system, achieving excellent performance in selective oxidation reactions.

Beyond materials development, many exciting studies have explored other critical aspects of catalysis. For example, Beatriz Roldán Cuenya and colleagues presented the study "*Operando* insights into correlating CO coverage and Cu–Au alloying with the selectivity of Au NP-decorated Cu_2O nanocubes during the electrocatalytic CO_2 reduction" (**https://doi.org/10.1039/D3EY00162H**). Using state-of-the-art *operando* techniques, such as X-ray absorption spectroscopy,

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surface-enhanced Raman spectroscopy, high-energy X-ray diffraction, and quasi *in situ* X-ray photoelectron spectroscopy, the team captured the real-time evolution of the local structure and chemical environment of catalysts. These insights are vital for understanding catalytic behavior and advancing catalyst design. In another pioneering work, Zongping Shao and colleagues introduced a dual-MOF strategy for zinc–air batteries in their study "A bi-functional air electrode developed from a dual-MOF strategy for high-performance zinc–air batteries" (**https://doi.org/10.1039/D4EY00008K**). This innovative approach combines pristine MOFs, serving as supports for oxygen evolution reaction (OER) catalysts, with carbonized MOFs that enhance oxygen reduction reaction (ORR) activity and electronic conductivity. The result is a bifunctional electrode with exceptional performance, achieving a small potential gap of 0.78 V, paving the way for next-generation battery technologies. Finally, Brian Seger and colleagues explored CO_2 conversion at the device level in their work "Insights into zero-gap CO_2 electrolysis at elevated temperatures" (**https://doi.org/10.1039/D3EY00224A**). Their findings reveal that operating at elevated temperatures significantly improves CO_2 mass transport, ionic conductivity, and water management, leading to high catalytic activity for CO_2 electroreduction. This promising approach enables CO_2 electrolysis at industrially relevant current densities, marking a significant step toward scalable carbon utilization technologies.

Going forward

As we embark on the next chapter of *EES Catalysis*, our mission to advance the frontiers of energy and environmental catalysis has never been more vital. Catalysis remains a cornerstone of scientific progress, enabling solutions to some of the most pressing challenges of our time, from sustainable energy transitions to mitigating environmental impacts.

Looking ahead, we are committed to fostering innovation and impact. The future of catalysis lies not only in refining established processes but also in exploring uncharted territories where interdisciplinary approaches merge chemistry, materials science, and engineering. By promoting such convergence, *EES Catalysis* will continue to be a platform for transformative research with real-world applications.

Our focus extends beyond the science itself. In the evolving landscape of academic publishing, we are dedicated to ensuring that the dissemination of knowledge remains inclusive, efficient, and transparent. We will strive to streamline the publication process while maintaining the highest quality standards, allowing researchers to share their findings quickly and effectively. Equally, our commitment to transparent and constructive peer review fosters a community of trust and collaboration among authors, reviewers, and readers.

As we look to the future, we are inspired by the potential of catalysis to drive sustainable change on a global scale. By gathering pivotal research and facilitating its impact, *EES Catalysis* aspires to be more than a journal – it aims to be a catalyst for progress in science, technology, and society. Together, let us harness the power of catalysis to build a better, more sustainable world.

Finally, we extend our heartfelt gratitude to our Editorial and Advisory Board members, authors, referees, and readers for their unwavering support. Your invaluable contributions have been instrumental in establishing *EES Catalysis* as a success, and we look forward to your continued collaboration as we strive to build on this foundation in the future.