Special Issue

Recent Progress in Electrocatalysis for Membrane-Driven Energy Technologies: Fuel Cells, Electrolysis, and Emerging Applications

Message from the Guest Editor

This Special Issue focuses on electrocatalysis within membrane-driven systems, highlighting recent progress in materials innovation, mechanistic understanding, and device engineering. Topics span a wide spectrum of applications, including proton exchange membrane fuel cells (PEMFCs) for clean power generation, water and CO2 electrolyzers for green hydrogen and carbon-neutral fuel production, as well as emerging electrolytic processes such as nitrogen reduction for ammonia synthesis and organic electrosynthesis. We invite contributions that address challenges in catalyst-membrane interactions, durability under industrial operating conditions, and cost-effective scaling strategies. Submissions may explore novel membrane materials (e.g., anion exchange membranes, hybrid composites), advanced characterization techniques, or system-level optimizations for integrating electrolysis with renewable energy sources. This issue aims to bridge fundamental research and industrial applications, providing a platform for researchers in chemistry, materials science, and energy engineering to share cutting-edge developments that accelerate the path toward a decarbonized future.

Guest Editor

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