Special Issue

Two-Dimensional Material-Based Membranes for Gas Capture and Separation

Message from the Guest Editors

Two-dimensional (2D) materials have long been a focal point in materials science, owing to their highly tunable chemical structures, uniform pore size distributions, and intrinsic transport pathways. Over the past two decades, the emergence of groundbreaking 2D materials—including graphene, transition metal dichalcogenides (TMDCs), layered double hydroxides (LDHs), metal nitrides/carbides (MXenes), metal–organic frameworks (MOFs), and covalent organic frameworks (COFs)—has highlighted their immense potential for nano- and atomic-level device applications.

This Special Issue aims to explore and maximize the potential of 2D materials in gas capture and separation, bridging experimental demonstrations with theoretical and simulation-based advancements. By fostering a systematic approach to employing 2D materials for efficient, low-energy membrane processes, we hope to establish a comprehensive foundation for their industrial implementation and future innovation.

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Message from the Editor-in-Chief

You are cordially invited to contribute a research article or a comprehensive review for consideration and publication in *Membranes* (ISSN 2077-0375). *Membranes* is an international, peer-reviewed open accessjournal of membrane technology published monthly online by MDPI. The journal covers the broad aspects of the science and technology of both biological and non-biological membranes, including membrane dynamics and the preparation and characterization of membranes and their applications in water, environment, energy, and food industries. Articles contributing to better understanding of transport processes in all types of membranes are also welcome. The scientific community and the general public have unlimited and free access to the content as soon as it is published. We would be pleased to welcome you as one of our authors.

Editor-in-Chief

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