Special Issue

Advanced Membrane Separation Processes: Technologies, Modelling and Applications

Message from the Guest Editors

The growing demand for efficient, sustainable separation technologies in sectors like environment, energy, health, and industry calls for advanced membrane-based solutions supported by robust modeling tools for faster scale-up and deployment. This Special Issue highlights recent progress in membrane separation processes, including experimental studies, theoretical work, multiscale modeling (e.g., CFD, pore-level transport, digital twins), and AI-driven optimization. Topics include water and wastewater treatment, desalination, gas separation, and applications in clean energy, circular economy, and biomedicine. Key areas include osmosis-based technologies (RO, FO, PRO), electromembrane processes (ED, RED, EDBM), and filtration (MF, UF, NF). We also welcome work on membrane distillation, crystallization, CO_2 capture, hydrogen separation, and biomedical uses (e.g., hemodialysis, hemofiltration). Submissions that couple experimental data with predictive models to quantify transport, assess fouling, design modules, or perform techno-economic/life-cycle assessments are encouraged. Articles, communications, and reviews on innovations in membrane science and engineering are invited.

Guest Editors

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Message from the Editor-in-Chief

As the world of science becomes ever more specialized, researchers may lose themselves in the deep forest of the ever increasing number of subfields being created. This open access journal Applied Sciences has been started to link these subfields, so researchers can cut through the forest and see the surrounding, or quite distant fields and subfields to help develop his/her own research even further with the aid of this multi-dimensional network.

Editor-in-Chief

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