

Membrane Distillation as a Promising Thermal Separation Technique for Industrial Wastewater Treatment [†]

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Abstract: Zero liquid discharge practices for chemical industries demand the treatment, recycle and reuse of continuously discharged huge volumes of wastewater every day. In the recent past, membrane distillation has been a promising thermally-driven separation technique included in the existing traditional treatment method. This paper reviews and compares the characteristics, configurations, operational parameters, pollutant feed concentrations, modules, and fouling problems observed in membrane distillation techniques used for treating wastewater from Textile, Petrochemical, Rubber industries, Concentrated Black Water, and Bilgewater. The effect of selecting hydrophobic microporous membranes on the measured rejection rate is analyzed and compared with the conventional pressure-driven membrane technique. High-purity distillates can be produced. However, for large-scale commercial applications, the design and fabrication of large-capacity equipment, optimum energy demand, mass balance for continuously changing initial pollutant concentrations remain the main challenge for future research.

Keywords: membrane distillation; wastewater; hydrophobic membrane; microporous membrane; thermal separation.

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Conflicts of Interest

The authors declare no conflict of interest.