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Review

# Ion exchange membranes: State of their development and perspective

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### Abstract

During the last 50 years, ion exchange membranes have evolved from a laboratory tool to industrial products with significant technical and commercial impact. Today ion exchange membranes are receiving considerable attention and are successfully applied for desalination of sea and brackish water and for treating industrial effluents. They are efficient tools for the concentration or separation of food and pharmaceutical products containing ionic species as well as the manufacture of basic chemical products. The evolution of an ion exchange membrane not only makes the process cleaner and more energy-efficient but also recovers useful effluents that are now going to wastes, and thus makes the development of society sustainable. Therefore, the intention of this review is to give a brief summary of the different preparation and characteristics of ion exchange membrane as well as their potential applications. The most relevant literatures

in the field are surveyed and some elucidating case studies are discussed, also accounting for the results of some research programs carried out in the author's laboratory.



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## Keywords

Ion exchange membranes; Amphoteric ion exchange membrane; Bipolar membrane; Mosaic ion exchange membranes; Hybrid ion exchange membrane; Electrodialysis

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