

## Advances in Membrane Technologies for Wastewater Treatment

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**Abstract :** This study provides a literature review of the special issue on wastewater treatment technologies, especially membrane technologies. Currently, wastewater is a serious and increasing worldwide problem with an adverse effect on the environment and living organisms. For this reason, many technologies have been developed to treat wastewater before discharging it to water bodies. We have been discussed membrane technologies to remove contaminants from wastewater such as heavy metals, dyes, pesticides, etc., which represent the main pollutants in wastewater. All the properties of these technologies including performance, economics, simplicity, and operability are also compared with other wastewater treatment technologies. The conventional water treatment technologies have the disadvantages of low separation efficiency, high energy consumption, and strict operating temperature. To overcome these difficulties, membrane technologies have been developed and used in wastewater treatment. Membrane technology uses a selectively permeable membrane to remove suspended and dissolved solids from water. This membrane is a very thin film of synthetic organic or inorganic materials, that can allow a very selective separation between a mixture and its components. Examples of membrane technologies include microfiltration (MF), ultrafiltration (UF), nanofiltration (NF), reverse osmosis (RO), electrodialysis (ED), gas separation, etc. Most of these technologies have been used extensively for the treatment of heavy metal wastewater. For instance, wastewater that contains  $\text{Cu}^{2+}$ ,  $\text{Cd}^{2+}$ ,  $\text{Pb}^{2+}$ ,  $\text{Zn}^{2+}$  was treated by ultrafiltration technology. It was shown that complete removal of metal ions could be achieved.

**Keywords :** industrial pollution, membrane technologies, metal ions, wastewater

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