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Nanofiltration Membranes for Water Purification: structure-transport relationships and applications STEVEN JONS, MOU PAUL, TAMLIN MATTHEWS, LEAELAF HAILEMARIAM, The Dow Chemical Company — Nanofiltration (NF) membranes are used for separating salts and small neutral molecules. NF membranes show unique selectivity properties compared to reverse osmosis membranes as it can selectively pass monovalent salts and neutral molecules as a function of charge and molecular weight cut-off which are dependent on membrane characteristics and operating conditions. Dow Water & Process solutions has been a pioneer in the membrane based water purification field and Dow's role was instrumental in developing several NF membranes for different applications. However, the characterization of NF membranes and hence the development of structure-property relationship is challenging due to the nanoscale thin, crosslinked nature of the membrane. Recently significant efforts were employed to develop analytical capabilities to understand polymer structure and composition and it had been possible to achieve a structure-property relationship for NF membranes. This paper will highlight similar relationships and will also focus on the relationships of membrane structure with membrane transport properties and how this relationship influences products for different application areas such as in oil field, sweetener and minimum liquid discharge etc.

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