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Vibrational Analysis of Aromatic Polyamide Reverse Osmosis Membranes

Aromatic polyamide reverse osmosis (RO) membranes that possess a high salt rejection rate of over 99 % are presently the most widely used desalination method. However, membrane fouling and high operational pressure is incurring the running cost of filtration plants, preventing further spread of this technology. To provide insight that would lead to better design of RO membranes, weight averaged vibrational analysis method developed by us is used on model RO membranes constructed by molecular dynamics simulation. With this method, we obtain the IR spectra of RO membranes at various moisture conditions. This allows the investigation of how water and polyamides interact inside the RO membranes and assignment of IR spectra obtained experimentally from commercial filtration membranes, which offers insight into the mechanism and factors that determine membrane filtration properties.