

Simple method for measuring diffusion coefficient using membrane filtration

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Diffusion coefficient is of great importance for researches related to solution dynamics. However, diffusion coefficient of unfamiliar solutes are usually not known. It is difficult for researchers to measure it due to complexity and expensive devices of existing methods. There are some prediction methods which make it easier to estimate diffusion coefficient. But they often do not represent the real diffusive behavior. Therefore, a new simple method for obtaining diffusion coefficient by using membrane filtration is suggested. By fixing the permeate flux of the membrane, and knowing the pure water permeability and structural parameter of the membrane, the diffusive and convective behavior happening inside the support layer of the membrane can be easily expressed. With simple calculation, the diffusion coefficient is measured in fast and precise manner. Another advantage of this method is that diffusion coefficients for different concentrations can be obtained in one experiment. Furthermore, this method is expected to measure the diffusion coefficient of mixtures, and also other values such as magnitude of concentration polarization.