

عنوان مقاله:

A comparison between Free volume and group contribution predictive mass transfer models for gas separation through polysulfone membrane

محل انتشار:

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خلاصه مقاله:

Over the past decade or more an extensive amount of data on the permeation of gases such as helium, hydrogen, oxygen, nitrogen, methane, and carbon dioxide in a wide array of glassy polymers has been published. Much of this work has been motivated by the search for materials with high permeability and high selectivity for potential use as gas separation membranes. This paper attempts to develop a method for correlating this data in a way that permits prediction of permeability behavior of other polymer structures. The method used involves an empirical modification of a free volume scheme that has been used in the past with some success. The previous method requires an experimental density of the polymer and an estimate of occupied volume from a group contribution method developed by Bondi. The non-equilibrium lattice fluid (NELF) theory was employed for prediction of the gas sorption. The NELF model and the group contribution model are also validated through a comparison with the experimental data obtained from the report of Nabati et al. The results revealed that the NELF model enables to predict the sorption behavior of N₂, O₂, CO₂ and CH₄ into the polysulfone membrane and the predicted sorption values were in very good agreement with experimental results and the group contribution model has shown a better agreement with the experimental data comparing to FFV model.

کلمات کلیدی:

Permeability, Glassy polymer membrane, NELF theory, Group contribution method

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