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传递现象

高压乙醇中的无限稀释扩散系数:实验测定与模型评价

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摘要

关键词 高压乙醇 扩散系数 Taylor分散技术 苯 甲苯 萘 吡啶 对硝基苯胺

分类号

INFINITE DIFFUSION COEFFICIENTS IN HIGH-PRESSURE ETHANOL:EXPERIMENTAL MEASUREMENT AND MODEL EVALUATION

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Abstract

The infinite diffusion coefficients of benzene, toluene, naphthalene, pyridine and p-nitroaniline in ethanol were measured by Taylor dispersion technique under 313—473 K and 0—16 MPa.The measurement accuracy of the established apparatus was first checked.The measured diffusion coefficient of the five organic solutes in ethanol did not change with pressure at low temperature, but it was significantly reduced with pressure increase when the temperature is higher than 373 K.Of the correlations available for polar solvents,the modified Wilke-Chang equation,the Yang-Zhang equation as well as the He-Yu equation were used to calculate the infinite diffusion coefficient. At low temperature, the three equations all agreed well with experimental results for both polar and non-polar solutes.However, the prediction accuracy was decreased sharply when the temperature was higher than 373 K, where the association factor of the solvent was varied with temperature as well as pressure.

Key words high-pressure ethanol diffusion coefficient Taylor dispersion technique benzene toluene naphthalene pyridine *p*-nitroaniline

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