

# **Diffusivities of Methane, Propane, and Propylene in Trihexyltetradecylphosphonium Bis(2, 4,4-Trimethylpentyl)Phosphinate**

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Ionic liquids have attracted much attention of researchers over the whole world due to their advantages including negligible vapor pressure near ambient temperature, high stability, high solubility for gases, and adjustable properties [1]. These advantages make them promising candidates to replace volatile organic compounds in gas separation. Experimental results show that trihexyltetradecylphosphonium bis(2, 4,4-trimethylpentyl)phosphinate ([P14666][TMPP]) has very high solubilities for methane, ethane, ethylene, propane, and propylene and has higher solubility for paraffins than for olefins.[2] The dissolution behavior of gases in a solvent is important for choosing the solvent and for design of the gas separation process. However, there is a lack of studies on diffusion coefficients of gases in [P14666] [TMPP]. In this work, the diffusion coefficients of methane, propane, and propylene in [P14666] [TMPP] were determined experimentally. A semi-infinite volume method was used to calculate diffusion coefficients. Experimental diffusion coefficient data were also correlated with the Wilke-Chang equation.