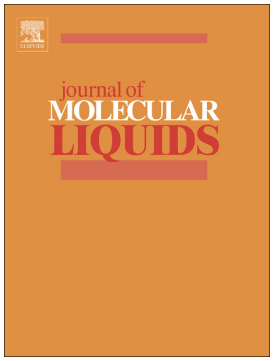

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PII: S0167-7322(17)30836-X
DOI: doi: 10.1016/j.molliq.2017.04.070
Reference: MOLLIQ 7226

To appear in: *Journal of Molecular Liquids*

Received date: 24 February 2017
Accepted date: 17 April 2017

Please cite this article as: Dana Dragoescu, Florinela Sirbu, Alexandr Shchamialiou, Talgat Khasanshin , Thermophysical properties of n-hexadecane+some alkylbenzenes binary mixtures at temperatures from 298.15K to 318.15K and atmospheric pressure. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Molliq(2017), doi: 10.1016/j.molliq.2017.04.070

Thermophysical properties of *n*-hexadecane + some alkylbenzenes binary mixtures at temperatures from 298.15 K to 318.15 K and atmospheric pressure

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Abstract

The thermophysical properties (densities, speeds of sound, refractive indices, and viscosities) for the binary mixtures of *n*-hexadecane with two aromatic hydrocarbons (*iso*-propylbenzene and *tert*-butylbenzene) were measured over the entire range of composition, at several temperatures from (298.15 to 318.15) K and atmospheric pressure, p = 0.1 MPa.

From the experimental results, the excess molar volumes, the isentropic compressibilities, the excess isentropic compressibilities, the deviation in refractive indices, the molar refractions, the excess molar refractions, and the deviation in viscosities were calculated.

A Redlich−Kister polynomial equation was applied in order to correlate the calculated excess and deviations properties of the binary mixtures with composition and the correlation parameters were estimated.

The ability of different theoretical (n,ρ) mixing rules (Lorentz-Lorenz, Gladstone-Dale, Arago-Biot, Edwards and Eykman) to predict the refractive index was evaluated.

The experimental viscosities are compared with values calculated by several different equations: Grunberg–Nissan, Katti Chaudry, Hind, Dolezalek, and three-body McAllister model.

The experimental and calculated results are discussed in terms of molecular interactions and structural effects between components of mixtures.

Keywords: *n*-hexadecane, alkylbenzenes, thermophysical properties, molecular interactions

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