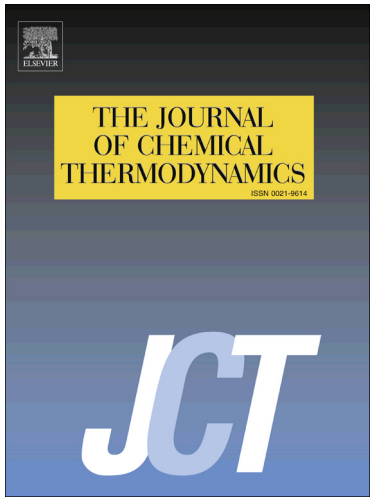

Comparative study of physical properties of binary mixtures of halogen free ionic liquids with alcohols

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PII: S0021-9614(17)30056-3
DOI: http://dx.doi.org/10.1016/j.jct.2017.02.022
Reference: YJCHT 4990

To appear in: *J. Chem. Thermodynamics*

Received Date: 5 September 2016
Revised Date: 8 February 2017
Accepted Date: 24 February 2017

Please cite this article as: K.H.A. Alkhaldi, A.S. Al-Jimaz, M.S. AlTuwaim, Comparative study of physical properties of binary mixtures of halogen free ionic liquids with alcohols, *J. Chem. Thermodynamics* (2017), doi: http://dx.doi.org/10.1016/j.jct.2017.02.022

Comparative study of physical properties of binary mixtures of halogen free ionic liquids with alcohols

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Abstract

Densities, refractive indices and speeds of sound along with their excess or deviation properties for both 1,3–dimethylimidazolium methylsulfate ([dmim][$MeSO_4$]) and 1–ethyl–3–methylimidazolium methylsulfate ([emim][$MeSO_4$]) with 1–propanol, 1–butanol and 1–pentanol over the entire range of mole fraction are reported at temperatures ranging from 298.15 K to 313.15 K and atmospheric pressure. Isentropic and excess isentropic compressibilities for both ionic liquids with 1–alcohols were calculated from the experimental results. Excess and deviation properties were further correlated using the Redlich-Kister polynomial. The measured speeds of sound were compared to the values obtained from Schaaffs' collision factor theory, Jacobson's intermolecular free length theory of solutions and Nomoto's relation. In addition, the experimentally obtained refractive indices were compared to the calculated values using Lorentz-Lorenz, Dale-Gladstone and Eykman mixing rules.

Keywords:, Density, Refractive index, Speed of sound, Ionic liquids, 1–alkanols, Binary mixtures

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