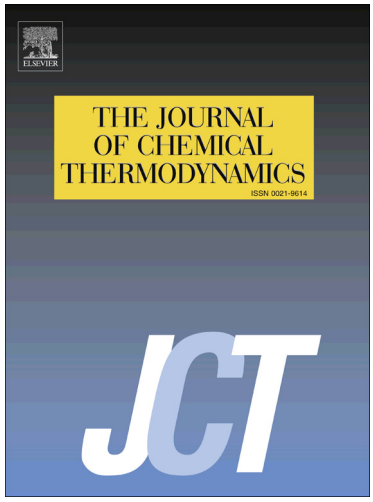

Physical properties of aqueous mixtures of (choline chloride + glucose) deep eutectic solvents

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PII: S0021-9614(18)30605-0
DOI: https://doi.org/10.1016/j.jct.2018.09.029
Reference: YJCHT 5558

To appear in: *J. Chem. Thermodynamics*

Received Date: 7 June 2018
Revised Date: 27 September 2018
Accepted Date: 28 September 2018

Please cite this article as: M. Moghimi, A. Roosta, Physical properties of aqueous mixtures of (choline chloride + glucose) deep eutectic solvents, *J. Chem. Thermodynamics* (2018), doi: https://doi.org/10.1016/j.jct.2018.09.029

Physical properties of aqueous mixtures of (choline chloride + glucose) deep eutectic solvents

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Abstract

Despite the importance of temperature-dependent density and viscosity data of ternary aqueous mixtures of DESs, experimental studies to determine these essential data have been rather limited. In the current study, the density and kinematic viscosity of the aqueous solutions of choline (chloride+glucose) DESs have been measured over the temperature range of (293.15-323.15) K and DESs concentration of about (1-10) mole%. Following the measurement of bubble temperature of the mixtures at 82.6 kPa, excess molar volumes, dynamic viscosities, viscosity deviations, and also activity coefficients of water in the mixture were calculated. In addition, suitable correlations have been proposed to represent the temperature and composition dependence of the density, kinematic viscosity and also dynamic viscosity data. All in all, the negative values of the excess molar volume, the positive values of dynamic viscosity deviation, alongside the activity coefficients with values less than unity denote negative deviation from ideality of the system studied. It was also observed that both the density and kinematic viscosity decrease with increasing temperature, while they tend to increase with higher mole fractions of DES.