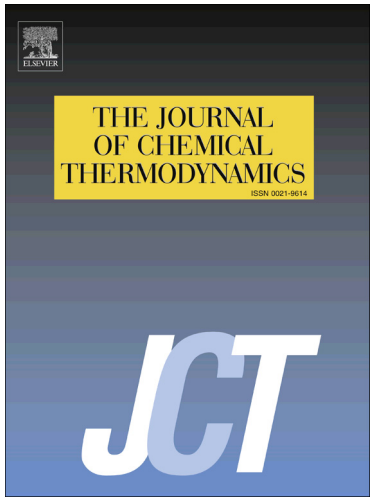
Accepted Manuscript



Thermodynamics properties of binary mixtures of aqueous solutions of glycols at several temperatures and atmospheric pressure

Heloisa Emi Hoga, Ricardo Belchior Torres, Pedro Luiz Onófrio Volpe

PII: S0021-9614(18)30117-4
DOI: https://doi.org/10.1016/j.jct.2018.02.022
Reference: YJCHT 5342

To appear in: *J. Chem. Thermodynamics*

Received Date: 29 August 2017
Revised Date: 22 February 2018
Accepted Date: 24 February 2018

Please cite this article as: H.E. Hoga, R.B. Torres, P.L.O. Volpe, Thermodynamics properties of binary mixtures of aqueous solutions of glycols at several temperatures and atmospheric pressure, *J. Chem. Thermodynamics* (2018), doi: https://doi.org/10.1016/j.jct.2018.02.022

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Thermodynamics properties of binary mixtures of aqueous solutions of glycols at several temperatures and atmospheric pressure

Heloisa Emi Hoga[1], Ricardo Belchior Torres[1], Pedro Luiz Onófrio Volpe[2]

[1]Departamento de Engenharia Química, Centro Universitário FEI, Avenida Humberto Alencar Castelo Branco, 3972, 09850-901, São Bernardo do Campo, SP, Brazil

[2] Departamento de Físico-Química, Instituto de Química, Universidade Estadual de Campinas, UNICAMP, P.O. Box 6154, 13083-970, Campinas, SP, Brazil

Abstract:

Densities (ρ), speeds of sound (u) and viscosities (η) for binary mixtures of {water + ethanol, or + ethylene glycol (EG), or + diethylene glycol (DEG), or + triethylene glycol (TEG), or + polyethylene glycol (PEG) 200, or + polyethylene glycol (PEG) 300, or + polyethylene glycol (PEG) 400, or + polyethylene glycol (PEG) 600, or + glycerol} have been determined as a function of composition at T = (293.15, 298.15, 303.15 and 308.15 K) and atmospheric pressure. From these results, excess molar volume (V_m^E), deviation in isentropic compressibility ($\Delta\kappa_S$), deviation in viscosity ($\Delta\eta$), and excess Gibbs energy of activation for viscous flow (ΔG^{*E}) were calculated and fitted by the Myers-Scott equation, as a function of mole fraction. Values of V_m^E and $\Delta\kappa_S$ were negative over the entire composition range for all mixtures studied. The values of $\Delta\eta$ were negative for the systems containing ethylene glycol and glycerol and positive for the systems containing ethanol, PEG 400 and PEG 600. For other systems, the deviation of viscosity presented an S-shape, with negative values at high water concentration. For all mixtures studied, the values of ΔG^{*E} were positive over the entire composition range. The results obtained were discussed in terms of structural effects and intermolecular interactions between like and unlike molecules.

Keywords: Glycols, ethanol, glycerol, PEGs, water, density, speed of sound, viscosity

Download English Version:

https://daneshyari.com/en/article/6659718

Download Persian Version:

https://daneshyari.com/article/6659718

Daneshyari.com