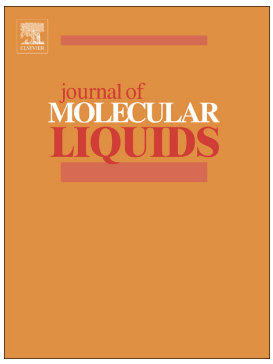

Thermodynamic and interaction studies of binary liquid mixtures on the basis of Flory's statistical theory and empirical relations

Vinay Sanguri, Rupali Sethi, Sunil, J.D. Pandey

PII: S0167-7322(18)32482-6
DOI: doi:10.1016/j.molliq.2018.09.039
Reference: MOLLIQ 9645

To appear in: *Journal of Molecular Liquids*

Received date: 13 May 2018
Revised date: 19 August 2018
Accepted date: 8 September 2018

Please cite this article as: Vinay Sanguri, Rupali Sethi, Sunil, J.D. Pandey , Thermodynamic and interaction studies of binary liquid mixtures on the basis of Flory's statistical theory and empirical relations. Molliq (2018), doi:10.1016/j.molliq.2018.09.039

Thermodynamic and interaction studies of binary liquid mixtures on the basis of Flory's statistical theory and empirical relations

Vinay Sanguri[1]*, Rupali Sethi[2], Sunil[2], J. D. Pandey[2]

[1] Department of Chemistry, S. P. M. Government Degree College, (University of Allahabad) Allahabad-211013, India

[2]Department of Chemistry, University of Allahabad, Allahabad- 211002, India

E-mail: drvsanguri@rediffmail.com

Abstract

A number of important and useful thermodynamic properties of seven binary liquid mixtures namely DPGDME + methanol, 1-propanol, 1-pentanol, 1-heptanol at 298.15K and oxolane + aniline, N-methyl aniline, N-ethyl aniline at 303.15K, 313.15K & 323.15K have been computed on the basis of the most widely accepted Flory's statistical Theory (FST). The component DPGDME is basically dipropylene glycol dimethyl ether and oxolane known as tetrahydofuran are the key ethereal liquids with which the interactions of popular solvents are analyzed. Also, some thermodynamics properties of aforesaid mixtures were calculated from the recently proposed empirical correlations using density and ultrasonic velocity. The theoretical results are compared with the experimental findings yielding quite satisfactory agreement. The results are discussed in the light of interactions operating in the systems.

Keywords: Thermodynamic properties, Binary mixtures, FST, empirical correlations, interactions.

1. Introduction

The key factor in determining the thermodynamic properties of any pure substance is the intermolecular forces viz. electrostatic forces, induction forces, chemical forces and dispersion forces prevalent between the molecules of a substance depending on the type of molecules in the vicinity of each other. The study of thermodynamic properties of mixture of pure components is intricate and cumbersome due to interaction between similar and dissimilar components which

*Corresponding author. Tel.: +91-9415253608.
E-mail address: drvsanguri@rediffmail.com (V. Sanguri).