Accepted Manuscript

Title: Volumetric Behaviour and Isentropic Compressibility of Formamide with 2-dialkylaminoethanols

Authors: Anjali Awasthi, Reetesh Srivastava, Vrijesh K. Pandey, Vikash Verma, Aashees Awasthi

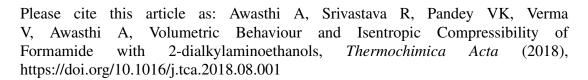
PII: S0040-6031(18)30176-X

DOI: https://doi.org/10.1016/j.tca.2018.08.001

Reference: TCA 78060

To appear in: Thermochimica Acta

Received date: 4-5-2018 Revised date: 2-8-2018 Accepted date: 3-8-2018



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ACCEPTED MANUSCRIPT

Volumetric Behaviour and Isentropic Compressibility of Formamide with dialkylaminoethanols

Anjali Awasthi¹, Reetesh Srivastava², Vrijesh K. Pandey², Vikash Verma², Aashees Awasthi^{2*}

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¹Institute of Engineering & Technology, Dr. Shakuntala Misra National Rehabilitation University, Lucknow, India

²Material Science Research Laboratory, Department of Physics, University of Lucknow, Lucknow, India

Highlights:

- 1. Hydrogen bonding occurs between FA+2-DMAE /2-DEAE molecules
- 2. Molecular association follows: FA + 2-DEAE > FA + 2-DMAE
- 3. The magnitude of κ_s^E or $K_{s,m}^E$ value follows the trend: FA+ 2-DEAE > FA + 2-DMAE.

Abstract:

The volumetric properties and isentropic compressibilities of binary mixtures of formamide (FA) with 2-dialkylaminoethanols viz. 2-dimethylaminoethanol (2-DMAE) and 2-diethylaminoethanol (2-DEAE) were evaluated over the entire composition range at 303.15, 313.15 and 323.15 K and at atmospheric pressure. The excess partial molar volumes ($\overline{V}_{m,1}^E$ and $\overline{V}_{m,2}^E$), excess isentropic compressibility (κ_s^E), excess partial molar compressions ($\overline{K}_{s,m,1}^E$ and $\overline{K}_{s,m,2}^E$) are deduced. The partial molar volumes ($\overline{V}_{m,1}^e$ and $\overline{V}_{m,2}^e$), partial molar compressions ($\overline{K}_{s,m,1}^e$ and $\overline{K}_{s,m,2}^e$), excess partial molar volumes ($\overline{V}_{m,1}^e$ and $\overline{V}_{m,2}^e$), and excess partial molar compressions ($\overline{K}_{s,m,1}^e$ and $\overline{K}_{s,m,2}^e$), at infinite dilution, over the entire composition range are also calculated. The knowledge of the volumetric properties and molar compression aids to understand specific molecular interactions existing between the FA and 2-DMAE/2-DEAE molecules of the binary system. The strength of intermolecular interactions in these mixtures follows the order: FA+2-DEAE > FA + 2-DMAE. The required experimental data are used from our earlier work on the volumetric and acoustic study published in J. Mol. Liqs. 219 186 (2016).

Keywords: partial molar volume; isentropic compression; excess properties; molecular interaction

PACS No.: 82.60Lf, 33.15Fm

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