Densities, Speeds of Sound, and Isentropic Compressiblities of Mixtures of 2-Methoxyethanol + 2-Ethoxyethanol at 293.15, 298.15, and 303.15 K

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Studies on excess functions of binary liquid mixtures have been performed in order to understand the molecular interactions between the solution components, as well as for engineering applications. This work has special relevance because the widely used poly-(ethylene glycol) is a molecule based on the chemicals studied in this work. As a continuation of our previous works [1, 2] on the thermodynamic properties of binary systems containing n-alkoxyethanols (which not only present intermolecular self-association, but also strong intramolecular effects due to the presence of -O- and -OH groups in the same molecule) with organic solvents, we present here the density and speed of sound measurements for 2-methoxyethanol 2-ethoxyethanol.

The measurements were carried out at atmospheric pressure at 293.15, 298.15, and 303.15 K. All quantities have been determined over the whole mole fraction range. The data were used to calculate excess molar volumes, V_m^E, isentropic and isothermal compressibilities, isobaric thermal expansion, and excess isochoric heat capacities using the excess molar heat capacities at constant pressure previously measured by us [3].

The ideal mixture was calculated from the expressions recommended by Benson and Kiyohara [4].

The V_m^E curves are rather symmetrical, and show positive values over the whole mole-fraction range. V_m^E ($x_1 = 0.5$) hardly increases with the temperature. It was noticed that the excess properties are very small. This is due to the fact that the different contributions cancel each other out.

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