

High-Pressure Density of Binary Mixtures of 2-(Dimethylamino)Ethyl Methacrylate + Alcohols

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The knowledge of the thermodynamic properties of non-electrolyte solution is required in many chemical engineering calculations involving fluid flow, heat and mass transfer. Moreover, there is interest in using volumetric properties data to test molecular theory and models of solution. As a continuation of our study involving alcohols, in the present work, densities of binary mixture of 2-(dimethylamino)ethyl methacrylate + methanol, or + ethanol, or + 1-propanol, or + 1-butanol have been determined as a function of composition at 298.15 K in a pressure range from (0.1 to 35) MPa. Both pure liquid and mixture densities were measured using a vibrating tube Anton Paar DMA 4500 densimeter, connected to an external Anton Paar HP high-pressure measuring cell, which enables density measurements up to 70 MPa. Excess molar volumes were calculated from the data and fit to the Redlich–Kister equation. The values are negative over the entire composition range for all investigated systems and the negative deviation follows the order: methanol > ethanol > 1-propanol > 1-butanol. For all studied systems, the negatives values of excess molar volume decreases with increasing in pressure of the mixtures. The results obtained are discussed in terms of intermolecular interactions, particularly hydrogen-bonding interactions between like and unlike molecules.