

Thermodynamics of Mixtures Containing a Strongly Polar Compound Part VIII: Liquid-Liquid Equilibria for N,N-Dialkylamide + Selected N-Alkanes

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We are engaged in a systematic investigation of the thermodynamic properties of mixtures containing a compound with a very high dipolar moment in the gas phase [1].

Amides, amino acids, peptides, and their derivatives are of interest because they are simple models in biochemistry. N-methylformamide possesses the basic (-CO) and acidic (-NH) groups of the very common in nature peptide bond. Proteins are polymers of amino acids linked to each other by peptide bonds. Cyclic amides are also of importance because they are related to structural problems in biochemistry. Consequently, the understanding of liquid mixtures involving the amide functional group is necessary as a first step to a better knowledge of complex molecules of biological interest.

As a continuation of our investigations on mixtures involving amides [2], we report here liquid-liquid equilibria curves for dimethylformamide with hexane, heptane, octane, or nonane. Liquid-liquid equilibria for dimethylformamide with decane [3], hexadecane [4], methylcyclohexane [5], or 2-methylpentane [6] are available in the literature.

The coexistence curves were determined visually. All of the curves show an upper critical solution temperature (UCST) with a rather horizontal top, and their symmetry depends on the size of the n-alkane. The UCST increases with the length chain of the n-alkane; the same behavior is observed in mixtures of n-alkanes with dimethylacetamide. The curves are progressively skewed to high values of the molar fraction of dimethylformamide when the chain length of the alkane increases.

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