Liquid-Liquid Equilibria for Binary Systems Containing Sulfolane + Alkanes

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Because BTX (benzene, toluene and xylene) are carcinogenic chemicals, extraction of aromatics from refomate is important in making high-quality gasoline. Also, the aromatics hydrocarbon extraction process is important because of the large use of these compounds in several processes. Many solvents such as sulfolane, N-methylpyrrolidone, glycol, and N-formylmorpholine are used to extract aromatics such as benzene, toluene, and xylene from hydrocarbon mixtures. Sulfolane is one of the most appropriate solvents for this separation due to its properties. The sulfolane extractive distillation process is one of the processes used generally for separating aromatics from reformates. The operating cost and initial equipment cost of the overall plant can be reduced by optimization of the feed to solvent ratio. For this optimization, liquid–liquid equilibrium data for systems including nonaromatics and sulfolane are needed. Liquid-liquid equilibrium (LLE) data were measured for four binary systems containing sulfolane and alkanes (pentane, hexane, heptane, and octane) within a wide temperature range using circulation-type equipment with an equilibrium view cell. The compositions of the two-liquid phases were analyzed by on-line gas chromatography with TCD. The binary liquid-liquid equilibrium data were correlated with the NRTL and UNIQUAC equations using temperature-dependent parameters. Both models correlate the experimental data well.