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Extraction Equilibria of Nicotinic Acid Using Alamine 300/Diluent and Conventional Solvent Systems

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Abstract: The distribution of nicotinic acid between water and Alamine 300 (tri-n-octylamine) dissolved in various (proton-donating and -accepting, polar and nonpolar) diluents, and a comparison with the extraction equilibria of pure diluent alone were studied at 298 K and a phase ratio of 1:1 (v/v). The cyclic alcohol/amine system yielded the highest synergistic extraction efficiency. The strength of the complex solvation was found to be reasonably high for halogenated aliphatic hydrocarbons and nitrobenzene, activating mainly the formation of the acid₁-amine₁ structure. The influence of the acid structure over distribution was evaluated through comparing the extractabilities of three acids containing different functional groups, i.e., nicotinic, benzoic and valeric acids. The results were correlated using versions of the mass action law, i.e., a modified Langmuir equilibrium model and a chemodel modelling approach comprising one or two acid-amine complex formation.

Key Words: Extraction equilibria, Nicotinic acid, Alamine 300, Modeling

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