

OPTIMIZED SOLVENT-FREE RECRYSTALLIZATION PURIFICATION

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Abstract

This treatment describes the details of three possible methodical procedures for determining the optimal operating conditions for the recrystallization separations of solid mixtures. One of these procedures uses traditional liquid solvents, another employs solid entrainers (i.e., solid solvents), while the third performs thermal stripping predictions that are possible without using any type of solvents. Optimization of each specific procedure is accomplished by always maximizing the calculated recovery yield of the desired solid product. Performing such calculations requires a highly reliable method for accurately determining the mutual saturated liquid phase solubility of all solutes being separated. The accuracy possible for such solubility predictions utilizing two direct methods for doing so were experimentally demonstrated with various combinations of four measured test solids in three representative liquid solvents at two different temperatures. Our procedure was then applied to optimally separate various representative mixtures of these test solids without using any liquid solvents.

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