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Acetonitrile: Ternary and Quaternary Systems

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The mutual solubility and liquid-liquid equilibria of acetonitrile ternary and quaternary systems with liquid solvents are reviewed in this document. The solvents include water, inorganic compounds, and a variety of organic compounds such as hydrocarbons, halogenated hydrocarbons, alcohols, acids, esters, and nitrogen compounds. A total of 191 ternary and 35 quaternary systems, whose properties were described in the chemical literature through 2000, are compiled. For 37 systems sufficient data were available to allow critical evaluation. All data are expressed as mass % and mole fractions as well as the originally reported units. Similar reviews of gas, liquid, and solid solubilities for other systems were published earlier in the International Union of Pure and Applied Chemistry Solubility Data Series. This is Volume 83 of the series.

www.iupac.org/publications/sds/2007/83_abstract.html

Band Broadening Function in Size Exclusion Chromatography of Polymers

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This article reviews some recent developments on the determination of the Band Broadening Function (BBF) in Size Exclusion Chromatography (SEC) of polymers. The correction for band broadening (BB) is important for quantitative determinations of the molar mass distribution (MMD) of narrow-distributed (or highly multimodal) polymers, and of derived variables such as kinetic parameters. In the narrow range of a molar mass standard, the BBF is uniform and of positive skewness. In a broad chromatographic range, the BBF is non-uniform and skewed; and it can be adequately represented by an exponentially-modified Gaussian function (EMG) of 2 parameters that vary slightly with elution volume: an increasing Gaussian variance and a decreasing exponential decay. Additionally, the total BBF variance remains almost constant if not close to the total exclusion limit. The following methods for determining BBF parameters are reviewed: a) a direct method based on assuming Poisson-distributed MMDs; b) a direct method based on measuring the mass- and molar mass chromatograms of narrow standards; c) a theoretical method based on a stochastic model that is equivalent to the Gidding-s-Eyring model; and d) a theoretical method based on a deterministic model obtained through an extension of the classical van Deemter expression. Ideally, the correction for BB requires a robust numerical inversion algorithm. However, alternative simplified solutions are also possible.

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