

Henry's Constants of Alkanols in Aqueous Mixtures (Invited)

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The Clean Air Act and the Environmental Protection Agency's Cluster Rule require information on the emission of volatile organic compounds (VOCs) from pulp and paper mills. The extent of these emissions can be estimated from a knowledge of the partitioning behavior of VOCs between air and simulated aqueous paper mill streams. The present study is concerned with the experimental determination of this partitioning behavior for methanol, a major VOC that accounts for 90% of VOC emissions in kraft mills, and other alkanols. Henry's constants of n-alkanols in aqueous solutions and in pulping spent liquors were measured at temperatures between 40o C to 90o C using a headspace gas chromatographic technique. The data were in good agreement with literature data when available. The temperature dependence of dimensionless Henry's constants was modeled with the classical van't Hoff equation and an empirical correlation was established for the dimensionless Henry's constants as a function of temperature and number of carbon atoms in the n-alkanol. Henry's constants of methanol in pulping spent liquors were correlated as a function of temperature and total solids content of the liquors. Our studies also show that laboratory data on model systems can be used to provide information on VOC emissions in pulp and paper mills.