

Measurement of Solubility for Disperse Dyestuffs in Supercritical Carbon Dioxide by Using a UV-Visible Spectroscopy with Optical Fibers

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Objectives of this study are to develop experimental apparatus and technique for measuring of solubility in supercritical carbon dioxide and to measure and correlate the solubility of dyestuffs in supercritical carbon dioxide. Investigation of searching calibration solvents for carbon dioxide from various calibration curves of dyestuffs in organic solvents was performed. Disperse dyestuffs used in this study are E-type (DR60, DB56, DY54), S-type (DR360, DB79.1, DY114) dyestuffs. And organic solvents such as benzene, acetone and ethanol were used for the calibration of molar extinction coefficient for carbon dioxide. Molar extinction coefficients of dyestuffs in organic solvents were calculated from the slope of linear calibration curves of absorbance. And reliability of the experimental technique and apparatus was compared with the literature. Solubility of the dye C. I. Disperse Yellow 54 in supercritical carbon dioxide have been measured in the temperature range from (333.15 to 393.15) K and at pressure from (14.81 to 30.04) MPa. The results were correlated using a Multi-Fluid Nonrandom Lattice Fluid Theory (MF-NLF) equation of state.