

Title: Solubility of Red 153 and Blue 1 in Supercritical Carbon Dioxide

Author(s): Coelho, José P.¹; Stateva, Roumiana P.²

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Abstract: Solubilities of red 153, (3-[[4-[[5,6(or 6,7)-dichloro-2-benzothiazolyl]azo]phenyl]ethylamino]propanenitrile), an azo compound, and disperse blue1 (1,4,5,8-tetraaminoanthraquinone) in supercritical carbon dioxide (SC CO₂) were measured at T = (333.2 to 393.2) K over the pressure range (12.0 to 40.0) MPa by a flow type apparatus. The solubility of red 153 (0.985. 10⁻⁶ to 37.2. 10⁻⁶) in the overall region of measurements is found to be significantly higher than that of disperse blue 1 (1.12.10⁻⁷ to 4.89.10⁻⁷). The solubility behavior of disperse red 153 follows the general solubility trend displayed by disperse dyes with a crossover pressure at about 20 MPa. On the other hand, blue 1, which is a disperse anthraquinone dye, exhibits unexpected behavior not recorded previously there is no crossover pressure at the temperature and pressure ranges studied, and the dye's solubility at T = 333.2 K practically does not increase with pressure. To the best of our knowledge, there are no previous measurements of blue 1 solubility in SC CO₂ reported in the literature. The experimental data were correlated by using the Soave Redlich Kwong equation of state (EoS) with the one-fluid van der Waals mixing rule, and an acceptable correlation of the solubility data for both dyes was obtained.

KeyWords Plus: Disperse Dyes; Anthraquinone Dyes; Density

Reprint Address: Coelho, JP (reprint author), ISEL, Chem Engr & Biotechnol Res Ctr, Lisbon, Portugal.

Addresses:

1. ISEL, Chem Engr & Biotechnol Res Ctr, Lisbon, Portugal
2. Bulgarian Acad Sci, Inst Chem Engr, Sofia 1113, Bulgaria

E-mail Address: jcoelho@deq.isel.ipl.pt

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