

Phase Behavior of Polystyrene in Dimethyl Ether and Dimethyl Ether + Carbon Dioxide

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The conventional analog print toner displayed only white and black colors, however, the digital printer toner is required to express full-color and to have a high-resolution. Therefore, in producing fine particle of the toner, it is very important to control comparatively uniform toner particle shape and size. For this reason, the methods such as RESS and SAS using supercritical fluids is used actively to produce fine particles. For making fine particles of digital printer toner, the solubility data is requisite, and these are obtained by measuring a cloud point pressure of this mixture. In this work, polystyrene was selected as a polymer of toner, and dimethyl ether and CO₂ were used as a solvent and a co-solvent. The cloud point pressures of PS in DME were measured with concentrations of PS, and those of PS in DME+ CO₂ were measured with the composition of CO₂ in DME. PS is soluble in DME well, and the cloud point pressure of PS increased proportionally to the amount of CO₂ added at the same temperature. According to this result, it was known that CO₂ could be used as an anti-solvent, and the cloud point of PS could be controlled by changing the concentration of CO₂.