

Dispersion Polymerization of Cross-linked PMMA in Supercritical Carbon Dioxide

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The use of supercritical CO₂ (scCO₂) as a solvent for polymerization is attractive because the product may be easily collected from solution after processing. In supercritical fluid, polymers are swollen and plasticized. Therefore, the removal of residual monomers, mixing of additives, and formation of foams may be easily achieved in supercritical fluid. Also, polymerization rate is promoted as the diffusion of monomer in the polymer particle is enhanced due to the plasticization.

Monodispersed polymer particles of micron-size are applied in many industrial fields such as biomedical application, liquid chromatographic fillers, standard calibration, ink additives, coatings and spacer of LCD panel, etc.. Recently, Desimone and Howdle et al. suggested that dispersion polymerization in supercritical fluid is especially useful for many industrial applications because of the simplicity of the separation process. We investigated dispersion polymerization of cross-linked PMMA using various cross-linking agents in scCO₂. We studied the effect of reaction condition on the size, morphology, and thermal property of cross linked PMMA particles.