

Dispersion polymerization of PMMA using poly(HDFDMA-*co*-MMA) as the stabilizer in supercritical carbon dioxide

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Recently, scCO₂ is used as a more environmentally friendly alternative to traditional solvents in polymerization. Unique properties of the scCO₂ such as large solubility and high mass transfer rates provide advantages in dispersion polymerization of various kinds of monomers. Mainly, the silicone and amorphous fluorinated polymer surfactants have been reported as successful stabilizers for the dispersion polymerization in scCO₂. In this study, copolymers of HDFDMA and MMA were synthesized in scCO₂ with varying HDFDMA/MMA ratios. To confirm the structure and to determine the composition of the resulting copolymers, ¹H-NMR and FT-IR were used. And its phase behavior in CO₂ system was measured using a variable volume cell in order to check the solubility at polymerization conditions. After that, dispersion polymerization of MMA in scCO₂ was performed using AIBN as the initiator and poly(HDFDMA-*co*-MMA) as the stabilizer. The resulting PMMA particles were compared with the previous result of our group, in this case, PMMA particles which were polymerized using poly(HDFDMA) homopolymer as the stabilizer.