

High Pressure Phase Behavior of Carbon dioxide + heptadecafluorodecyl (meth)acrylate + poly[heptadecafluorodecyl (meth)acrylate]

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Most fluoropolymers were insoluble in many organic solvents except CFCs. But CFCs have many environmental problems, so it is necessary to substitute solvent for processing of fluoropolymers. For the homogeneous radical polymerization, monomer and polymer must be dissolved in supercritical carbon dioxide at given condition. Therefore, understanding and predicting the phase behavior of carbon dioxide + fluorinated acrylic ester monomer + fluorinated acrylic ester polymer system is important.

In this study, we measured cloud point pressure using a variable volume view cell for the ternary systems of Carbon dioxide + heptadecafluorodecyl (meth)acrylate + poly[heptadecafluorodecyl (meth)acrylate] at temperature from 300 to 380K and pressure up to 300bar. We changed polymer concentration, monomer concentration and molecular weights of polymer for these experiments. In these cases, typical LCST behavior was observed. And liquid-liquid-vapor transition was observed at high monomer concentration.