

## Polymerization and Impregnation for Drug-Polymeric System in Supercritical Carbon Dioxide

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Supercritical carbon dioxide is considered as a useful alternative of toxic or volatile organic solvents for polymer synthesis and processing. Main advantages to use scCO<sub>2</sub> as a solvent are that it is less-toxic, non-flammable, chemically inert and naturally abundant than many other organic solvents.

We carried out polymerization of various monomers (*N*-isopropylacrylamide, *N*-vinyl-2-pyrrolidone, methyl methacrylate and so on.) using dispersion polymerization methods in supercritical carbon dioxide with fluorinated dispersant. The polymerizations were prepared in scCO<sub>2</sub> at various monomer and dispersant concentration, and temperature and pressure ranges.

The fluorinated dispersant used in dispersion polymerization was removed with supercritical carbon dioxide and reused. Dispersant and solvent free sphere polymeric particle was used to be matrix for drug delivery system. The model drugs were ibuprofen and acetaminophen. Then, supercritical carbon dioxide was used to be a solvent for impregnation of drugs into the spherical polymer.