Preparation of thermo responsive polymer particles with potential use in drug delivery system

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Poly(*N*-isopropylacrylamide) (PNIPPAm) is a temperature-responsive polymer with numerous potential applications in many fields, such as biomaterials, drug delivery systems, biocatalysts, biosensing as well as enzyme immobilization, among others. PNIPPAm has been widely studied as an "intelligent" and "switchable" material with a low critical solution temperature (LCST) or volume phase transition temperature (VPTT) in an aqueous phase of ~32 ºC. We carried out homo and crosslinking polymerization of *N*-isopropylacrylamide using dispersion polymerization methods in supercritical carbon dioxide ($scCO_2$) with fluorine or siloxane based dispersant. After polymerization, the dispersant was removed with $scCO_2$. Dispersant and solvent free sphere polymeric particle was used to be matrix for drug delivery system. The model drug was Ibuprofen. Then, $scCO_2$ was used as an enhancer for impregnation of drugs into the spherical polymer.