

Soxhlet extraction using carbon dioxide to remove surfactant from polymer particles

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Carbon dioxide (CO₂) is considered as a useful alternative of toxic or volatile organic solvents in many different fields of industrial such as separation processes, particle forming, cleaning, synthesis and modification of polymers and organic reactions. The use of CO₂ as extraction solvent has been studied at many other groups in the last two decades. Main advantages to use scCO₂ as extraction medium are that it is non-flammable, chemically inert and naturally abundant than many other organic solvents.

In this study, surfactants (fluorine and siloxane-based) were extracted using carbon dioxide from spherical poly (methyl methacrylate) [PMMA] particles which were polymerized using PHDFDMA (poly(3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-Heptadecafluorodecy methacrylate)) as stabilizer in scCO₂ and poly(2-hydroxyalkyl methacrylate) particles which were synthesized with PDMS-g-pyrrolidonecarboxylic acid (commercially available stabilizer, Monasil PCA) in compressed liquid dimethyl ether (DME). Both fluorine-base surfactant (PHDFDMA) and siloxane-based surfactant (Monasil PCA) effectively removed from the polymer particles. The polymers were characterized by FE-SEM, EDS and DSC, etc.