

### Preparation of micron-size cross-linked poly(methyl methacrylate) particles by dispersion polymerization in supercritical carbon dioxide

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Supercritical fluids as the reaction medium have many advantages because they can be tuned their solvent properties over a wide range by varying pressure. Especially, supercritical carbon dioxide reverts to the gaseous state on depressurization, greatly simplifying the separation of solvent from solute.

There have been strong demands for highly cross-linked polymer particles with superior heat resistance and solvent resistance to serve as various spacer, slip property improvers for plastic films, and so on.

Herein, cross-linked PMMA particles were prepared by dispersion polymerization in scCO<sub>2</sub> in the presence of poly(heptadecafluorodecyl methacrylate) and 2,2'-azobis(isobutyronitrile) as the dispersant and the initiator respectively at 70°C, 300bar and 24hours. Poly(HDFDMA) was synthesized by solution polymerization in scCO<sub>2</sub>. Ethylene glycol dimethacrylate and 1,4-buthanediol diacrylate were used as the cross-linking agent. We investigated the effect of the kinds and the concentration of the cross-linking agent on the polymer morphology, size and the cross-linking density of polymer particles.