

Sorption and diffusion of carbon dioxide in spherical polymer particles

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Supercritical carbon dioxide is considered as a useful alternative of toxic or volatile organic solvents for polymer synthesis and processing. The use of supercritical carbon dioxide as a solvent offers the possibility to develop clean and environmental friendly processes for the drug delivery system. Supercritical carbon dioxide has excellent plasticizing properties and can swell most polymeric matrix. Biologically active or medical and cosmetic ingredients which were weak to thermal system can be impregnated into polymer without interference on the activity of the active substance because of mild experimental condition of supercritical carbon dioxide. Then, sorption and diffusion properties of carbon dioxide into polymer are very important. Sorption of carbon dioxide and swelling of polymer by sorption of carbon dioxide are enhanced to impregnate of some ingredients into polymer matrix.

Spherical polymer particles are synthesized in supercritical carbon dioxide using the dispersion polymerization method. Sorption of polymer is measured with gravimetric method at various time, pressure and temperature. The amounts of sorption and diffusion coefficient as shapes of sample (powder or film) are greatly varied.