Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Light Scattering Study of a fluorinated Alkyl Methacrylate Polymer in Carbon Dioxide JI GUO, APS, ACS, JOSEPH M. DESIMONE, MICHAEL RUBINSTEIN — The solution properties of fluorinated homopolymers in liquid and supercritical carbon dioxide were studied by light scattering. Poly(fluoroalkyl methacrylate) samples were fractionated by carbon dioxide (CO_2) to achieve narrow polydispersity and the refractive index of each sample in CO_2 was measured with a high pressure optical setup. Molecular weight, size, and interaction parameters of the polymer dissolved in CO_2 were studied as a function of temperature and CO_2 density using both static and dynamic light scattering. The solvent quality of CO_2 was shown to quantitatively improve with temperature and CO_2 density. We observed both θ-temperature and θ-density for poly(fluoroalkyl methacrylate) in CO_2. The hydrodynamic radius was found to increase with the temperature and density of CO_2. We demonstrate that the second virial coefficient of the polymer in CO_2 can be expressed in terms of the universal interaction parameter in the good solvent regime. This confirms that polymers in CO_2 have the same universal behavior as in organic solvents.

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Date submitted: 01 Dec 2004 Electronic form version 1.4