

Abstract Submitted
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Miscibility of Polymers in Supercritical Carbon Dioxide JEFFREY DEFELICE, JANE LIPSON, Dartmouth College — We have developed a simple model that allows us to correlate underlying thermodynamic behavior with trends in miscibility, which we have applied to mixtures of polymers and supercritical carbon dioxide (scCO₂). scCO₂ is considered a “green” solvent, making it an attractive choice over familiar organic solvents. Experimental cloud point investigations have determined the miscibility of a diverse array of polymers in scCO₂. Properties of these polymers such as fluorination, alkyl group size, and molecular weight have a strong effect on mixture miscibility. Although polymer/scCO₂ mixtures have been modeled with some success in the past, the ability of an equation of state (EOS) to make accurate predictions has yet to be demonstrated. We have used a simple EOS to study several of these mixtures. We draw insight from the trends observed via our parameterization of pure component experimental data and discuss how the use of pure component information, alone, leads us to predictions about mixture behavior. This will ultimately aid in our understanding of what is controlling polymer miscibility in scCO₂.

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