

PHASE BEHAVIOR OF THE BIODEGRADABLE POLY(LACTIDE-CO-GLYCOLIDE) SOLUTION IN SUPERCRITICAL FLUID SOLVENTS

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ABSTRACT :

Experimental data of high pressure phase behavior between 35 and 105 °C and pressures up to 2500 bar are presented for poly(lactic acid) and poly(lactide-co-glycolide)₁₅ (PLGA₁₅), PLGA₂₅, and PLGA₅₀ in supercritical carbon dioxide, trifluoromethane (CHF₃), and chlorodifluoromethane(CHClF₂). Poly(lactic acid) dissolves in carbon dioxide at pressures near 1250 bar, in CHF₃ does at pressures of 500 to 750 bar, and in CHClF₂ at pressures of 30-145 bar. As glycolide (GA) is added to the backbone of PLGA, the cloud point pressure increases by 36 bar/(mol GA) in carbon dioxide, 27 bar/(mol GA) in CHF₃, and by only 3.9 bar/(mol GA) in CHClF₂. PLGA₅₀ does not dissolve in carbon dioxide up to pressures of 2500 bar whereas it is readily soluble in CHClF₂ at pressures as low as 95 bar at 40 °C. Cloud point behavior of poly(lactic acid), PLGA₁₅, and PLGA₂₅ in supercritical carbon dioxide shows the effect of glycolide content between 35 and 108 °C. Also, the effect of CHClF₂ in poly(lactic acid) - carbon dioxide system show the impact of added 6 wt%, 19 wt%, 36 wt% and 65 wt%. Also, the cloud-point behavior shows the impact of glycolide content on the phase behavior of PLA, PLGA₁₅, PLGA₂₅ and PLGA₅₀ in supercritical CHClF₂. The comparison of biodegradable polymer show the impact of the phase behavior of poly(d,l-lactide) and poly(l-lactide) in supercritical CHF₃. The phase behavior of CHF₃ as a cosolvent for 5 wt% poly(d,l-lactide)-supercritical carbon dioxide system are presented for the effect of added 10 wt% and 29 wt% to CHF₃ content.

* **Poster Presentation**

* **Topics : Thermodynamics and high pressure equilibria**