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Controlled morphology of biodegradable polymer blends SASIWIMON BUDDHIRANON, THEIN KYU, The University of Akron — Phase diagrams of biodegradable polymer blends containing poly(ε-caprolactone) (PCL) and poly(d,l-lactic acid) (PDLLA) having two different molecular weights were established by means of cloud point measurement and differential scanning calorimetry. Subsequently, the theoretical phase diagram was calculated self-consistently based on the combination of Flory-Huggins free energy for liquid-liquid phase separation and phase field free energy for crystal solidification. The phase diagrams thus obtained were LCST type or hour-glass type, which depended on molecular weight of PDLLA utilized. Guided by the phase diagram, the emerged morphology was determined as a function of blend concentration and temperature. It appears that the morphology control is feasible that ultimately affects the end-use property of PCL/PDLLA blends. A wide variety of morphology of biodegradable polymer may be developed with the porous structure and pore size to control scaffold porosity and the rate of drug delivery.

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