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Grain Growth Kinetics of AnBn Star Block Copolymers in Supercritical Carbon Dioxide XIAOCHUAN HU, SAMUEL GIDO, THOMAS RUSSELL, University of Massachusetts, HERMIS IATROU, NIKOS HADJICHRISTIDIS, University of Athens, FERASS ABUZAINA, BRUCE GARETZ, Polytechnic University — Using a series of lamellae-forming AnBn (n = 1, 2, 4, and 16) miktoarm star block copolymers, the effect of the number of arms on the grain growth kinetics has been investigated by annealing in supercritical carbon dioxide (CO2). Across this series all materials have the same A and B block molecular weight and all have the equal number (n) of each type of arm. The grain growth was monitored in real space by transmission electron microscopy, followed by subsequent micrograph image analysis. It was found that supercritical CO2 could be used to promote the grain growth of these AnBn star block copolymers at relatively low temperatures. Also, the molecular architecture was found to have a significant impact on the grain growth kinetics. The grain growth of these AnBn stars annealed in supercritical CO2 was then compared to a previously completed grain growth study of the same materials under simple thermal annealing. It was found that the grain growth kinetics for the AnBn stars with n = 2, 4, and 16 were similar for both supercritical CO2 and thermal annealing. However, the grain growth of the diblock (AnBn with n = 1) was dramatically enhanced in supercritical CO2 relative to thermal annealing.

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