

Abstract Submitted
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Effect of homopolymer additives on texture evolution in block copolymer composites HYUNG JU RYU, JANE SUN, MICHAEL BOCK-STALLER, Carnegie Mellon University — This contribution presents a systematic study of the effect of homopolymer (hP) addition on the texture evolution in block copolymer (BCP) blends. The microstructures of poly(styrene-b-isoprene) based symmetric di-BCP blended with homopolystyrene additives at various filling fraction were analyzed after different thermal annealing time. For the analysis we utilized serial electron imaging in conjunction with image reconstruction & stereological analysis. Particular emphasis was on the elucidation of the evolution of type and frequency of grain boundary (GB) formation as well as average grain size and orientation. Relative GB energies were determined from triple junction analysis. The results demonstrate that the presence of even small amount of hP impurities significantly reduce grain growth and annealing of high energy GB surfaces. This is interpreted as a consequence of selective segregation of the fillers within high energy GB regions and the associated stabilization of the GB surfaces. These results have important implication on the use of BCPs in areas ranging from plastic electronics to tunable photonic crystals.

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