

Abstract Submitted
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Phase behavior and morphology of high hard block content polyurethanes. ALBERTO SAIANI¹, The University of Manchester, JULIA S. HIGGINS², Imperial College London — We have investigated the phase behavior and morphology of a set of high hard block content polyurethanes: 50 to 100% (wt.) hard segments. Using mainly calorimetry, scattering and microscopy techniques we were able to elucidate the origins of all the thermal events observed through differential scanning calorimetry. Correlating our thermodynamic work with our structural work we were able to propose a new morphological model of the structure and the phase behavior of high hard block content polyurethanes. We have shown that above 65% hard segment content the melt-quenched samples present a two-phase morphology one pure hard segment phase co-existing with a mixed phase with the same hard segment content of 65% for all samples. When annealed at high temperature the mixed phase undergoes phase separation resulting in the same phase-separated mesophase. This model allowed us to account for our small angle X-ray experiments that showed a single scattering peak at the same position for all the samples.

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