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Phase Separation of Model Segmented Poly(Carbonate Urethanes) REBECA HERNANDEZ, ELENA HUNG, JAMES RUNT, Department of Materials Science and Engineering, Penn State University — The present paper focuses on the phase separated morphology and segment demixing of model poly(carbonate urethanes) [PCU] with hard segment contents ranging from 30 – 65% and soft segments composed of 1,6 poly(hexamethylene carbonate) [MW = 1K]. Hard segments were formed from 4,4'-methylenediphenyl diisocyanate and 1,4 butanediol. This family of materials represents a recent approach in the development of polyurethanes with improved long-term biostability, and is under clinical investigation in a number of biomedical devices. Only a single glass transition temperature was observed for each copolymer, increasing in temperature with increasing hard segment content. However, loss spectra from dynamic mechanical analysis showed clear evidence of two mixed phases. The results of small-angle X-ray scattering and tapping mode AFM experiments were consistent with these observations and will be discussed. Finally, these results will be compared with initial findings on phase separation in another family of polyurethane copolymers of current interest as blood-contact materials in biomedical devices having mixed poly(dimethylsiloxane) – poly(hexamethyleneoxide) soft segments.

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