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A Comparative Study of Microphase Separation of Polyurethane Multiblock Copolymers with Different Soft Segment Chemistries. REBECA HERNANDEZ, CSIC Madrid, TAEYI CHOI, Penn State University, JADWIGA WEKSLER, AJAY PADSALGIKAR, AorTech Biomaterials, LICHONG XU, CHRISTOPHER SIEDLECKI, JAMES RUNT, Penn State University — We focus in this study on three series of chemically well-defined polyurethanes (PUs) with the same hard segments (MDI-BDO) but different soft segment chemistries of interest in biomedical applications: 1000 g/mol aliphatic polycarbonate, polytetramethylenoxide and a mixed macrodiol of polydimethylsiloxane (PDMS) and polyhexamethylenoxide. Using quantitative small-angle X-ray scattering we demonstrate that the degree of hard/soft segment demixing varies greatly between the materials. For example, the PDMS-based copolymers exhibit a three phase, core-shell morphology, while the other copolymers exhibit a typical two phase structure. Additional analysis was conducted with a number of experimental probes including FTIR to assess inter- and intracomponent hydrogen bonding, and tapping mode AFM to characterize the nanoscale morphology.

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