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Influence of Thermal History on Microphase Separation and Morphology of Elastomeric Polyureas[1] JAMES RUNT, ALICIA CASTAGNA, AUTCHARA PANGON, Department of Materials Science and Eng, Penn State University — Polyureas are versatile elastomers consisting of alternating soft and hard segments. These polymers tend to form a nanophase-segregated morphology consisting of high aspect ratio hard domain ribbons in a low Tg matrix, the details of which are key in tailoring the unique characteristics of this family of materials. In the present work, bulk-polymerized polyureas were synthesized from a modified diphenylmethane diisocyanate and a polytetramethyleneoxide based diamine (1000 g/mol) and annealed at selected elevated temperatures. Various experimental probes (e.g. atomic force microscopy and small-angle X-ray scattering) reveal significant changes in hard domain ordering as a function of thermal history. Time-resolved synchrotron X-ray scattering was also conducted as a function of temperature to augment these findings.

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James Runt
Penn State University

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