Baroplastics

Block copolymers are macromolecules comprised of two or more chemically distinct polymers covalently bonded together. Depending on the degree of thermodynamic compatibility between the different blocks, such copolymers can either be segmentally mixed or microphase separated into microdomains. This transition can occur with decreasing temperatures, known as UDOT (Upper Disorder Order Transition) or with increasing temperature, known as LDOT (Lower Disorder Order Transition) analogous to UCST and LSCT.

The current work of the group focuses on the study of block copolymers that present strong pressure sensitive phase behavior called baroplastics. In this kind of materials the application of pressure enhances miscibility of the block components and induces a change on the temperature of the order/disorder transition. This phenomenon translates to a radical change in the rheological properties of the material that makes possible the transition from solid to liquid solely through the application of pressure. The project aims to the development of polymeric materials that could be process mainly with pressure, avoiding the use of high temperatures that cause degradation and make currently used thermoplastics unsuitable for a long recycle life.

SANS profile for 34.3 K PS-b-PHMA at 140 °C and indicated P
Selected Bibliography:


Current Support:
The Lord Foundation / Lord Corporation, and by the Seaver Institute.