

MAR17-2016-020071

Abstract for an Invited Paper
for the MAR17 Meeting of
the American Physical Society

Chimeric Plastics : a new class of thermoplastic

MARK SONNENSCHNEIN, The Dow Chemical Co.

A new class of thermoplastics (dubbed “Chimerics”) is described that exhibits a high temperature glass transition followed by high performance elastomer properties, prior to melting. These transparent materials are comprised of co-continuous phase-separated block copolymers. One block is an amorphous glass with a high glass transition temperature, and the second is a higher temperature phase transition block creating virtual thermoreversible crosslinks. The material properties are highly influenced by phase separation on the order of 10-30 nanometers. At lower temperatures the polymer reflects the sum of the block copolymer properties. As the amorphous phase glass transition is exceeded, the virtual crosslinks of the higher temperature second phase dominate the plastic properties, resulting in rubber-like elasticity.