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Crystallization Induced Structuring and Properties of CEC-P-CEC Elastomeric Multiblock Terpolymers C. GUILLERMO ALFONZO, GUILLAUME FLEURY, FRANK S. BATES, Department of Chemical Engineering and Materials Science, University of Minnesota, KIMBERLY A. CHAFFIN, Corporate Science and Technology, Medtronic, Inc. — We report the synthesis and characterization of a new class of block copolymer based thermoplastic elastomers that microphase separate in response to block crystallization. Five relatively monodisperse CEC-P-CEC block terpolymers containing glassy poly(cyclohexylethylene) (C), semi-crystalline poly(ethylene) (E) and elastomeric poly(ethylene-alt-propylene) (P) were synthesized in a heptablock architecture by anionic polymerization and catalytic hydrogenation. Microphase segregation is induced from a homogeneous state by E crystallization, resulting in a bicontinuous morphology with CEC and P sub-structures leading to a useful combination of tensile modulus, tensile strength and elastic recovery. This molecular design decouples the material processing temperature from copolymer composition and molecular weight due to a favorable combination of block-block interactions in the melt state.

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