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Renewable Pentablock Copolymers Containing Bulky Natural Rosin for Tough Bioplastics. MD ANISUR RAHMAN, MITRA S. GANEWATTA, HASALA N. LOKUPITIYA, YUAN LIANG, MORGAN STEFIK , CHUANBING TANG, University of South Carolina — Renewable polymers have received significant attention due to environmental concerns on petrochemical counterparts. One of the most abundant natural biomass is resin acids. However, most polymers derived from resin acids are low molecular weight and brittle because of the high chain entanglement molecular weight resulted from the bulky hydrophenanthrene pendant group. It is well established that the brittleness can be overcome by synthesizing multi-block copolymers with low entanglement molecular weight components. We investigated the effects of chain architecture and microdomain orientation on mechanical properties of both tri and pentablock copolymers. We synthesized rosin-containing A-B-A-B-A type pentablock and A-B-A type triblock copolymers to improve their mechanical properties. Pentablock copolymers showed higher strength and better toughness as compared to triblock copolymers, both superior to homopolymers. The greater toughness of pentablock copolymers is due to the presence of the rosin based midblock chains that act as bridging chains between two polynorbornene blocks.

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