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Thermoplastic Elastomers via polyolefin/Layered Silicate Nanocomposites SRI HARSHA KALLURU, ERIC W. COCHRAN, Iowa State University, Ames, IA — Here we report the synthesis of fully exfoliated polyolefin nanocomposites via Surface-Initiated Ring Opening Metathesis Polymerization (SI-ROMP). Montmorillonite (MMT) clay platelets were rendered hydrophobic through ion exchange with alkyl-ammonium surfactants terminated with norbornene. We were then able to form block copolymer brushes of (substituted) norbornenes and cyclopentene via SI-ROMP. Subsequent hydrogenation yielded highly crystalline polyethylene and rubbery saturated polynorbornenes, thus giving a thermoplastic elastomer. Nanocomposites were prepared with different nanofiller percentages and were characterized for morphological (XRD, TEM), thermal (TGA, DSC), and mechanical (DMA, Rheology) properties. Complete exfoliation of nanocomposites was confirmed by XRD and TEM. A fraction of the polymer brushes were subsequently removed from their substrate by reverse ion exchange and characterized in parallel with their corresponding nanocomposite analogs. In this way we were able to directly assess the role of the filler particle in the thermal properties, melt rheology, morphology, and tensile properties.

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