

Abstract Submitted  
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**Rheological Properties of a Polybutadiene/Clay Nano-Composite Crosslinked via Thiol-ene Click Chemistry** VIJESH TANNA, H. HENNING WINTER, Univ of Mass - Amherst — We have created an industrially feasible processing method to create a novel polybutadiene/clay nanocomposite. The fabrication step was designed such the final composite would be chemically crosslinked with exfoliated clay sheets dispersed randomly throughout the polymer matrix. Due to the polybutadiene's high functionality, the composite's storage modulus was shown to increase by several orders of magnitude due to crosslinking. In addition, the effect of reinforcements due to clay was shown to double the storage modulus of the composite due to the high elasticity of individual clay sheets. Surprisingly, we observed a critical crossover frequency,  $w_c$ , below which the mechanical properties, complex modulus, of the neat crosslinked polymer slightly exceed that of the composite. This transition may be due to the large lateral dimensions of the individual clay sheets, hundreds of microns, preventing a small number of crosslinks from forming. We have shown that reinforcement from both chemical crosslinks and clay significantly improves the mechanical properties of the polybutadiene/clay composite and have quantified this reinforcement over a wide range of temperatures and frequencies.

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