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Secondary Forces as a Driving Mechanism for Thermally Induced Drug Release in ROMP based Polymers CASEY KIMBALL, SHAW L. HSU, GREG TEW, University of Massachusetts Amherst — To control drug release via a thermal mechanism is important from both a fundamental and application standpoint. Traditionally, biocompatible polymers with secondary interactions in the backbone have been investigated. Instead, we have synthesized a novel poly(ethylene oxide) crosslinked Ring Opening Metathesis Polymerization based polymer comprised of a polynorbornene derived backbone with multiple substituents groups, including a tetra-ol, diamine, dicarboxylic acid and amino acid based side chains. The strength of secondary interactions based on the functional groups present plays a critical role in chain dynamics and thermal properties. DSC measurements revealed a substantial change in the thermal transitions to be as high as thirty degrees, depending on substituent group and crosslinking properties. Infrared spectroscopy has been employed to characterize the functional groups present. It has been revealed that the strength of the hydrogen bonds strongly correlated with the transition temperature. Additionally the presence of water has a perturbing effect of disrupting the hydrogen bonding network and affecting the chain dynamics of the overall crosslinked system.

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