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Polymer nanocomposite (PNC) T_g from the perspective of percolation theory JAMIE KROPKA, The University of Texas at Austin, PETER GREEN, The University of Michigan, VENKAT GANESAN, The University of Texas at Austin — A number of researchers have speculated on the connections between the liquid to glass transition and percolation concepts. Most recently, the film thickness dependence of T_g exhibited by polymers has been quantified in terms of the change in percolation threshold when transitioning from a 3D to 2D system. Here, we extend these concepts to develop a model for the behavior of PNC T_g. The placement of impurities (nanoparticles) in a lattice (polymer matrix) changes the percolation threshold of the system, which we claim can be related to a change in T_g. Specific treatments of the impurities can result in either increases or decreases in T_g relative to the pure system, and the magnitude of the changes in T_g are related to the size and shape of the lattice impurities. We discuss the details of our results for such effects and compare them to experimental observations reported for PNCs.

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