Fundamental Structure-Property Relationships of PSAs Using Rheological Characterization

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It is well understood that both the composition and architecture of a polymer affect its performance as a pressure sensitive adhesive (PSA). However, the specific relationships of chemical potential, glass transition temperature (T_g), degree of branching, crosslink type and density, and molecular weight with PSA properties are often complicated and the variables can be difficult to isolate. Rheological characterization can be used as a proxy for PSA testing in many cases to deconvolute these variables and understand the fundamental contribution of each to PSA performance. This paper will discuss the use of dynamic mechanical analysis (DMA), extensional rheology, and large-amplitude oscillatory strain (LAOS) to characterize a series of water-borne acrylic PSAs with systematically varied and well-controlled composition, T_g, and chain architecture.