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Local Relaxation Behavior and Dynamic Fragility in Hydrogen Bonded Polymer Blends¹ JAMES RUNT, Penn State University, KEVIN MASSER, Penn State University, HANQING ZHAO, PAUL PAINTER, Penn State University — The dynamics of intermolecularly hydrogen bonded polymer blends of poly(p-(hexafluoro-2-hydroxyl-2-propyl)styrene) with poly(vinyl acetate), poly(ethylene[30]-co-vinyl acetate[70]) and poly(ethylene[55]-co-vinyl acetate[45]) are investigated by broadband dielectric relaxation spectroscopy and Fourier transform infrared spectroscopy. Each blend component exhibits a glassy state (beta) relaxation, and these relaxations are affected by the formation of intermolecular associations. The glassy state behavior of the blends can be modeled using the Painter-Coleman association model. All blends exhibit a single Tg and a single dielectric segmental (alpha) relaxation, indicative of strong segmental-level coupling. The fragility of the glass-formers depends on the volume fraction of intermolecularly associated segments, and the association model predicts which compositions have the highest fragilities. A relaxation related to the breaking and reforming of hydrogen bonds is observed at temperatures above the alpha process, and its temperature dependence varies systematically with ethylene content.

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