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Characterization of aging behavior associated with multi-layered polymer laminates YING JIN, YING WU, SHAW LING HSU, University of Massachusetts, Amherst — To predict the physical stability of multilayered polymer laminates film, the underlying segmental motion of each layer needs to be characterized as a function of time and temperature. We focused on the dimensional stability of various poly(vinylidene fluoride) (PVDF) and its blends. Because of the significant density difference between the crystals formed and the amorphous phase, dimensional stability or the presence of residual stress is difficult to avoid. We have used a combination of techniques to characterize the effects of various comonomers, nucleation agents or blends on the crystallization behavior, the morphology formed and thus dimensional stability. The stress changes in polymer films were investigated as a function of temperature with the cantilever deflection approach. The volume relaxation with time is observed using density gradient column. The morphological features evolved were also analyzed. The magnitude of the residual stress was quantitatively evaluated. The time evolution reaching a stable structure was also investigated in terms of the local glass transition temperature. We further discussed the changes by adding nuclear agents in order to force the polymer films to reach equilibrium states achieving stability stable in a short time scale.

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