Statistical analysis on creep behavior of polymer composites

One of the distinctive properties of polymer material is viscoelasticity, which involves but differs from viscosity and elasticity. An exhibition of viscoelasticty, creep deformation of polymer material is a non-linear behavior dependent on material formulation, time, temperature, stress, and other factors. It is of interest (1) to evaluate the effect of different formulations on composites by characterizing their viscoelasticity and (2) to predict the long-term creep behavior of polymer material wth applications involving constant stress. Creep curves of polymer composites were analyzed with different models through non-linear regression. The models were evaluated in terms of characterization and prediction. Accelerated creep tests were conducted at higher temperatures and the curves at different temperatures were used to obtain the long-term prediction curve based on Time-Temperature Superposition (TTS).