ABSTRACT

This case study on optimization of blends with process variables shows how application of advanced tools of Design of Experiments can simultaneously optimize a mixture formulation and processing conditions, taking advantage of complex interactions in the system. The effect of recycled PET and virgin PET on tensile strength and stiffness was studied. The optimal amount of mixture components to produce maximum recycled-content products is determined. As the results of doing systematic experimentation, using mixture experiments, the quality of recycled plastic products can be improved and becomes more robust to variations at the optimal thermal operating settings. This is done through numerical optimization approaches that are available, using a mixture-process-variable simplex experimental setup to generate a predictive model of mechanical response. Then manipulating the predictive models is completed to find the "sweet spot" for both mixture and process variables.