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Influence of Exchange Reactions on the Rheology and Morphology of the Reactive Blends of Poly (Trimethylene Terephthalate) and Phenoxy Resin

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In this work, dynamic rheological response of binary blends comprised of poly (trimethylene terephthalate), PTT, and a phenoxy resin over full composition range was studied. This blend system exhibits the characteristics of a highly reacted blend in which, the amount of reaction is proportional to phenoxy content. The morphology of the blends studied by scanning electron microscopy confirmed that all of the blends, except PTT/phenoxy 90/10 which has a droplet in matrix morphology, are miscible. The fracture surfaces of the samples are of ductile type which shows that this blend system has mechanical characteristics of ductile materials and therefore is industrially interesting. Since phase separation leads to a reduction in blend's viscosity, PTT/phenoxy 90/10 has a much lower complex viscosity and shear moduli than those of other blends as well as the neat components. The exchange reactions in this blend system result in a very high complex viscosity and shear moduli in the blends with their phenoxy content higher than 10 wt% in which, the complex viscosity and shear moduli of the blends increase by increasing phenoxy content. NMR examinations were also carried out to confirm the occurrence of the exchange reactions.