

Abstract

Since the last decade, graphene nanoplatelets with their exceptional physical properties are used as fillers in thermoplastic blends. In this work, the influence of commercial graphene nanoplatelets on properties of a high density polyethylene, in solid and melt states, was investigated, in comparison with the one of organically modified montmorillonite fillers. The use of a compatibilizer, a maleic anhydride grafted polyethylene, led to a clay based nanocomposite, with some improved mechanical and rheological properties, but with disappointing mechanical properties at break. On the other hand, by reducing the viscosity during mixing, the added compatibilizer slightly lowered the degree of dispersion of high aspect ratio graphene particles, weakening the material. More interestingly, the nanocomposite constituted with both clay nanoplatelets and lamellar graphene particles exhibited better reinforcing characteristics, in melt and solid states. This result can be partially explained by the high viscosity of the clay based nanocomposite which helps in the separation of graphene particles during mixing.