

Preparation and Characterization of TPU-PP/ Cenosphere Value-Added Composite

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Abstract:

Particulate Composite is a microscopic combination of matrix and reinforcing material with a recognizable interface between them. Cenosphere is an inexpensive waste generated in bulk from thermal power station. It can be use as a reinforcing material in various composite systems. In this study, particulate composite of TPU-PP (matrix phase) and cenosphere (reinforcing phase) are prepared and extensively studied with respect to their modified and unmodified interface. Non-surface treated cenosphere has been found to get agglomerate during their blending with polymer matrix which subsequently reduces its overall performance. So, its surface was modified by 3-aminopropyl triethoxy silane coupling agent and on the other hand matrix was modified by glycidyl methacrylate (PP-g-GMA). Surface modified cenosphere and synthesized compatibilizer were functionally characterized by FTIR spectroscopy. Composites of TPU-PP/cenosphere were prepared having cenosphere concentration between 5-20% by weight. Morphological studies of all the prepared composite variants were done by scanning electron microscope. In general, composites with an improved interface found to possess enhanced mechanical, thermal & chemical properties.

Keywords : TPU (Thermoplastic polyurethane), PP (Polypropylene), Cenosphere, Particulate Composite, 3-aminopropyl triethoxy silane coupling agent, Glycidyl methacrylate