Comparative Study of Impact Strength and Fracture Morphological of Nano-CaCO3 and Nanoclay Reinforced HDPE Nanocomposites

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Abstract : The present study investigated the impact strength and fracture mechanism of nano-CaCO3 and nanoclay reinforced HDPE nanocomposites by using Charpy impact test. The nano-CaCO3 and nanoclay reinforced HDPE granules were prepared by the melt blending method using a compounder system, which consists of industrial banbury mixer, single screw extruder and granule cutting in industrial-scale. The nano-CaCO3 and nanoclay reinforced HDPE granules were molded using an injection-molding machine as plates, and then impact samples were cut by using punching die from the nanocomposite plates. As a result of impact experiments, nano-CaCO3 and nanoclay reinforced HDPE nanocomposites were determined to have lower impact energy level than neat HDPE. Also, the impact strength of HDPE further decreased by addition nanoclay compared to nano-CaCO3. The occurred fracture areas with the impact were detected by SEM examination. It is understood that fracture surface morphology changes when nano-CaCO3 and nanoclay reinforced HDPE nanocomposites.

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Keywords : charpy, HDPE, industrial scale nano-CaCO3, nanoclay, nanocomposite

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