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Study on the property of the microcellular injection molded Polyolefin/Beta Cyclodextrin composites

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Abstract: This study investigated the effects of Beta Cyclodextrin (0.5, 1, 3 wt%) on the tensile strength/thermal properties of microcellular injection molded PP/Beta Cyclodextrin and PPgMA/Beta Cyclodextrin composites. The fillers used, Beta Cyclodextrin, is micro-materials in size. The injection molding process was done by non-foam and microcellular molding. Results showed that the 0.5 wt% loading of Beta Cyclodextrin also had the best tensile strength in three different loading (0.5, 1.0, 3.0 wt%). Tensile strength is related to the filler dispersion in the matrix. Good dispersion resulted in good tensile strength. Tensile strength decreased with addition of Beta Cyclodextrin but impact strength and Young's modulus increased with increasing Beta Cyclodextrin loading. The enhancement was significantly for microcellular molding. The 5wt% Beta Cyclodextrin loading of the composites had the largest storage modulus for PP/ Beta Cyclodextrin micro-composites and 0.5 wt% Beta Cyclodextrin loading had the largest tensile strength for Beta Cyclodextrin nanocomposites. The 1 wt% of Beta Cyclodextrin loading had the highest degradation temperature for PP/Beta Cyclodextrin micro-composites and 3 wt% had the highest degradation temperature for PP/Beta Cyclodextrin nano-composites. Cell size decreased and cell density increased with addition of Beta Cyclodextrin of the PP and PPgMA composites.

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