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A STUDY ON THE INJECTION MOLDING PROCESS OF PBT/ABS BLENDS: THE CORRELATION AMONG DUCTILE-BRITTLE TRANSITION TEMPERATURE, MORPHOLOGY AND DEGRADATION

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PBT/ABS blends, prepared by co-rotational twin-screw extrusion, have been injection molded to evaluate the influence of the injection molding process on the properties, mainly impact strength and ductile-brittle transition temperature (DBTT), and morphology of the blends. The following factors, or injection molding parameters, have been studied in two levels, a lower and a higher one: injection temperature, mold temperature, holding pressure and injection speed. The test specimens necessary for performing the Izod impact strength test have been injection molded according to a two-level fractional factorial design of resolution IV with 03 center points, totalizing eleven samples. The effects of each factor, as well as, of its interactions on the properties described above have been determined and its significance has been tested. At room temperature all the samples presented excellent impact strength, around 750J/m, and no significant influence of the injection molding parameters could be detected. Concerning the DBTT, on the other hand, a major difference among the samples has been observed, with values ranging from 18°C to -3°C, a gap of 20 Celsius degrees. The statistical analysis has revealed that the mold temperature and the injection speed play an important role on this property and should be of major concern. The width of the injection molded specimens has been measured to evaluate shrinking and it has been observed that holding pressure and injection speed have a significant influence on it, as expected. The morphology of the blends has been analyzed by TEM and the degradation of both matrix and disperse phase has been investigated via FTIR.