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DEVELOPMENT OF HIGH-PERFORMANCE OF PP/PC ALLOYS

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By incorporating PC to PP, the heat resistance (HDT) is expected to be improved. From PC side, the chemical resistance and processability would be improved by blending PP. However, the high-performance PP/PC alloy has not been explored. The problem may be caused by big differences both in the melt viscosity and the polarity between PP and PC. Actually we found that, for PP rich systems (PC content < 40 wt%), the tensile properties were far below the additive values of component polymers. That is, the tensile properties were sacrificed by blending the tougher component (PC). For example, a PP/PC=80/20 (wt. ratio) blend showed a very low tensile strength (5 MPa). It was much lower than neat PP (32 MPa) and the additive value (37 MPa). For the 80/20 composition, we tried to improve the properties by changing the operation conditions of a twin-screw extruder (37 mm screw diameter); screw rotation speed (100~300 rpm), barrel temperature profile (160?~250?), and feed rate (8~27 MPa). A high-impact blend (Izod impact strength=140 kJ/m2) was successfully obtained at a particular set of operation variables. The mechanical properties were further improved by employing a reactive compatibilizer as the third component. Two-phase morphology was observed by TEM and SEM. Then, the processing condition–morphology–properties relationship is discussed for the design of high-performance PP/PC alloys.