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Blends of Polypropylene, Grafted with Acrylic Acid and Maleic Anhydride, with PA6 and its Use in Composites with Polyamide 6 by Two-component Injection Molding

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Blends of different types of polypropylenes with polyamide 6 were produced by extrusion. The polypropylenes used were a PP homopolymer, a maleic anhydride grafted homopolymer, and an acrylic acid grafted homopolymer. The blends were characterized by DSC measurements, selective extraction, infrared spectroscopy, REM microscopy, melt rheology, and its mechanical properties.

Three types of interactions in the blends as well as in two-component composites mold by the core-back process could be identified. Blends of PP with PA6 had poor mechanical properties. Its components were not compatible, and two-component bars could not be produced. Blends of PPgAA and PA6 were made compatible during reactive extrusion. Two-component bars could only be produced with a blend containing 50 % PA6. The composite formation was based on the interdiffusion of the PA6 in both components and the reactive compatibilization in the blends. Blends of PPgMAN were also compatibilized during reactive extrusion. The composite formation on two-component injection molding was based on two mechanisms: the interdiffusion at sites, where PA6 chains of both the components came into contact, and an interfacial reaction, where PPgMAN and PA6 came into contact. The interfacial reaction was supported by the high mobility of the first component at the temperature of the melt of the second component.