

Rubber/Plastic Blends Based on Devulcanized Ground Tire Rubber

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ABSTRACT: Tire and waste rubber recycling is a very important issue facing the rubber industry and science community. Compounding the ground rubber tire (GRT) with commercial polyolefins is a possible and effective way of used tire recycling which can provide new rubber/plastic blends at a much lower cost. In the present study, GRT and ultrasonically devulcanized GRT (DGRT) are incorporated into a polypropylene. In addition, DGRT is compounded and dynamically revulcanized (RGRT) in polypropylene. Compounding and dynamic revulcanization is carried out by means of a twin screw extruder and Brabender internal mixer. Sulfur and phenolic resin curing systems as well as various compatibilizers are used. Mechanical properties, rheology and morphology as well as thermal stability and melting behavior of the resulting rubber/plastic blends are studied. The obtained blends show an excellent processability along with impact strength higher than that of pure polypropylene. Among various compatibilizers and cure systems utilized, the phenolic resin cure system and maleic anhydride grafted PP compatibilizer can significantly improve the Young's modulus and tensile strength of plastic/rubber blends.

KEY WORDS: devulcanized rubber, polypropylene, dynamic vulcanization, twin screw extruder, internal mixer, compatibilizer, mechanical property, rheology and morphology.