

Thesis Title A Study of Impact Modification of Polyamide 6 Using
 Natural Rubber

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ABSTRACT

Impact modification of polyamide 6 (PA6) using local natural rubber was studied over a wide range of rubber molecular weights. Two techniques were used to prepare various molecular weight rubbers: mastication and chemical reaction with phenyl hydrazine. Ultrinox 626 was selected out of 11 types of commercial antioxidants as a suitable one for the PA6/NR blend system. The rubber particle dispersion in the PA6/TTR5L NR blends were compared for three mixing processes: 2-roll mill, Haake and Brabender internal mixers.

The PA6 was modified by addition of natural rubber over a molecular weight range of 3,000-1,200,000 to prepare blends using melt blending technique on the 2-roll mill. Good impact strength was dependent on degree of rubber dispersion and it was obtained (18 kJ/m^2) for the blend containing the rubber molecular weight of 290,000 that has the average rubber particle size of 0.24 micron.

The rheological studies of the blends were conducted and it was found that the rubber molecular weight controlled the viscosity ratio, μ of the blends. The rubber dispersions were independent on μ such that in the range of

0.6-8.7 it resulted in small average rubber particle size of 0.21-0.32 micron. The μ value close to unity resulted in good rubber dispersion and impact strength. Incorporation of 10% NR affected the drop in the heat distortion temperature (HDT) rather than the hardness of the blends.