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DYNAMIC PROPERTIES

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DISTRIBUTION IN BR/NBR BLENDS. THESIS ADVISORS: CHAKRIT
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The distribution of carbon black in BR/NBR blends was studied by the use of Dynamic Mechanical Thermal Analysis (DMTA). The study consists of three parts. In the first part, the influences of blend ratio of BR/NBR, carbon black surface area and black loading on carbon black distribution in BR/NBR blends were investigated. It has been found that the black distribution was strongly affected by blend ratio and black loading. However, the black distribution was observed to be slightly affected by the black surface area. Variation in carbon black distribution in different rubber phases influences cure properties and mechanical properties of the blends. Scorch time and cure time decrease with increasing the ratio of amount of black in BR phase to the amount of BR. Upon increasing the ratio up to 0.6, cure rate was found to increase. Above the ratio of 0.6, cure rate decreases since BR was the dispersed phase. For the mechanical properties of unfilled compounds, the blend ratio strongly affects the % of elongation at break and slightly affects tensile strength, modulus and hardness. However, in the case of filled compounds, the effect of black distribution overrides the effect of blend ratio.

In the second part, factors affecting black distribution were investigated. It was found that the effects of blend ratio and mixing sequence on black distribution in blends were more significant than the effects of viscosity difference between BR and NBR and of rubber-filler interaction.

In the final part, the effects of some additives (Struktol 60NS, Struktol WB16, Ethylene octene rubber) on black distribution in blends were determined. From the results obtained, the cure properties and mechanical properties of unfilled compounds were strongly influenced by blend ratio and loading of additives studied. Nonetheless, in the case of filled compounds, the influence of black distribution overrides those effects of blend ratio and loading of additives. Further investigation of the black distribution on the other blend systems and/or additives are recommended.