NATURAL RUBBER/BUTADIENE RUBBER BLEND SYSTEM FOR TREAD APPLICATION

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The present study deals with the cure behavior and mechanical properties of NR/BR binary blend system with a special focus on retreading application. In the present investigation, natural rubber (NR) and butadiene rubber (BR) were blended in different proportions and the improvement in mechanical properties was reported as a function of blend ratio.The performance of two grades of carbon black fillers - N220 and N330 in the above blends was also evaluated.

In the proposed NR/BR blend systems, both cure time and scorch time increased with increase in BR content. Tensile strength and abrasion loss decreased with increasing BR content whereas hardness and heat build-up increased irrespective of the type of black used. It was concluded that black filled NR/BR blends can be tailor made to meet the essential quality parameters required for on-the-road and off-the-road tread applications.

Key words: Activation energy, Blend ratio, Carbon black, NR/BR blends, Rate constant, Rubber blends

INTRODUCTION

Tyres are expected to perform for thousands of miles and retain their essential properties despite the horrendous driving habits and sometimes poorly built or maintained roads. In order to cope with different road and driving conditions tyres are engineered with complex models. A tyre consists of several components and layers, each having its own specific functions to withstand the aforementioned conditions. They consist of numerous rubber compounds, different types of carbon black, chemicals and minerals to accelerate the vulcanisation. They also consist of fabric elements and several kinds of steel for reinforcement.The performance of the pneumatic composite depends on the compounds design, construction and interaction of these components (Bennet *et al.*, 1975).

Tread is one of the most important components of a pneumatic tyre. It is the only part of the composite that comes in contact with the road and hence calls for high wear resistance, low rolling resistance, low heat buildup, low tearing and adequate traction. Thus choice of elastomers for the tread compound is of great importance in determining the best balance of properties (Lechtenboehmer *et al.*, 1990). In order to achieve viable products, polymer blends have been developed so that the mixture will have superior properties than their

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