

BLEND OF POLYBUTADIENE WITH NATURAL RUBBER LATEX MASTERBATCH

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The fillers such as carbon black and silica were incorporated in to the fresh natural rubber (NR) latex by a modified coagulation process. The coagulum containing fillers was dried in the conventional way to get latex filler masterbatches. NR/BR blend compounds were prepared by mixing the master batch with the required quantity of BR and other compounding ingredients. The compounds were vulcanized and characterized for mechanical and dynamic properties.

It was observed that blends prepared from master batches had better mechanical properties like tensile strength, modulus, tear strength, abrasion resistance, hardness and lower heat build-up compared to blends prepared using dry rubber mixing technique. As the proportion of BR in the blend increased the abrasion loss reduced while the hardness and heat build-up increased for all the blends, due to the unique micro structure of *cis*-1, 4-polybutadiene rubber. There was reduced filler-filler interaction on blending NR with BR for the blends based on masterbatches. Filler dispersion data indicated that filler dispersion was not adversely affected on blending. From the plots of $\tan \delta$ versus temperature it was observed that for the pure materbatch there was a lowering of $\tan \delta$ peak height indicating better polymer-filler interaction, compared to the mill mixed compound. The $\tan \delta$ value at 60 °C and hence the rolling resistance was lower for the 80/20 NR/BR blend prepared using the masterbatch.

Keywords: Carbon black, Latex masterbatch, Natural rubber latex, Polybutadiene rubber, Silica

INTRODUCTION

Blends based on natural rubber and polybutadiene rubber are extensively used in tyre sector due to the enhanced mechanical properties like low heat build-up, excellent abrasion resistance and low rolling resistance. Silica in combination with silane coupling agent offers reduced rolling resistance and enhanced wet traction for tyres.

However in comparison with carbon black, silica imparts lower wear resistance

and dry traction performance. Further silica is non conductive in nature and when used as single filler in tyres there can be accumulation of static electric charge. Due to these reasons silica along with carbon black, have attained great significance for tyre sector (Wang and Michael, 2009; Rothon 2002; Wang *et al.*, 2001; Donnet *et al.*, 1993). Due to filler-filler interactions existing in reinforcing fillers it is difficult to disperse them uniformly either in a single polymer or in blends. The dispersion of these fillers is the crucial parameter that controls the