

STUDIES ON BLENDS OF NATURAL RUBBER AND 1,2-POLYBUTADIENE

Baby Kuriakose, C. K. Premalatha and N. M. Mathew

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Blends having different proportions of natural rubber and thermoplastic 1,2-polybutadiene were prepared and evaluated for processing characteristics, technological properties, ageing and ozone resistance. The results indicated that the cure rate index of the blends decreased as the proportion of 1,2-polybutadiene in the blend increased. Better technological properties were obtained for the blends which contained a higher proportion of natural rubber. However, ageing and ozone resistance were better for the blends which contained a higher proportion of 1,2-polybutadiene. The reinforcing effect of silica in these blends was similar to its effect in normal rubber compounds.

Key words:—Natural rubber, Blends, 1,2-polybutadiene, Cure rate index, Ageing resistance, Ozone resistance, Silica.

Baby Kuriakose (for correspondence), C. K. Premalatha and N. M. Mathew, Rubber Research Institute of India, Kottayam-686 009, India.

INTRODUCTION

Polymer blends are usually heterogenous in nature because of the thermodynamic incompatibility between the components. At least in some cases, such as thermoplastic-elastomer blends, many useful properties result from the thermodynamic incompatibility of the components. Blending of two elastomers or an elastomer and a thermoplastic material is usually done with specific objectives such as enhancement of physical properties and improvement of resistance to the action of heat, oxygen and ozone and of processing characteristics. Blending of natural rubber (NR) or styrene-butadiene rubber (SBR) with ethylene-propylene diene rubber (EPDM) or blending of nitrile rubber with polyvinyl chloride (PVC) is reported to improve ozone resistance (Almond, 1962; Ambelang *et al.*, 1969; Buckler and Harris, 1955; Mathew, 1984, 1988).

Natural rubber has excellent physical properties and very good processing characteristics. But this polymer lacks resistance to action of heat, oxygen and ozone and hence has only limited application in areas where such conditions prevail for long periods. 1,2-polybutadiene (1,2-PB), which is a thermoplastic elastomer, offers very good processing characteristics and excellent resistance to ozone due to its crystalline nature and saturated backbone structure respectively. It can also be vulcanized with sulphur or peroxide, like natural rubber. Hence in the present study, blends of NR and 1,2-PB were prepared and evaluated for their cure characteristics, technological properties and ageing and ozone resistance.

EXPERIMENTAL

Materials

NR used for the study was ISNR 5 (light