Natural Rubber Research, 21 (1&2):38-46, 2008

DEGRADATION BEHAVIOUR OF BLENDS OF NATURAL RUBBER WITH SPECIALITY RUBBERS: EFFECT OF HEAT, OIL, OZONE AND RADIATION

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Elizabeth, K.I. and Alex, R. (2008). Degradation behaviour of blends of natural rubber with speciality rubbers: Effect of heat, oil, ozone and radiation. *Natural Rubber Research*, 21 (1&2):38-46.

Degradation behaviour of natural rubber (NR) and its 50/50 blends with four synthetic rubbers *viz.*, hydrogenated nitrile rubber (HNBR), ethylene propylene diene rubber (EPDM), chloroprene rubber (CR) and acrylonitrile butadiene rubber (NBR) were evaluated with respect to heat, oil, ozone and radiation as NR degrades very easily under these conditions. All the blends exhibited better ageing resistance than pure NR. Among the blends, NR/HNBR showed remarkable degradation resistance under all the conditions. Though NR/EPDM exhibited better heat and ozone resistance, its oil ageing resistance was very poor and had only very low initial tensile properties. NR/NBR showed excellent oil, ageing and radiation resistance, but its heat and ozone resistance were very poor. NR/CR showed lower degradation resistance than pure NR.

Key words: Blends, Degradation resistance, Natural rubber, Synthetic rubber.

INTRODUCTION

There is an ever increasing technical interest in the use of dissimilar rubber blends in order to improve specific vulcanizate properties, such as tensile properties and degradation resistance. Blending of polymers is an important and widely accepted method to produce commercially useful materials. Blending can combine the characteristic properties of the polymers to get new materials with tailored properties rapidly and economically. Unfortunately, blends of immiscible elastomers are often accompanied with the reduction in properties like modulus and tensile strength. For blends of elastomers of low olefinic content, the poor strength properties are a consequence of cure rate incompatibility between the polymers (Loadman *et al.*, 1989). Natural rubber (NR) though having excellent dynamic mechanical properties, is highly prone to degradation by heat and weathering due to its unsaturated structure. Blends of NR with specialty elastomers have been used in many commercial applications (Kozlowski, 1995; Bhat *et al.*, 2003; Baker *et al.*, 1986). NR blends with ethylene propylene diene rubber have been used for better weather resistance and with acrylonitrile butadiene rubber for oil/fuel resistance (Suma *et al.*, 1993; Karnika *et al.*, 1998). Blending of butadiene rubber (BR) with NR (Freitas de Castro *et al.*, 2003)

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