

IMPROVED COMPATIBILITY OF NR/BUTYL AND NR/EPDM BLENDS BY PRECURING

N. Suma and Rani Joseph

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In order to improve the mechanical properties of NR/butyl rubber NR/EPDM rubber blends, the butyl and EPDM phases were precured to a low level and then blended with NR. The optimum level of precuring for obtaining maximum improvement in mechanical properties was determined. The blends prepared from precured butyl or EPDM with NR were found to possess superior mechanical properties when compared with their conventional blends.

Key words: Natural rubber, Butyl rubber, Cure compatibility, EPDM, Blends.

N. Suma and Rani Joseph (for correspondence), Department of Polymer Science and Rubber Technology, Cochin University of Science and Technology, Cochin 682 022, Kerala, India.

INTRODUCTION

More than ever before, today there is increased technological interest in the use of blends of dissimilar rubbers. However, such blends generally show inferior mechanical properties compared with the average properties of the components. This can be attributed to three types of incompatibility which exist between dissimilar elastomers: viscosity mismatch, thermodynamic incompatibility and cure mismatch (Coran, 1988). As a result of incompatibility, during mixing the curatives migrate to the more unsaturated or more polar rubber which cures faster than the slow curing rubber(s) causing the latter remaining undercured. This phenomenon leads to poor mechanical properties of the blends. Such migration can also occur due to the difference between the reactivities of the elastomers or due to the difference between

the solubilities of curatives in elastomers (Gaczynski and Parasiewicz, 1984; Davidson and Woods, 1976; Guillaumond, 1976; Shershtner, 1982).

It is known that ozone resistance and oxidative ageing resistance of high diene rubbers like natural rubber (NR), styrene-butadiene rubber, butadiene rubber etc. can be improved by the incorporation of low unsaturation rubbers like ethylene-propylene-diene rubber (EPDM) (Andrews, 1967; Andrews *et al.*, 1963). However, the vulcanizates of such blends are generally poor in both static and dynamic mechanical properties due to some of the reasons already outlined.

Earlier workers on such blends have tried functionalisation of the slow curing phase using reagents such as maleic anhydride and the functionalised elastomers