

STABILITY AND AGEING OF ENR GUMS BY THERMOGRAVIMETRY AND IR SPECTROPHOTOMETRY

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Chaki, T. K., Roy, S. and Gupta, B. R. (1992). Stability and ageing of ENR gums by thermogravimetry and IR spectrophotometry. *Indian Journal of Natural Rubber Research*, 5 (1&2): 217-222.

Thermogravimetric analysis of epoxidized natural rubber (ENR) was carried out. The T_{max} values of ENR showed shift to higher values relative to natural rubber. However, the integral procedural decomposition temperature (IPDT) and apparent activation energy decreased with increasing epoxidation level. Low temperature (70°C) air aged samples were studied by IR spectroscopy. The peak intensities of carboxyl, hydroxyl, hydrofuran etc. were found to increase. Some new peaks like ether, lactone etc. were detected. Dielectric studies and gel content analysis were performed with the aged and unaged ENR samples.

Key words: Epoxidized natural rubber, Ageing, IR study, Stabilizer, Dielectric study.

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INTRODUCTION

Epoxidized natural rubber (ENR) has emerged as one of the most potential chemically modified rubbers. The commercial success of the elastomer depends not only on its ultimate properties but also on its stability and ageing behaviour. The stability of polymers changes on storage, due to the presence of reactive groups and unsaturation leading to reaction with oxygen or other chemical substances.

A study on the storage of ENR has been reported by Chaki *et al.*, (1990). The storage stability of aged ENR was explained with the help of plasticity, sol-gel, stress-strain, dielectric and IR studies. Studies on the storage stability and degradation of other rubbers have already been reported (Sambhi, 1982; Black *et al.*, 1986;

Knoblock *et al.*, 1987; Bristow, 1984; Bhowmick *et al.*, 1985). The present work is an extension of the study by Chaki *et al.* (1990).

EXPERIMENTAL

Epoxidized natural rubber of different epoxidation levels were obtained from the Malaysian Rubber Producers' Research Association (MRPRA), UK. Stabilized and unstabilized ENR were also prepared in the laboratory as per the method described elsewhere (Roy *et al.*, 1990). NR (ISNR-5) for comparison was obtained from the Rubber Research Institute of India, Kottayam.

Determination of gel content

Gel content of raw rubbers was determined using 0.3 - 0.4 g samples of 0.5