HYDROXYLAMINE SULPHATE STABILIZED NATURAL RUBBER SHEETS: A VISCOSITY CONTROLLED APPROACH FOR ENHANCED STORAGE AND MECHANICAL PERFORMANCE

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Natural rubber (NR) tends to harden during processing and storage, increasing its viscosity and necessitating extended mastication or the use of costly peptisers. To address this, constant viscosity natural rubber (CV-NR) NR treated to maintain consistent viscosity has gained popularity among manufacturers. Currently, CV rubber is marketed only in bale form as ISNR 3CV. This study explores the preparation of constant viscosity natural rubber sheets (CV-NRS) using hydroxylamine sulphate (HS) as a viscosity stabilizer at varying concentrations. The influence of HS on Mooney viscosity, plasticity retention index (PRI), vulcanization behavior and mechanical properties were evaluated both initially and after six months of storage. Fourier Transform Infrared Spectroscopy (FTIR) analysis was conducted to examine the chemical modifications induced by HS. Results showed that CV-NRS maintained stable viscosity, exhibited improved PRI and yielded vulcanizates with enhanced mechanical properties. FTIR spectra confirmed the formation of stabilizing chemical structures, indicating of HS effectiveness in inhibiting oxidative degradation and preventing premature crosslinking. These findings underscore the potential of HS as a cost-effective stabilizer for NR, enhancing both its processing characteristics and long-term performance.

Keywords: Constant viscosity, FTIR, Mooney viscosity, Oxidative degradation, Plasticity retention index, Storage hardening

INTRODUCTION

Natural rubber (NR), primarily composed of *cis*-1,4-polyisoprene, is a high molecular weight, viscoelastic polymer derived from the latex of *Hevea brasiliensis*. Along with rubber hydrocarbons, latex contains proteins, carbohydrates, fatty acids, enzymes, antioxidants and pigments. NR is known for its excellent elasticity, tensile strength, flexibility, water resistance, abrasion and tear resistance and electrical insulation. These properties make it ideal for applications in tyres, automotive parts, belts, hoses, footwear, gloves and adhesives. However, NR is susceptible to aging and degradation under heat, light, oxygen and ozone.

The properties such as Mooney viscosity and Wallace plasticity of NR are found to

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