

AGEING OF NATURAL RUBBER VULCANIZATES IN ACID AND ALKALI SOLUTIONS

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Resistance of natural rubber vulcanizates towards hot aqueous solutions of a few industrially important chemicals was studied. Absorption of water by rubbers containing lyophilic materials is a diffusion/osmotic phenomenon. Retention of strength after ageing in distilled water is lower, compared to that after ageing in aqueous media containing acid or alkali, provided the media are inert towards rubber. As the concentration of acid or alkali in the ageing media increases, the tendency for water to diffuse into the rubber matrix gets reduced. Reinforcing and nonhydrophilic fillers were found to reduce water absorption.

Key words : Natural rubber, Ageing, Chemical resistance, Vulcanizates, Water absorption.

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INTRODUCTION

Polymers find applications in many chemical industries as a protective lining to various metallic vessels, which carry chemicals at different temperatures (Westhead, 1961). Oxygen, ozone, heat, solvents and chemicals are the most common agents which cause degradation of polymers. Among the available plastics and rubbers, polytetrafluoroethylene (PTFE) and chlorosulphonated polyethylene are usually recommended for highly chemical resistant applications (Butt and Wright, 1980). However, the high cost and poor processability of these materials are limiting factors with respect to their large scale applications. For general chemical resistant applications soft natural rubber (NR) vulcanizates are satisfactory materials except for media such as hydrocarbons,

strong acids and oxidising chemicals and for continuous operation at very high temperature (Vennells, 1971). Literature on the resistance of NR vulcanizates towards different liquids and chemicals is limited. Hence an attempt was made to study resistance of NR vulcanizates towards aqueous solutions of a few industrially important chemicals.

EXPERIMENTAL

Materials

Polymers

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|-------------------------------------|------------------|
| Natural rubber | - ISNR 5 |
| Deproteinized natural rubber (DPNR) | - Nitrogen, 0.1% |
| Chloroprene rubber (CR) | - Neoprene W |