

EFFECT OF NON-BLACK FILLERS AND PIGMENTS ON THE PHYSICAL PROPERTIES AND DEGRADATION RESISTANCE OF NATURAL RUBBER LATEX THREAD EXPOSED TO UV-RADIATION

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The effect of titanium dioxide and its combinations with fillers such as china clay, precipitated calcium carbonate and barium sulphate at a low dosage on the physical properties and degradation resistance of latex thread prepared using conventional and efficient vulcanization systems were investigated. Though titanium dioxide had little effect, its combination with fillers attributed better modulus and tensile strength to the thread samples. Addition of titanium dioxide did not improve the degradation resistance of thread to heat and UV light. The combination of titanium dioxide with precipitated calcium carbonate showed better performance under photo oxidative ageing.

Key words : Degradation, Latex thread, Non-black fillers, Pigment, Rubber, Ultraviolet radiation.

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INTRODUCTION

Among the physical properties of latex thread, the most important parameters are the modulus and tensile strength. The effects of vulcanization systems and accelerator combinations on the above properties have been reported (Weiss, 1979; Collins and Gorton, 1984; 1985). Due to its large surface area, the thread is vulnerable to degradation by detergents, heat, light and oxygen. UV-light causes both degradation and discolouration (Morton, 1959; Robert, 1978). Studies have also been conducted on the effects of various antioxidants in retarding degradation (Gorton *et al.*, 1989). Generally certain non-black fillers are added at low dosages (below 10 phr) along with titanium dioxide to latex thread compounds for getting better modulus and colour respectively. But no systematic study on the effects of common non-black fillers and pigments on the physical properties of latex threads have been reported.

In dry rubber compounding, fillers generally act as reinforcing agents, but in latex they weaken the rubber film rather than improve its strength, due to the poor rubber-filler interactions (Blackley, 1997; Peethambaran and Kuriakose, 1989). But it has also been reported that china clay at low dosages can improve the physical properties of latex vulcanizates (Van Rossem and Plaizier, 1938).

The present work reports on the effect of titanium dioxide (pigment) and fillers like china clay, precipitated calcium carbonate and barium sulphate (barytes) along with titanium dioxide on the physical properties of latex thread, with special reference to its degradation under UV-radiation.

EXPERIMENTAL

Centrifuged high ammonia natural rubber latex conforming to BIS 5430-1981 was used in this study. Latex thread compounds were prepared as per the