EFFECT OF RESIDUAL DIAMMONIUM HYDROGEN PHOSPHATE (DAHP) CONTENT ON NATURAL RUBBER CENTRIFUGED LATEX PROPERTIES DEVELOPMENT AND ITS EFFECT ON LATEX FILM PROPERTIES

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Abstract

Natural rubber particle, a polyisoprene core is surrounded by a shell of non-rubber components, proteins and phospholipids. Natural PO_4^{3-} are added to ammonia preserved latex due to the hydrolysis of phospholipid layer around the rubber particle. Although this process contribute for the stability of the latex this could produce a waste sludge; a precipitate of magnesium with phosphate. In centrifuged latex (CL) manufacturing process PO_4^{3-} are added as diammonium hydrogen phosphate (DAHP) before centrifugation in order to remove residual Mg^{2+} present in field latex (F-NRL) to the level of 80-100 ppm. In most cases, added DAHP will leave excess PO_4^{3-} in latex as most manufacturers added it without estimating the remaining Mg^{2+} present in latex. It results in high amount of PO_4^{3-} in latex as considerable amount of PO_4^{3-} are released from the natural hydrolysis process with storage time. This study, aimed to determine the effect of residual DAHP content on properties of latex and films. A series of CL samples were prepared by adding 0 g (control sample), 3, 6, 9, 12 and 15 g of 15% DAHP. Changes of the latex characteristics such as mechanical (MST) and chemical stability time (CST), PO_4^{3-} and Mg^{2+} content, viscosity and mechanical properties of latex films were determined with time according to ISO procedures. High ammonia preserved CL showed a considerable amount of natural PO_4^{3-} of about 350-250 ppm which fluctuate with storage time. The excess PO_4^{3-} in the latex lead to decrease in viscosity and stability due to colloidal destabilization. The control sample showed highest MST (315 seconds) and CST (97 seconds) with storage time. Higher PO_4^{3-} content in latex causes increase in tensile strength but not more than 23 M Pa. The highest tensile strength of 25 M Pa was achieved by control sample with time. Elongation at break of all the samples are greater than 750% and control sample showed the highest value. Finally concluded that, no need to add DAHP in manufacturing CL if the Mg^{2+} content of F-NRL is below 100 ppm.

Key words: - colloidal; destabilization; diammonium; magnesium; rubber latex; phosphate