CHAPTER V

CONCLUSION AND SUGGESTION

Oxidative degradation of natural rubber in the presence of microparticles containing titanium dioxide under UV light were investigated. The titanium dioxide – encapsulated microparticles recovered by freeze–drying were agglomerated having 30 μm. in diameter. EDX–SEM data suggested that there was 0.1% atomic concentration of titanium within the particles, X–ray diffraction confirmed that titanium dioxide is in the form of anatase, which is the most active titanium dioxide to accelerate condition. The ash content indicated that there is 1.13%w/w of titanium dioxide in microparticles. The extent of unvulcanized natural rubber degradation is varied as a function of UV exposure time under accelerated condition but independent of the amount of titanium dioxide incorporated in the range of 0.1–5%w/w (in the form of powder or microparticles). After 15 days of sunlight exposure; the vulcanized natural rubber sheets have lost their mechanical integrity. ATR - IR spectrum of degraded vulcanized natural rubber sheets showed peak corresponding to carbonyl group suggesting that the oxidative degradation has occurred at the surface in all samples. The appearance of surface fracture of vulcanized natural rubber sheets implied that greater extent of degradation has taken place as compared to the controlled sample. The degradation of natural rubber in the presence of water showed decreasing molecular weight of unvulcanized and decreasing of tensile strength of vulcanized natural rubber. These results suggested that water plays a role in controlling degradation.

To improve controlled degradation of natural rubber, it is necessary to prepare high – quality titanium dioxide containing microparticles. Such microparticles should be well separated which require highly efficient drying process like spray – drying.