

Thesis Title A Study of Structure-Properties of Rubber
 Vulcanisates by Dynamic Mechanical Analyser
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ABSTRACT

The present work involved the study of the dynamic mechanical properties of vulcanised rubber by using dynamic mechanical thermal analyser (DMTA). The objective was to gain the knowledge of the factors controlling the dynamic properties of rubber vulcanisates. The effects of DMTA parameters on DMTA thermogram were also studied.

The results obtained showed that the major parameters affecting dynamic mechanical properties of NR vulcanisates were crosslink density, reinforcing fillers and oil. Nature of the crosslink and non-reinforcing filler, on the other hand, were found to have little effect on dynamic properties. The presence of proteins in NR assisted more efficient curing of NR, thus resulting in higher shear modulus. $\tan \delta$ value of deproteinised NR was, however, smaller than those of NR containing proteins.

Also studied was the application of DMTA to follow the extents of vulcanisation in different phases of rubber blends. Results obtained from the present study suggested that $\tan \delta$ peak heights of two phase systems depended on the morphology of the blends. Therefore, there is a limitation on the use of DMTA for measurement of the extents of cure in different phases of rubber blends.