P R E F A C E

Thermoplastic elastomers are becoming increasingly popular nowadays. They combine the advantageous characteristics of both rubbers and plastics, that is, they can be processed like thermoplastics but they exhibit properties of vulcanized elastomers. Currently, a lot research is being carried out in this field. No systematic study is available on the mechanism of failure, morphology, processing behaviour, and mechanical properties of thermoplastic elastomers prepared from blends of thermoplastics and rubbers. The ageing and degradation studies of these blends have not been reported to date. The present thesis deals with these aspects in the case of natural rubber-polyethylene blends. In addition, short fibre reinforcement of the blends, has also been examined.

Chapter I.7 consists of the dynamic mechanical properties of NR-HDPE blends over a wide range of temperatures.

Chapter I.8 deals with the morphology and properties of thin films of NR-HDPE blends in relation to the method of preparation.

The second section of the thesis comprises studies on ageing and degradation of the blends.

Chapter II.1 presents a general survey of the ageing and degradation characteristics of polymeric materials. The scope of the present work has also been outlined.

Chapter II.2 gives the experimental details of ageing and degradation studies.

Chapter II.3 consists of the results of γ-ray irradiation of NR-HDPE blends.

Hot air ageing and nitric acid corrosion of the blends have been described in Chapter II.4.

The last section of the thesis deals with short fibre reinforcement of NR-PE blends. Chapter III.1 consists of a brief survey of short fibre reinforcement of elastomers and plastics and scope of the present investigation.

Chapter III.2 gives the details of the processing conditions and experimental techniques used in the present work.

Chapter III.3 consists of the studies on various aspects of short fibre reinforcement of NR-HDPE and NR-LDPE blends with special reference to fibre dispersion, orientation, and breakage, fibre-matrix adhesion and development of anisotropy.

Chapter III.4 comprises the studies on tensile rupture of short fibre filled NR-HDPE blends in relation to pre-cuts inflicted on the samples prior to testing.