

AN ABSTRACT OF A THESIS

RHEOLOGICAL PROPERTIES OF POLY(PHENYLENE SULPHIDE) IN POLYMER MELT PROCESSING

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Master of Science in Chemical Engineering

Poly(phenylene Sulphide) (PPS) is a high temperature polymer which is finding use in an increasing number of applications. PPS has very good physical characteristics and excellent chemical stability. It can be cast, injection molded, and extruded.

This research was undertaken to find the dependence of rheological, thermal, and mechanical properties of PPS on molecular weight and molecular weight distribution. Six specimens of different molecular weights were subjected to rheological, thermal, and mechanical analysis.

Thermal analysis shows that the peak melting temperature is independent of molecular weight, whereas the onset melting temperature, and peak crystallization temperature decrease slightly with increasing molecular weight.

Rheological analysis reveals that viscosity, shear stress, storage modulus, and loss modulus increase with an increase in molecular weight. A method to determine the melt flow indices of PPS specimens, using a capillary rheometer, has been developed. The convected Maxwell model is applied to evaluate rheological stress.

The modulus of elasticity, breaking factor, tensile strength, and percent elongation at break of extruded specimens were found to increase with increasing molecular weight. X-ray analysis reveals that a degree of orientation can be achieved by stretching and heating the extrudate.

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