

## **S y n o p s i s**

The survey of pertinent literature reveals a growing interest in research on the high performance engineering polymers to meet various requirements/demands. Thermally stable polymers can be modified by a variety structural moieties to achieve the desired properties. Among different classes of thermally stable-high performance polymers; poly(amide - imide)s have gained the attention of researchers as they combine the versatility of polyamides and the high temperature properties of imide groups. Though the synthesis and characterisation of different poly(amide - imide)s have been reported by several authors, there exists limited information on the soluble poly(amide - imide)s.

The present study has; therefore, been undertaken with a view to synthesise novel copoly(amide - imide)s through the reaction of phenylated diimide diacid with various aromatic diamines. The present study also deals with the characterisation of these copoly(amide - imide)s and their structure-property correlation studies.


Chapter 1 opens-up with a general introduction to high performance engineering polymers; their salient features and the types according to structural units. Methods of preparation and end uses are also presented; particularly for poly(amide - imide)s. This chapter concludes with a critical discussion concerning the objectives and scope of the present investigation.


Chapter 2 deals with the materials and the experimental detailed procedures on the synthesis of diimide-diacid, polymers, and the analytical techniques used in the present study to characterise the novel monomer as well as poly(amide - imide)s and co poly(amide - imide)s.

Chapter 3 presents the results and discussion. It deals, at first, with the synthesis and characterisation of novel phenylated diimide diacid (IV); obtained

through the reaction of trimellitic anhydride with tetraphenylated aromatic diamine viz, 2,5- bis (4 – aminophenyl) – 3, 4-diphenyl thiophene. Synthesis, characterisation and thermal properties of high molecular weight co poly(amide - imide)s [ $\eta=0.5$  to 4.5] from (IV) and aromatic diamines are also discussed. Viscosity, infrared spectra, solubility, XRD studies are correlated to the repeat unit structure of the thermally stable ( $T_0 > 300^\circ\text{C}$ ) co poly(amide - imide)s under investigation. Polymers did show improved solubility in organic polar aprotic solvents viz. NMP, DMAc and Pyridine etc.

Chapter 4 summarises the findings of the present investigation together with some concluding remarks; followed by the references.

  
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