P-1-07

Synthesis and Characterization of Bismaleimides Based on Diamino Phenyl Indane

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Aromatic polyimides having the heterocyclic unit along the main chain of the polymer backbone are an interesting class of materials having excellent commercial and industrial importance. These materials are condensation polymers derived from bifunctional carboxylic acid anhydrides and primary diamines.

Owing to the thermal and oxidative stabilities, solvent resistance and electrical properties, polyimides are extensively used in electronics, sleeve bearings and valve seatings and as the matrix component of the graphite composite for compressor vanes in jet engine and other aerospace applications. High strength composites, thermally stable films, moulding compounds and adhesives are numbered among these applications. Polyimides are thermally stable and retain a significant portion of their physical strength at temperature up to 482 °C during short-term exposure. For prolonged exposure, they can be used at about 260 °C. The structural features of the polymer primarily determine the thermal and oxidative stabilities of polyimides.

Bismaleimides (BMI) are well known class of thermosetting polyimides. Unmodified BMI resins suffer from brittleness due to their high cross linking densities. Further the processing conditions of BMI resins can be tailored by proper selection of the aromatic diamine used for the synthesis of BMI. The modification of the BMI resins using aromatic diamines has been the most attractive and important approach for practical use. The performance of the cured resultant resin depends on the structures of the original BMI resin and the diamine extender, the ratio of the BMI to the diamine modifier and the curing conditions.

In the present paper, the authors wish to report the synthesis and characterization of bismaleimide resins based on diamino phenylindane.

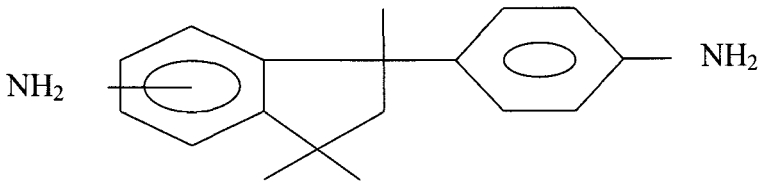

Figure 1. Structure of the diamine – 5(6)-amino-1(4'-aminophenyl)-1,3,3-trimethylindane

The above diamine is also used as a chain extender for the bismaleimide derived from maleic anhydride and 4,4'-diamino diphenylsulfone, with a view to reduce the processing temperature. The thermal properties of the materials investigated will be discussed.