

Mechanical properties of Epoxy – polyurethane polymer blends

*Kh.R.AL –Rawi

**R.H.Yosif

***T.S.Najem

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Abstract:

Binary blends have been formed for epoxy (EP) and polyurethane (PU), the concentration was chosen to give 4 compatible thermoset-thermoset blends (80-20, 60-40, 40-60, 20-80) EP-PU. Samples were cast as sheet of 4mm thickness prepared from simultaneous mixing of the two constituents in the required percentage. Standard impact samples (ISO 179) were prepared and mechanically tested by Charpy test either as prepared or after being heat treated, aged at 75c° for 3, 6, and 9 hrs. The results showed that the increment and / or decrement of impact toughness depend on blend concentration, and thermal aging to some polymer blends.

In addition to the impact tests, the morphology by scanning electron microscopy was carried out to investigate whether these blends are classified as compatible blends.

The aim of this research is to product a new polymer material with new properties. Especially the mechanical and physical properties.

Introduction

Plenty of people are actively involved new a day with polymers as new materials with new properties and new application [1].

The importance of polymers is still regarded as cheap alternative materials that are easily replaceable and disposable [2].

The intensive use of polymer for broad use has lead to the development of materials for specific application based on specific properties [3].

Polymer blends are defined as any combination of two or more polymers resulting from common processing step [4], [5].

Polymer blend may also be defined as intimate mixtures of two kinds of polymers, with no covalent bonds between them [6], or that are not bonded to each other [7]. Blending of polymer, therefore, are excellent methods for modification and improvement of polymer properties

[8], [9]. Blend display widely varied behavior from brittle to strong and flexible [10].

The dendrite structure lead to crystalline polymer Co- continuous morphologies have extensively analyzed for their improved mechanical properties [11],[12].

Previous research in our laboratory and elsewhere has shown that synergism can exist in certain polymer pairs which lead to enhanced some of physical and mechanical properties [13].

Significant improvements in impact resistance and toughness are usually noted for such blends [6].

Impact test

Impact resistance is a measure of the ability of a material or structure to with stand certain level of the application of a sudden load without failure.

The impact resistance of a structure is therefore a complex function of

* College of science for women- University of Baghdad

** College of Science- University of Baghdad

*** College of Science- Almustansiriya University