

Modification of Monomers to Produce High-Performance Soluble Polymers

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Abstract

The raw material cost, market size, energy needs, health and environment concerns have been important factors especially for discovery and introduction of new monomers and new polymers. There has been always constant search for new cost-effective monomers that can be used in the synthesis of polymers for special applications. In this respect, the synthesis of polymers and required building blocks from renewable resources has attracted considerable attention of researcher throughout the world [1-4].

Keywords: Polymers; Monomers; Macromolecules; Renewable resources; Solvents

Introduction

Polymer is composed of number of repeating units called as monomer, attached with each other to form a long chain. These large molecules are also referred as Macromolecules. The unique material properties of polymer are attributed their molecular structure. The development of polymers is perhaps the biggest achievement chemistry has made and it has significant effects, in every day of life. Aromatic polymers possess high-performance thermal stability due their unique properties and the presence of heterocyclic moiety (imide) into the backbone of polymer chain. Heterocyclic ring in the polymer chain containing ether, ketone group which enhance thermal stability and close packing structure [5-7]. Polyimide is essential for the performance of material with good solubility and thermal stability [8]. They are used in housing furnishings, house wares, construction materials, tanks, pipes, insulations, storage, transportation, packaging, medicinal use, military application, aerospace, communication electronics, recreation activity and many other fields [9-12]. Polymers are progressively providing areas of applications therefore dominated by metals and ceramics are such area is thermally stable polymers. However; these polymers have poor solubility and process ability. Various method has been used to improve thermal stability and modify other physical properties [13]. The effect of cardo fluorene moiety and long-branched aliphatic chain in Poly (Ether Imide) (PEI) membranes on gas transport properties have been investigated [14].

Mini Review

The raw material cost, market size, energy needs, health and environment concerns have been important factors especially for discovery and introduction of new monomers and new polymers. There has been always constant search for new cost-effective monomers that can be used in the synthesis of polymers for special applications. In this respect, the synthesis of polymers and required building blocks from renewable resources has attracted considerable attention of researcher throughout the world. synthesis of aromatic polymers Considering that the introduction of functional and phenylene groups will improve the solubility, ther-

mal and mechanical properties, as well as optical properties [15]. Ether and ketone linkage are the most flexible linkage introduced into polymer backbone. It is recognized that an aryl ether linkage imparts properties such as better solubility and melt processing characteristics and improved toughness in comparison with those of polymers without an aryl-ether linkage.

Aromatic polymers are commercialized heterocyclic polymers, having properties such as thermal stability, mechanical properties, as well as good chemical and irradiation resistance. Because of these properties they have been widely used in aerospace as high-performance engineering materials and in electronic industries as inter layer dielectrics. However, main drawback of these class of polymers was insolubility and intractability, which caused difficulties in synthesis and processing. Research work has been carried out to get high-performance thermally stable polymers. For further application, it is desirable to synthesize soluble and processable polymers [16].

Conclusion

Design and synthesis of bifunctional monomers with various organic methods. These monomers further polymerized by step growth polymers (condensation polymer). Synthesized polymer characterized by inherent viscosity, solubility. Solubility of Polymers soluble at room temperature in various aprotic/protic polar solvents the main approach of synthesis high performance polymers by the modification of monomers. These monomers modified by introduced bulkier cardo, pentadecyl long aliphatic chain, ether, ketone, moiety into the backbone of polymers [17,18]. Only aryl group containing polymers shows less solubility in aprotic polar solvents to improve process ability by the introduction of various substituents.

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