Patent Search

Invention Title	PROCESS FOR THE PRODUCTION OF NOVEL LATENT SELF-CURABLE EPOXY RESINS
Publication Number	03/2021
Publication Date	15/01/2021
Publication Type	INA
Application Number	202141000869
Application Filing Date	08/01/2021
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	POLYMER TECHNOLOGY
Classification (IPC)	C08G0059500000, C08J0005240000, C08G0059180000, C08G0059680000, C08L0063000000

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Abstract:

The present invention relates to the production of novel latent self-curable skeletally modified imidazole core" based epoxy resins in the form of one-component system useful for the manufacture of prepregs for advanced high performance composites. In the present work skeletally modified imidazole core based phenolic (IBP) and amino (IMA and IDA) derivatives are synthesized using appropriate chemical precursors at specified experimental conditions and their molecular structures are ascertained from different analytical techniques. The skeletally modified imidazole core derivatives with molecularly built-in self-curable chemical moieties namely imidazole core mono amine (IMA), imidazole core bisphenol (IBP) and imidazole core diamine (IDA) were separately reacted with epichlorohydrin under an alkaline condition through a facile process route to obta corresponding di-, tri and tetra functional epoxies of self-curable in nature. The optimum yield of varying nature of self-curable epoxy resins with di, tri and tetra functional moieties obtained are 85%, 82% and 88% respectively. The shelf-life of di, tri and tetrafunctional epoxies developed is found to be more than 12 weeks. The self-curing behavior " di-. tri and tetra functional epoxies developed are studied using differential scanning calorimeter and the polymerization temperature (cure temperature) obtained are 198 °C, 170 °C and 204 °C respectively. The present invention offers a number of advantages over the existing methodologies adopted for different types of one pack epoxy resin syste reported as on date, in terms of chemical composition, reaction time, method of reaction, work-up methodology, shelf-life, cure behavior and fabrication methods. The skeletall modified imidazole core based self-curable epoxy resin produced can effectively and efficiently act as latent cure binder for the production of wide range of industrial coatings, adhesives, sealants, encapsulants and prepregs for composites for high performance applications. Hence, the present method of producing of latent self-curable epoxy resin is considered as clean synthetic process route and cutting edge technology in the field of one component latent cure epoxy systems.

Complete Specification

Field of invention

The present invention relates to the production of novel latent self-curable varying functionalities of epoxy resins from the derivatives of skeletal!)' modified imidazole core based phenolic and amino compounds and epichlorohydrin under the alkaline conditions through a facile process route. The present invention offers a facile synthetic and cutting edge process route for the production of latent self-curable epoxy resins capable of utilized in the form of single pack system for different industrial products including the manufacture of prepregs for advanced high performance composites. The present invention provides the new types of epoxy materials with molecularly built-in curable chemical moieties, which are expected to solve

number of short comings experienced with the different types of latent cure epoxy systems, currently used for the manufacture of prepregs for high performance epoxy composite components. The present invention offers a number of advantages over the existing methodologies adopted for different types of single component epoxy resin systems reported as on date, in terms of chemical composition, reaction time, method of reaction, work-up methodology, shelf-life, cure behavior, processability and ihermo-mechanieal properties. Back ground of the Invention

Epoxy resin is one of the most important classes of thermosetting polymeric materials widely used as high performance adhesives, coatings, sealants, encapsulants, and matrices for advanced composites due to their outstanding chemical and mechanical properties including excellent adhesion towards different substrates. They also possess light weight, high strength, good durability and high stability to UV exposure, excellent chemical resistance and easy processing. Epoxy products are widely used in aerospace, automobiles, land and marine transportation, chemical process industries, electrical and electronic industries due to their high performance characteristics

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Page last updated on: 26/06/2019