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Advanced epoxy resins for making structural composites

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Epoxy resins are widely used in different industries as adhesives, surface coatings and matrix of composites. This is due to their unique properties including excellent mechanical and electrical properties, thermal and chemical stability. The pure or virgin epoxy resins have high viscosity and the inherent toughness of polymer network is low. Some additives like diluents, fillers (micro or nano) extenders, adhesion promoters and toughening agents usually are being used in epoxy formulations in order to make a suitable or advanced epoxy matrix. Much research has been carried out to enhance the toughness of the cured epoxy resins. The general strategies used are introduction of flexible chain into the network structure (e.g. ether linkage), compatible blending with flexible or ductile polymer, reduction in crosslink density of network and introduction of a suitable matter like rubber, thermoplastic or rigid particles as a second phase. For a decade we have done a comprehensive work in the area of modifications of epoxy resins in order to develop an advanced epoxy matrix system suitable for making glass or carbon/epoxy prepregs. These includes selection of suitable epoxy resins, curing systems, modification of an epoxy system by using reactive diluents, toughening of a system by using carboxyl-terminated Copolymer of Butadiene and Acrylonitrile (CTBN), poly (propylene oxide) based amine (Jeffamine D-400) or long-chain hardener and Hydroxyl Terminated Poly butadiene (HTPB), micro capsulation of curing agent and developing new latent accelerator.

Biography

Mohammad Hosain Beheshty has received his PhD from Bath University, UK. He is the Head of Composite Department of Iran Polymer and Petrochemical Institute and Chairman of Iran Composite Scientific Association. He has published more than 85 papers in reputed journals and has been serving as an Editorial Board of *Iran Polymer Journal and Iranian Journal of Polymer Science and Technology.*

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