

Preparation and properties of functionalized cross-linked polyimide aerogel

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Abstract

Polyimide aerogel has the characteristics of high mechanical strength and low thermal conductivity, and has broad application prospects in high-end fields such as aerospace. The traditional polyimide aerogel has the problems of large shrinkage, high thermal conductivity and poor environmental resistance. Nano-carbon materials with a large two-dimensional aspect ratio are expected to solve the above problems, but they are easy to agglomerate and cannot be effectively dispersed in PI matrix, functional modification is needed. In this paper, 4,4'-diaminodiphenyl ether (ODA) is used as a modifier to modify carbon nanotubes, graphene oxide and nanocarbon fiber powders. After drying, functionalized carbon nanotubes, graphite oxide and Nano carbon fiber powder. The functionalized nano-carbon material powder is used as a cross-linking agent, 4-amino-N-(4-aminophenyl)-benzamide (DABA) and ODA are mixed diamine monomers, 3,3',4, 4'-Biphenyltetracarboxylic dianhydride (BPDA) is a monomer of dianhydride. The functionalized cross-linked polyimide aerogel was prepared by two-step method and sol-gel method combined with CO₂ supercritical drying technology.

Keywords

Polyimide; Aerogel; Nano carbon material; Functionalization

References

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