Graphene-based Aerogel Thermal Management Materials Based on Orientation Freezing Technology

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Abstract

Inspired by the ordered porous structure of natural trees, ordered porous materials have become a research hotspot in the field of thermal management materials rapidly since they were reported[1]. Its characteristics are that the ordered pore structure can achieve effective thermal insulation in both horizontal and vertical directions. Although researchers have gradually started the development and exploration of ordered porous graphene based aerogels in the field of thermal insulation, their high temperature oxidation resistance is difficult to realize their application in high temperature aerobic environment. The development of high temperature resistant ordered porous thermal insulation technology plays an important role in the development of aircraft thermal protection system and other extreme environmental applications[2]. At the same time, mastering the thermal performance control method is very important for the structural design, preparation and performance optimization of high performance ordered porous thermal insulation materials. The aim of this study is to prepare an ordered porous anisotropic graphene based aerogel by means of freeze drying technology, and explore its thermal management performance control methods to overcome the limitations of the existing disordered porous graphene aerogels in thermal and mechanical applications.

Keywords

Graphene Aerogel; ordered porous materials; thermal management materials; Orientation Freezing Technology

Reference

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