

论文

三维有序SiC空心球的制备及表征

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摘要:

以三维有序多孔碳为模板, 以聚甲基硅烷(PMS)为前驱体, 经过前驱体的渗入、交联和陶瓷转化以及多孔碳模板的烧除, 制备了长程三维有序SiC空心球. 所制备的SiC空心球的外径(135-896 nm)、球壳厚度(14-79 nm)、BET比表面积(50.8~5.0 m²/g)及微孔体积(0.265~0.038 cm³/g)受不同孔径的多孔碳模板(150-1 000 nm)或不同前驱体浓度的控制. 所制备的SiC空心球以hcp结构排列成长程三维有序的结构.

关键词: 三维有序 SiC空心球序列 陶瓷前驱体转化技术 SiC陶瓷

Preparation and Characterization of Three dimensionally Ordered SiC Hollow Spheres

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Abstract:

Three-dimensionally long range ordered SiC hollow spheres were prepared for the first time by infiltrating polymethylsilane(PMS) into three-dimensionally ordered sacrificial porous carbon templates produced from the ordered silica spheres as the original templates, curing and pyrolysis of PMS, and the removal of the porous carbon templates. It was found that the outer diameter(135-896 nm), the wall thickness(14-79 nm), BET specific surface area(50.8-5.0 m²/g) and micropore volume(0.265-0.038 cm³/g) of the achieved SiC hollow spheres can be tailored by utilizing carbon templates with different pore sizes or PMS solutions with different concentrations. In addition, the produced SiC hollow spheres were packed as a hcp structure to be a long range ordered assembly.

Keywords: Three-dimensionally ordered material Hollow sphere Pre-ceramic polymer conversion technique SiC ceramic

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