

包埋浸渗/气相沉积二步法在C/C复合材料表面制备SiC涂层

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摘要 采用包埋浸渗法和化学气相沉积(CVD)法相结合在炭/炭(C/C)复合材料表面制备了SiC涂层, 借助扫描电镜、能谱分析以及X射线衍射等检测手段对涂层的微观组织形貌、元素分布和物相组成进行了观察与分析. 结果表明:

包埋法制备的SiC涂层与C/C复合材料基体的界面处形成了梯度过渡层, CVD法制备的涂层十分致密, 有效填充了包埋SiC涂层中的孔隙, 因此, 二步法制备的SiC涂层具有良好的抗氧化性能, 涂层试样在1500℃静态空气中氧化60h失重率仅为2.01%.

试样失重的主要原因是其在高低温热循环过程中氧气从涂层中的微裂纹扩散至基体表面, 从而引起基体氧化所致.

关键词 [C/C复合材料](#) [化学气相沉积](#) [涂层](#)

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SiC Coating Prepared by a Two-step Technique of Pack Cementation and CVD on Carbon/Carbon Composites

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Abstract A SiC coating was prepared on carbon/carbon (C/C) composites by a two-step technique of pack cementation and CVD processes to prevent these composites from oxidation. SEM, EDS and XRD were applied to analyze the surface and cross-section morphologies, element distribution and phase composition of the coating, respectively. The results show that a transitional layer with gradient distribution of Si and C content is formed between the SiC coating obtained by pack cementation process and C/C substrate, and the compact coating prepared by CVD process effectively fills the pores of the coating by pack cementation. The coating made by the two-step technique exhibits excellent oxidation protective ability. The weight loss percentage of the coated C/C composites is only 2.01% after oxidation in air at 1500℃ for 60h. The weight loss of C/C composites is primarily due to the reaction of C/C and oxygen diffusing through the microcracks in the coating during the thermal cycle between 1500℃ and room temperature.

Key words [carbon/carbon composites](#) [chemical vapor deposition](#) [coating](#)

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