

低温化学气相渗透法制备C_f/TaC复合材料的研究

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摘要 利用TaCl₅-Ar-C₃H₆反应体系, 用化学气相渗透(CVI)的方法, 在炭毡中碳纤维表面沉积TaC.

研究了温度对涂层的沉积速率、沉积均匀性、物相组成、微晶尺寸和微观生长形貌的影响. 研究结果表明: 沉积速率随沉积温度升高先增加后减小, 在950℃时达到最大值, 在900℃时沉积均匀性最好; 在800~1000℃范围内能沉积出结晶度较好的TaC涂层, 随着温度升高, 微晶尺寸增大; TaC在碳纤维表面为岛状生长模式; 随温度升高, 岛尺寸先增加后减小, 岛扩散能力增强, 沉积岛之间相互链接融合.

关键词 [TaC](#) [化学气相渗透](#) [沉积速率](#) [微观生长形貌](#)

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Research of C_f/TaC Composites Prepared by Low Temperature Chemical Vapor Infiltration (CVI) Process

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Abstract TaC was deposited by a chemical vapor infiltration(CVI) method with TaCl₅-Ar-C₃H₆ system in the carbon fiber felt. The influences of temperature on CVI deposition rate, deposition uniformity, phase composition, crystallization size and surface growth morphology of TaC coating in carbon fiber felt were studied. The experimental results show that, the deposition rate increases firstly with the rising of temperature, reaches its maximum value at 950℃ and then decreases; at 900℃, the deposition uniformity is the best; the highly crystalline TaC can be deposited between 800℃ and 1000℃ and the crystalline size increases at elevated temperature; it is island-like growth model of TaC on the carbon fiber between 800℃ and 1000℃; with the rising of deposition temperature, the sizes of the deposition islands increase firstly and then decrease; the diffusion ability of the deposition islands increases, and the deposition islands link and melt each other at elevated temperature.

Key words [TaC](#) [chemical vapor infiltration](#) [deposition rate](#) [microstructure growth morphology](#)

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