

研究论文

SiC纤维的化学气相生长与表征

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**摘要** 以一甲基三氯硅烷为气源化合物, 二茂铁为催化剂, 噻吩为催化助剂, 用化学气相生长法直接制备SiC纤维. 研究了裂解温度、催化剂及助剂浓度及H<sub>2</sub>与MTS的配比等因素对裂解产物形态的影响. 分别采用SEM, EDX和XRD对产物的组成和形貌进行了表征. 结果表明, 产物由单一的β-SiC组成. 通过改变反应条件, 无需高、低压气氛及激光辅助, 即可以获得直径为20 nm~1.5 μm、长度从10 μm至数毫米的高长径比SiC纤维.

**关键词** [SiC纤维](#) [化学气相生长](#)

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Synthesis and Characterization of Silicon Carbide Fibers by Chemical Vapor Growth

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**Abstract**

Silicon carbide(SiC) fibers were directly synthesized by chemical vapor growth(CVG). Methyltrichlorosilane(MTS) was selected as the SiC gaseous source and, ferrocene and thiophene as the catalyst and the cocatalyst, respectively. The influences of pyrolysis temperature, the contents of catalyst and the cocatalyst, and the molar ratio of H<sub>2</sub> to MTS on the morphologies of the pyrolysis products were investigated, respectively. The products were identified by X-ray diffraction(XRD), scanning electron microscopy(SEM) coupled with energy dispersive X-ray(EDX), respectively. The results show that, the products are composed of β-SiC. The growing of SiC fibers suggests a conditions-dependent process. SiC fibers with different diameters(20 nm--1.5 μm) and length(10 μm to several micrometers), therefore, can be synthesized directly by CVG under various conditions without the help of laser, high or reduced pressure.

**Key words** [Silicon carbide\(SiC\) fiber](#); [Chemical vapor growth\(CVG\)](#); [Characterization](#)

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