

FBG传感器在复合材料固化监测中的应用

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摘要:

FBG传感器广泛应用于复合材料结构健康监测中, 本文将双光栅的FBG传感器埋入到玻璃纤维/环氧树脂预浸层合板结构中, 监测热压固化过程中温度、内应力变化以及固化残余应变, 分析了残余应变对FBG传感器性能的影响。实验表明FBG传感器可以有效监测复合材料结构固化过程的温度和内应力, 以及由温度计算的粘度变化, 为智能固化控制提供依据, 且固化于复合材料结构内的传感器可用于结构的全服役周期健康监测。

关键词: 传感器 复合材料 光纤布拉格光栅 固化监测 残余应力

Application of Fiber Bragg Grating Sensor in Cure Monitoring of Composite

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Abstract:

The fiber Bragg grating (FBG) sensor was widely used in the composites structure health monitoring. The double FBG sensors were embedded in the prepreg glass fiber/epoxy laminate composite structure to monitor the variable of temperature viscosity internal strain in the hot-press curing processing and the residual strain after curing, analyze the FBG sensor performance affected by the residual strain. The experiments indicated that the FBG sensors could monitor the temperature internal strain and viscosity calculated from temperature in the curing processing of composites and provide a basis for intelligent curing control. The same sensor cured in the composite could be used for health monitor of of the composites structure in full life service.

Keywords: sensor, composite, fiber Bragg grating, cure monitoring, residual strain

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