应用光学　2007 28 (2): 209-211　ISSN: 1002-2082　CN: 61-1171/O4

光纤技术

耐高温光纤Bragg光栅的响应特性研究

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收稿日期　修回日期　网络版发布日期 2007-3-9　接受日期

摘要　以耐高温光纤光栅和普通的光纤光栅为实验研究对象,研究了其高温特性。普通的FBG，当温度超过300℃以上，光纤光栅已变黑变脆，虽然有传感特性，但已不能在实际中应用；通过对耐高温光栅裸栅进行300℃以上的高温实验，发现耐高温FBG处于20℃～350℃之间时反射波长与温度之间有着良好的线性关系，且光栅性能良好，没有出现被碳化现象，灵敏度为0.01nm/MPa；随着温度进一步升高，FBG反射波长与温度开始呈现非线性关系。实验结果表明，耐高温光栅适合于高温油气井下应用。

关键词　光纤布拉格光栅(FBG)　反射波长　高温特性　温度灵敏度系数

分类号　TN253

Response characteristics of high temperature resistant fiber Bragg grating

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Abstract The temperature characteristics of high temperature resistant FBG and the ordinary FBG were experimentally investigated. The ordinary FBG becomes black and brittle, and can not be used in practice even though it still has sensing feature, when temperature reaches more than 300℃. The experiment with the high temperature FBG indicates that the high temperature resistant FBG has good linearity from 20℃ to 350℃, and it is not carbonized, the sensitivity is 0.01nm/MPa, but the linearity is deteriorated with the further increase of temperature. The result shows that the high temperature resistant FBG can be used for the high temperature oil downhole measurement.

Key words　fiber Bragg grating(FBG)　reflection wavelength　high temperature characteristic　temperature sensitivity coefficient

DOI:

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