

靶式光纤Bragg光栅流量传感器

作者：胡玉瑞,唐源宏,李川

单位：中国航空油料有限责任公司云南公司

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摘要：

通过传统流量测量元件的原理、技术和传感结构的研究，在设计中采用了光纤Bragg光栅作为传感元件并选用了靶式传感结构。利用靶式流量计中靶片受力与液体流速成一定函数关系，研制了一种轴封膜片结构的光纤Bragg光栅靶式流量传感器。建立了加载在靶板处的载荷量与该光纤Bragg光栅靶式流量传感器的Bragg波长移位值关系的传感模型；计算出该传感器的理论灵敏度为18pm/Kg；理论分辨率为0.055Kg/pm。并通过砝码干校法实验，测量出了传感器的实际灵敏度16.7pm/Kg，实际分辨率为0.06pm/Kg。

关键词：流量测量；光纤Bragg光栅；波长移位；砝码干校法

Fiber Bragg Grating Target Type Flow Sensor

Author's Name:

Institution:

Abstract:

Through the studying of the traditional principle of flow measurement devices, technology, and its structure, Optical fiber Bragg grating have been used as the sensing element. In a target-type sensing structure have been selected in the design. Take advantage of the certain functional relation between the target flowmeter force in the target chip and liquid flow rate, we developed a fiber Bragg grating target type flow sensor of diaphragm seal structure. Establishing the sensing model based on a linear relation between the load capacity of target plate with the Bragg wavelength shift of fiber Bragg grating target type flow sensors. Theoretical sensitivity is 18pm/Kg; the theory resolution is 0.055Kg/pm. After weight calibration experiment, the actual loading sensitivity, 16.7pm/Kg, the actual resolution is 0.06Kg/pm.

Keywords: flow measurement; fiber Bragg grating; wavelength shift; Weight calibration method

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