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论文

适用于色敏解调的光位移传感器宽带LED

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摘要：

为保证光位移传感器的工作性能,输入光源在500~800 nm波长范围内需具有较高的光谱能量,照明用LED波长在700 nm以上光谱能量陡降,限制了传感器的工作范围.针对照明用LED光谱能量不足的问题,研制出适用于色敏解调光位移传感器的宽带LED光源.首先利用单色仪对光位移传感器色敏元件WS7.56的性能进行了测试,依据色敏解调结果提出了光位移传感器正常工作所需的输入光源的光谱能量阈值.在照明用LED光谱特性基础上,配比掺杂氮氧化物红色荧光粉提升LED红光及近红外光光谱能量,得到了满足输入光源光谱能量阈值的宽带LED.最后,对该宽带LED光位移传感器进行了位移测量实验,实验结果较使用照明用LED光源有明显改善,位移解调线性度良好.本文研制的宽带LED光源体积小、效率高,是光位移传感器较为理想的宽带光源.

关键词： 光位移传感器 光谱能量 宽带LED 红色荧光粉

Broadband LED for Optical Displacement Sensor with Wavelength Sensitive Detector

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Abstract:

A broadband light source with high spectrum intensity in 500~800 nm is required to ensure a good performance in optical displacement sensor. Considering the lighting LED’s low spectrum intensity after 700 nm, a broadband LED source was developed for optical displacement sensor. Firstly, tests on wavelength sensitive detector WS 7.56 fixed at the back end of optical displacement sensor were performed and the threshold of the light source spectrum intensity to ensure the linearity of optical displacement sensor was proposed. Then, by using (oxy) nitride red phosphors to enhance the LED spectrum intensity of red light to infrared, the broadband LED source was developed to satisfy the threshold of the light source spectrum intensity. Finally, a good performance of the broadband LED was proved by displacement sensing experiments. The broadband LED source is comparatively a perfect light source which can satisfy the needs of optical displacement sensor and have superiority in size and efficiency.

Keywords: Optical displacement sensor Spectrum intensity Broadband LED Red phosphors

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