

光学计量与测试

固体材料定向光谱发射率测量装置研究及误差分析

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摘要:

针对红外隐身材料光谱发射率测评的需要, 提出一种基于能量法的发射率测量模型, 并建立起固体材料定向光谱发射率测量装置, 能实现温度范围50℃~300℃与光谱范围1.3μm~14.5μm的固体材料定向光谱发射率测量。通过对试样进行实测, 得到不同样品在150℃和同一样品在不同温度下的光谱发射率曲线, 得出该材料发射率随温度变化的结论。最后分析了样品同黑体温度不等引起的误差, 给出温差为1℃和2℃时, 发射率相对误差随温度与波长的分布曲线, 以及不同黑体温度下3μm~5μm和8μm~14μm的平均相对误差值。

关键词: 定向光谱发射率 光谱辐射计 相对误差

Directional spectral emissivity measurement of solid materials and its error analysis

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Abstract:

In order to meet the spectral emissivity test and evaluation of infrared materials, a directional spectral emissivity measurement apparatus based on a solid material emissivity testing model was developed. Solid materials can be measured in the temperature range of 50℃ to 300℃ and in the spectral range of 1.3μm to 14.5μm. Some experiments were done under different conditions, spectral emissivity graphs were given. Final errors caused by the difference between sample surface temperature and blackbody cavity temperature were analyzed and error graphs changing with temperature and wavelength were shown when temperature differences were 1℃ and 2℃.

Keywords: directional spectral emissivity IR spectral radiometer relative error

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