

论文

煤田火区自然地物热红外发射率光谱测量及其特征

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摘要:

利用傅里叶变换红外光谱仪对新疆水西沟煤田火区自然地物进行发射率光谱测量, 采用平滑光谱迭代法对温度和发射率进行分离反演, 得到精确的地物温度和发射率, 对7种典型自然地物热红外发射率光谱特征进行分析, 并选择ASTER影像5个热红外波段进行数据模拟。结果表明: ① 波长在8~13 μm, 地物热红外发射率光谱特征存在明显差异, 尤其是在8.5~10.0, 11.3和12~13 μm处, 可作为识别不同地物的特征波段; ② 发射率光谱在ASTER影像5个热红外波段变化趋势呈现明显区别, 在遥感影像对火区地物信息的提取研究中具有实际应用价值; ③ 得到的地物发射率为火区地表温度的反演提供了精确的参数, 可以提高温度反演的精度。

关键词: 煤田火区; 地表温度; 傅里叶变换红外光谱仪; 发射率; 平滑光谱迭代法

Thermal infrared emissivity spectrum and its characteristics of natural surface objects in coalfield fires area

Abstract:

The Fourier transform infrared spectrometer was used to measure the emissivity of natural surface objects in Shuixigou coalfield fires area of Xinjiang. The smooth spectral iterative method was used to separate the temperature and emissivity, and the accurate temperature and emissivity of the surface objects were obtained. The thermal infrared emissivity spectral characteristics of seven typical types natural surface objects were analyzed, and five ASTER thermal infrared bands were selected to conduct the data simulation. The results show that: ① The characteristics of thermal infrared emissivity spectrum show distinct differences in wavelength range of 8~13 μm, especially in 8.5~10, 11.3 and 12~13 μm. Therefore these bands can be used as identifying characteristics of different bands; ② Emissivity spectrum shows a characteristic difference at five ASTER thermal infrared bands, it is practically useful in the process of using remote sensing images to extract information for surface objects in coalfield fires areas; ③ The emissivity can provide surface temperature retrieval with a precise parameter, so as to improve precision of temperature retrieval.

Keywords: coalfield fires area; surface temperature; fourier transform infrared spectrometer; emissivity; ISSTES(Iterative Spectrally Smooth Temperature/Emissivity Separation Algorithm ISSTES)

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