



Laboratory Spectroscopic Measurement and Analysis of Lunar sample Analogs

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Mineral composition and distribution of lunar surface is critical for investigating the origin and geologic evolution of the moon. It has been a very effective method for the use of visible and near infrared spectroscopy for lunar surface minerals identification and quantification, and the scientific results are rich. In this study, we firstly prepared six kinds of mineral samples and one kind of glass sample that have been proved existed on lunar surface, including high-Ca pyroxene, low-Ca pyroxene, olivine, plagioclase, ilmenite, apatite, and agglutinitic glass. The samples were crushed and ground to an average particle size of $\sim 70\mu\text{m}$ on the lunar soil. According to the modal abundance of these minerals in the real lunar soil released by LSCC, the mixing ratio was calculated and seven kinds of the simulated lunar samples which contained different mineral contents were prepared. Then, the reflectance spectra of these seven lunar simulated samples in the range of 450-3200 nm were measured by using a VIS/NIR spectrometer (ASD FieldSpec 4 Hi-Res) and a MIR FTIR spectrometer (Modal 102F). At last, By using the Modified Gaussian Model (MGM), The spectral parameters such as the absorption band position, absorption band depth and width of the seven mixed mineral's spectra are calculated, and the subtle spectral changes with the mineral contents were analysed without considering the space weathering effect.