LUNAR TITANIUM CHARACTERIZATION BASED ON CHANG'E (CE-1) INTERFERENCE IMAGING SPECTROMETER (IIM) IMAGERY AND RELAB SPECTRA. Fujiang Liu[1], Jinping Shi, Qiao Le[1], Yang Rong[1], [1] Department of Science and Technology of Remote Sensing, Faculty of Information Engineering, China University of Geosciences (Wuhan), liufujiang@cug.edu.cn.

Introduction: In order to estimate lunar titanium abundance efficiently, we choose areas around Apollo 17 and 16 landing sites[1][2] to characterize the titanium spectral features, including Full Wave at Half Maximum (FWHM), absorption position, absorption depth, absorption area and absorption asymmetry, using CE-1 IIM images, with 32 bands and a 200m spatial resolution obtained by China National Space Administration (CNSA), RELAB spectra and Lunar Soil Characterization Consortium (LSCC) data, because the absorption features of titanium centers on ~0.5μm[3] where all RELAB spectra, LSCC data and IIM, the first spectrometer to acquire interfered images for global moon, can cover the wavelength. In this abstract paper titanium spectral features of Apollo 17 landing sites are first characterized by IIM data. It is found that the linear correlations between Ti content and each absorption parameter are low. Then the analysis of titanium spectral characterization of Apollo 16 and 17 landing sites based on RELAB data and the comparison between RELAB data and IIM data will be soon undertaken.

Data and analysis for IIM: We perform MNF and inverse-MNF transformation to IIM images to reduce the noise and then resample and calibrate the images to the spectrum of sample 62231 collected by Apollo 16. Next continuum removal is performed on IIM images in order to extract absorption parameters, i.e. absorption position (λ), absorption depth (D), Full Wave at Half Maximum (FWHM), absorption area (A) and absorption asymmetry (S), to draw the graphs below where Ti content of the 18 Apollo 17 landing sites comes from LSCC.

The five absorption parameters of Apollo 17 landing sites are illustrated in Fig. 1-5.

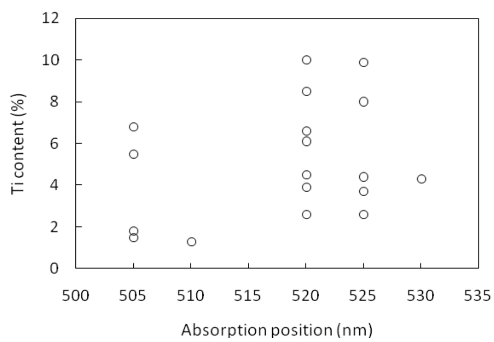

Fig. 1 Scatter graph of absorption position against Ti content

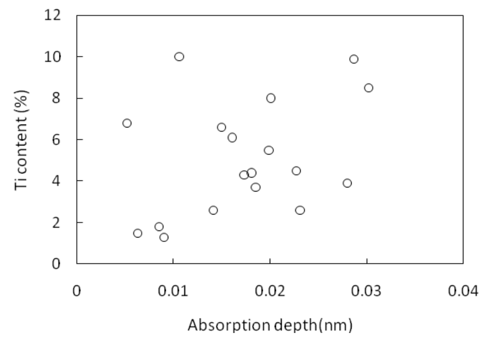

Fig. 2 Scatter graph of absorption depth against Ti content

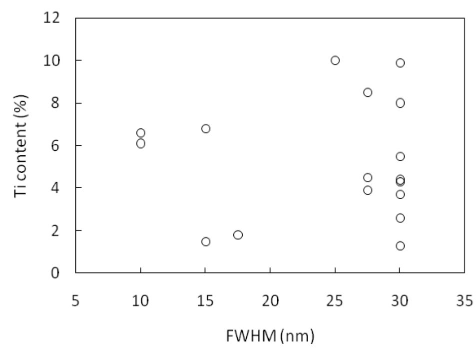

Fig. 3 Scatter graph of FWHM against Ti content

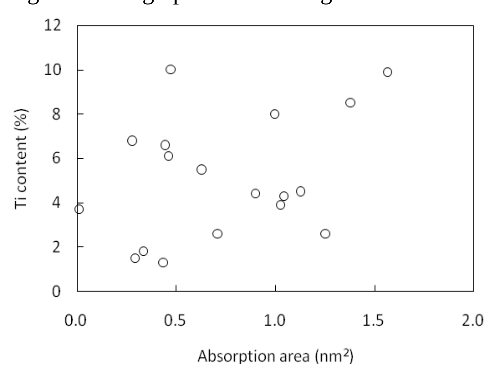

Fig. 4 Scatter graph of absorption area against Ti content

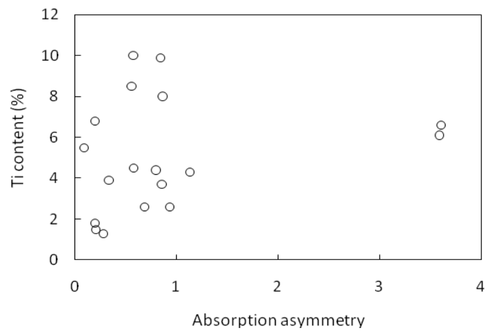

Fig. 5 Scatter graph of absorption asymmetry against Ti content

Unlike the RELAB data where the spectra are collected and measured by the sizes of <10μm, 10-20μm, 20-45μm and >45μm, with a low resolution at 200m, the size of IIM data can be neglected. The correlation coefficient *R* between FWHM and Ti content is small, 0.022. The largest *R* value belongs to Fig. 2, between absorption depth and Ti content; *R* equals 0.354, which indicates that titanium absorption characterization is not pronounced on IIM spectra.

Discuss: The low spatial and spectral resolution, 200m and larger than 5nm respectively, are the main factors that affect the *R* value and the accuracy of the results. Next the work will focus on the titanium spectral analysis based on RELAB data in order to compare the difference of titanium spectral features between IIM data and RELAB data, which can provide experience for follow-up experiments on titanium abundance estimate by hyperspectral methods.

References: [1] Paul G. Lucey et al. (2000) *JGR, 105*, 20297–20305. [2] Blewett D. T. (1997) *JGR, 102*, 16319–16325. [3] Xue Bin et al. (2004) *Progress in Geophysics, 19*, 717-720.