

MINERALOGICAL INTERPRETATION ON THE FELDSPATHIC HIGHLANDS OF THE MOON ON THE BASIS OF SOME FELDSPATHIC LUNAR METEORITES.

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Introduction: Using the Kaguya multiband imager and spectral profiler, Ohtake et al. [1] observed numerous locations in the highlands where anorthosite composed of nearly pure anorthite. Korotev et al. [2] discussed on the origin of the Moon's feldspathic highland and pure anorthosite. We carried out mineralogical studies of two feldspathic lunar meteorites, NWA 482 and Dho 307 [3], for which reflectance spectra have been measured, to gain better understanding of the feldspathic farside highland.

Samples and Methods: Two polished thin sections (PTS) were prepared from white slices of NWA 482 and Dho 307 at NIPR. Elemental distribution maps of Si, Mg, Fe, Ca and Cr were obtained by the EPMA at ORI and NIPR. Reflectance spectra were measured at the Brown University.

Results: NWA 482 was described as a typical of a crystalline impact melt breccia [4], but our PTS shows textures not common for lunar feldspathic meteorites. Dho 307 is similar to Dho 489 [5], and contains many fragments of pure plagioclase and small olivine fragments in the matrix.

Textures of NWA 482. The PTS shows dendritic mafic silicates in plagioclase matrix (FeO 0.4 wt%). The dendrites consist of fine olivine (Fo₆₇) and Opx crystals (Ca₁₂Mg₆₁Fe₂₆) up to 10 to 20 μm in diameter. Their local modal abundances are: olivine 8 to 16 vol. %; opx 10 to 15; plag 70 to 80, but plagioclase is more dominant in the total PTS. The spectrum shows 950 nm absorption of low-Ca pyroxene with little asymmetry indicating the presence of olivine.

FeO Contents of the Dho 307 Plagioclase. FeO contents of large fragments of clear plagioclase crystals in Dho 307 are close to those (FeO 0.06 wt. %) of crystalline cumulate eucrites, Y980433 with no 1250 nm absorption, but those of dusty plagioclase are as high as those of FAN and magnesian anorthosites. The spectra show more olivine than those of NWA 482.

Discussion: The textures of plagioclase-rich anorthosites are diverse, and complex heating and metamorphic events as were found in NWA 482 will increase the FeO contents large enough to be detected by 1250 nm absorption. Spectra of the low-Th, low-Fe farside feldspathic highland may show low-Ca pyroxene absorption with signs of olivine. Future sample return missions from such area are required for the final solution of the mechanism of plagioclase concentration.

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References: [1] Ohtake M. et al. 2009. *Nature* 461:236-240. [2] Korotev R. L. et al. 2010. Abstract #1440. 41st Lunar and Planetary Science Conference. [3] Takeda H. 2009. Abstract #1565. 40th Lunar and Planetary Science Conference. [4] Rubin A. et al. *Met. Bull.* No. 85, *Meteoritics & Planetary Science* 36: A293-A322. [5] Takeda H. et al. 2006. *Earth & Planetary Science Letters* 247:171-184.