ION MICROPROBE U-Pb DATING OF PHOSPHATES IN VERY-LOW-TI BASALTIC BRECCIA.

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Abstract: The lunar meteorites have valuable informations for understanding the evolution of the Moon's crust, because each meteorite may potentially provide a new insight into the thermal history of unexplored regions of the Moon. In spite of their scientific interests, chronological studies of Very-Low-Ti (VLT) basaltic meteorites have not be well understood, since the most VLT basalt meteorites are brecciated and consist of mixtures of materials with different origins. In this paper, we summarize our recent studies of in-situ U-Pb dating of VLT meteorites.

An ion microprobe analyses of mare-origin's phosphates in Yamato-981031 resulted in a total Pb/U isochron age of 3535 ± 170 Ma in the $^{238}U/^{206}Pb$ - $^{207}Pb/^{206}Pb$ - $^{204}Pb/^{206}Pb$ 3–D space (95% confidence limit), while those of QUE 94281 resulted in a total Pb/U isochron age of 3401 ± 170 Ma and 65 ± 300 Ma (95% confidence limit). These formation ages of phosphates are consistent with each other and also agree with previous studies of 3569 ± 100 Ma for EET 96008 [1] and 3521 ± 138 Ma for EET 87521 [2], whose basaltic components are also classified into VLT mare basalt. This result indicates that there is no chronological impediment to the hypothesis that these meteorites have originated from the same place on the Moon and were launched by a single impact, which has been proposed based on the similarity of launching ages, mineralogical and geochemical signatures [3-5].

Recent global and high-resolution mappings of chemical composition and mineralogical composition on the Moon observed by Clementine and Lunar Prospector enable us to discuss on the ejection sites of some lunar meteorites [6-8]. Assuming the scenario for Yamato-981031 [8], our data suggest that the formation age of northern parts of mares of near-side of Moon (possibly, Mare Frigoris or Lacus Somniorum or Lacus Mortis) might be about 3.5 Ga. Thus, our in-situ dating techniques of lunar brecciated meteorites coupled with the higher-resolution remote-sensing data may provide a radiometric (not based on the crater density) chronological assessment of unexplored regions on the Moon.

References: [1] Anand M. et al. (2003) *GCA* 67, 3499-3518. [2] Terada K. et al. (2005) *GRL* 32, L20202. [3] Arai T. and Warren P. H. (1999) *M&PS.*, 34, 209-234. [4] Warren P. H. and Ulff-Møller F. (1999). *LPS XXX*, Abstract #1450. [5] Korotev R. L. et al. (2003) *AMR* 16, 152-175. [6] Fagan T. J. et al. (2002) *Meteoritics & Planet. Sci.*, 37, 371-394. [7] Gnos E. et al. (2004) *Science* 305, 657-659. [8] Sugihara T. et al. (2004) *AMR* 17, 209-230.