ION MICROPROBE U-Pb DATING OF THE YAMATO-983885 LUNAR METEORITE

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Introduction: The lunar meteorites have valuable information for understanding the evolution of the Moon's crust, since each meteorite may potentially provide a new insight into the thermal history of unexplored region of the Moon. In spite of their scientific value, chronological studies of lunar meteorites have been difficult, since most of them are complex breccias, and in some cases, their isotopic "clocks" have been disturbed by subsequent impact events. Recently, an *in-situ* U-Pb dating method has been successfully applied to phosphate grains in the lunar basaltic meteorites [1-7] and has enabled us to unravel the lunar evolution such as ancient magmatism 4.35 Gyr ago [6] and an extremely low μ-value (= $^{238}U/^{204}Pb$) of magma sources [5, 7]. In this paper, we report an ion microprobe U-Pb dating of phosphate grains in lunar polimict breccia Yamato (Y-) 983885.

Samples: Y-983885 is a 290 g polymict regolith breccia found in Antarctica [8]. Kaiden and Kojima [8] reported a preliminary result of the petrography and oxygen isotopic composition, and verified its lunar origin. Arai et al [9] investigated the mineralogy of thin section Y-983885,59-2 and reported that it consists of a KREEP basalt, Mg-rich troctolite/norite, a high-Al basalt, a very low-Ti (VLT) basalt, a granulite originated from ferroan anorthosite, and Si, Na-rich impact spherule. For this study, thin sections, Y-983885 57-1 and 59-6 were allocated by National Institute of Polar Research (NIPR). Based on the mineralogical studies, it was found that these thin sections also consist of a KREEP basalt, a high-Al basalt and a VLT basalt, similar to Y-983885,59-2.

Results: Tentative in-situ U-Pb analyses of phosphates grains in Y-983885 57-1 were carried out using Sensitive High Resolution Ion MicroProbe (SHRIMP) at Hiroshima University, JAPAN. Although these phosphate grains are from various clasts (that is, different origins), obtained data are roughly expressed by a total Pb/U isochron line of ~4.0 Ga. Since the most of phosphates are likely from Mg-rich rocks and/or KREEP basalts, our preliminary data seem to be consistent with those of Apollo samples [10]. For detail discussion on the chronology of each component, further investigation will be required.

References: [1] Anand M. et al. (2003) *GCA* 67, 3499-3518. [2] Terada, K. et al. (2005) *GRL* 32, doi:10.1029/2005 GL023909. [3] Anand, M., et al. (2006) *GCA* 70, 246-264. [4] Terada, K. et al. (2006) *M&PS* 41, A5129. [5] Terada, K. et al. (2007) *EPSL* 259, 77-84. [6] Terada, K. et al. (2007) *Nature* 450, 849-852. [7] Terada, K. et al. (2008) *EPSL* in press. [8] Kaiden H. and Kojima H. 2002. LPSC XXXIII, Abstract #1958 [9] Arai T. et al. 2005. *Antarctic Meteorite Research* 18:17-45. [10] Nyquist, L. E. et al. (2001) in The Century of Space Science, 1325-1376.