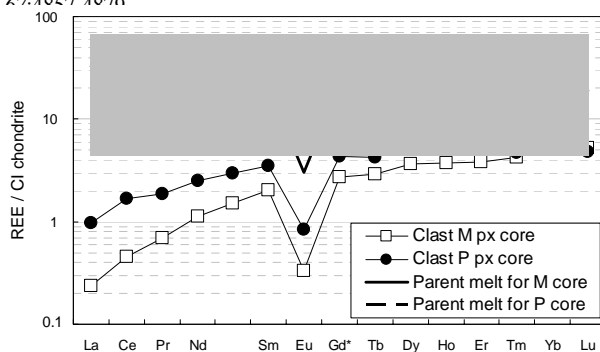


SOURCE MAGMA COMPOSITIONS FOR BASALT CLASTS OF LUNAR METEORITE EET 87521 IN CONNECTION TO KREEP. T. Arai¹, H. Shimoda², N. Kita^{2,3}, Y. Morishita² and H. Kojima¹. ¹Antarctic Meteorite Research Center, National Institute of Polar Research, Kaga, Itabashi, Tokyo 173-8515, Japan (tomoko@nipr.ac.jp), ²Geological Survey of Japan, AIST, Tsukuba, Ibaraki, 305-8567, Japan, ³Department of Geology and Geophysics, University of Wisconsin, Madison 1215 W. Dayton Street Madison, WI 53706-1692, USA.

Introduction: A lunar meteorite Elephant Moraine (EET) 87521 is a fragmental breccia dominantly composed of coarse-grained very low-Ti (VLT) mare basalts [1]. The bulk-regolith composition is extremely heterogeneous [2] and the presence of two basalts with different magma compositions and fractionation trends have been reported [3, 4]. The bulk-regolith REE composition shows a KREEP-like LREE-enriched pattern [2]. In this study, the source magma compositions for the two basalts (basalt clasts P and M of [4]) are calculated using the most primitive pyroxene REE compositions analyzed by ion microprobe, and appropriate D values of [5], to constrain the petrogenesis of EET 87521 basalts.

Result & discussion: The calculated parent melts for the two basalts show almost identical compositions, having KREEP-like patterns which are LREE-enriched ($La / Yb = 1.9$ and 2.2) and slightly larger negative Eu anomaly ($Sm / Eu = 4.1$ and 6.6), with modest absolute REE concentrations (Fig. 1). This indicates the KREEP signature in the bulk-regolith compositions [2] is mainly attributed to the basalt components. The parent-melt REE compositions are distinct from those of any known mare basalts including Apollo 17 and Luna 24 VLT basalts [6], but are almost identical to those of Apollo 14 VLT glasses [7]. The parent melt for gabbros and basalts in lunar-meteorite dimict breccia NWA 773 is also related to the Apollo 14 VLT glasses [8], suggesting the close petrogenetic connection of EET and NWA 773. Since the source magmas are related to KREEP, these lunar-meteorite basalt breccias strongly support the presence of VLT magmatism / volcanism in the Procellarum KREEP Terrane.

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521

basalts and Apollo 14 VLT glasses (shaded area).