THE CLAST INVENTORY OF KREEPY LUNAR METEORITE NORTH WEST AFRICA 4472.

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Introduction: NWA 4472 is a 64.6 gram lunar KREEP-rich breccia that was found in Algeria in 2006 [1]. It is reportedly paired with the larger (188 g) NWA 4485 stone, on the basis of bulk composition and petrography [1, 2]. Bulk chemistry investigations [2, 3] have concluded that the breccia is rich in incompatible trace elements (ITE) and is compositionally similar to KREEP lithologies collected by Apollo 14 [e.g 4, 5]. As it is so enriched in KREEP, it is likely to have been launched from the lunar near-side, from a location within the Th-rich [6] (proxy for ITE) Procellarum KREEP Terrane [7].

We present here an initial investigation of a large (31.6 x 24.3 x 4 mm) slab of the breccia. Back-scatter electron and elemental mapping have been performed to assess the heterogeneity of the meteorite. From this early analysis we have identified specific polymineralic and monomineralic clasts that we intend to investigate using a variety of analytical and dating techniques.

Sample Description: NWA 4472 is composed of a wide range (<7 mm) of pale cream, grey, brown, black and orange clasts consolidated in a dark matrix. The sample is cross-cut with fractures: most of which have been infilled with terrestrially deposited calcium carbonate and have a rusty-red appearance in the hand specimen. Small glass beads (<150 µm) are present within the matrix, suggesting that the sample was fused in a regolith environment. Therefore, the stone is classified as a regolith breccia.

Clast Inventory: Clast source provenance appears to be diverse. There is a small mare basalt lithic component (<4 mm, <10% of the sample), with a range of textures from plumose to sub-ophitic (e.g. basalt 1 pyx: Fs_{18-59} Wo_{11-31} En_{16-63}, basalt 2 olivine: Fo_{46-50}, pyx: Fs_{34-46} Wo_{10-30} En_{34-58}). Most basaltic clasts appear to have been derived from a low-Ti to VLT source region, as they have a relatively low (although variable) abundance of ilmenite. Shock metamorphosed granulized basaltic clasts are quite common, suggesting that included lithic material has experienced a range of thermal metamorphic conditions.

As noted by [2] granophyric KREEP-associated silica-K-feldspar intergrowth clasts occur throughout the NWA 4472 groundmass (<5%). They are often affiliated with small Zr-rich and phosphate (apatite) accessory phases. Additional lithic clast components include a diverse range of impact melt and fragmental breccias, and feldspathic polymineralic lithic clasts, suggesting a minor highland FAN component.

Ongoing and Future Research: We are currently conducting mineral chemistry investigations from the wide range of lithic components in NWA 4472 that will be presented at the conference. Chronologic work will follow.

References: [1] Connolly et al. (2007). The Met. Bull., No. 91, *MAPS* 42, A413-A466. [2] Kuehner et al. (2007). *38th LPSC, abst.* no. 1516. [3] Korotev and Zeigler (2007). *38th LPSC, abst.* no. 1340. [4] Jolliff et al. (1991). Proc. 21st LPSC, .193-219. [5] Warren P. (1989). LPI Tech Report 89-03, 149-153. [6] Lawrence et al. (2006). Geophys. Res. Lett. 34, Issue 3. [7] Jolliff et al. (2000). *J.Geophys. Res.* 105, p 4197-4216.