NEW LUNAR METEORITE NORTHWEST AFRICA 482: AN ANORTHOSITIC IMPACT MELT BRECCIA WITH LOW KREEP CONTENT.

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This is a preliminary report on the new NWA482 lunar meteorite. At 1015 g [*1*], NWA482 is the second largest among the ~20 discrete lunaites discovered (35% in the past two years) to date. The meteorite's precise find location is unknown, but cosmic-ray exposure evidence [*2*] confirms it is not paired (even in the source-crater/launch sense) with the Dhofar 026 lunar highland impact melt breccia [*3*].

The meteorite consists of 80-90 vol% plagioclase, subequal amounts of olivine and pigeonitic to subcalcic pyroxene, and traces of FeS, carbonate (from very mild terrestrial weathering), and very little else. KREEP-associated phases (K-feldspar, phosphates) have not yet been found, although there surely must be traces of them present. The texture (Fig. 1) is typical of lunar crystalline impact melt (polymict) breccias: extremely fine-grained except for isolated larger (up to 3 mm) relict plagioclases. The rock is cut by glassy and vesicular melt veins and melt pockets, which suggest an uncommonly intense shock, possibly linked with the violent launch off the Moon. The porosity is high (roughly 13%, based thin section observations plus a density measurement of ~2.54 g/cm^3 from the volume of a 21-g slab), for a lunaite. Lower porosities prevail among the regolith breccia lunaites [*4*], but then ordinary porous regolith breccia is probably too flimsy to survive Moon-Earth transit.

Plagioclase averages $An_{96.3}$. Olivine (at least where large enough to analyze) averages $Fo_{65.6}$ ± (1-σ, 19 analyses) 0.6, with FeO/MnO = 93±8. In the (analyzable) pyroxenes, Wo ranges from 11 to 30 mol%, yet *mg* is uniform at 70.0 mol%; FeO/MnO averages 50±6 (uncommonly low, for lunar pyroxene). Very similar mineral-compositional data have been obtained by D. Kring (see [*1*]). The FeNi metals have not yet been analyzed quantitatively, but energy-dispersive spectra show that most are Ni-rich kamacites, confirming the rock is polymict.

Our 21-g slab is cut by a 0.1 mm wide vein of glass (shock melt), the average composition of which (10 analyses, in wt%) is SiO_2 = 44.6, MgO = 3.6, Na_2O = 0.4, Al_2O_3 = 29.2, FeO = 3.5, Cr_2O_3 = 0.07, K_2O ~ 0.03, CaO = 17.5, and TiO_2 ~ 0.13. In all probability this shock melt approximates the bulk meteorite composition.. Even though the K_2O and TiO_2 data are imprecise, they suggest that the NWA482 impact melt was KREEP-poor in comparison to typical impact melts from the small Apollo-Luna sampling region [*5*]. This result is not too surprising, because remote-sensing data [*6*] have shown that the Apollo region happens to be unrepresentatively KREEP-rich.

References: [1] Grossman J. G. and Zipfel J. (2001) *Meteoritical Bull.* **85**. [2] Nishiizumi K. et al. (2001) *MaPS* **36**, this volume. [3] Warren P. H. et al. (2001) *LPS* **32**, abs. 2197. [4] Warren P. H. (2001) *JGR* **106**, 10101-10111. [5] Korotev R. L. (1994) *GCA* **58**, 3931-3967. [6] Lawrence D. J. et al. (2000) *JGR* **105**, 20307-20331.

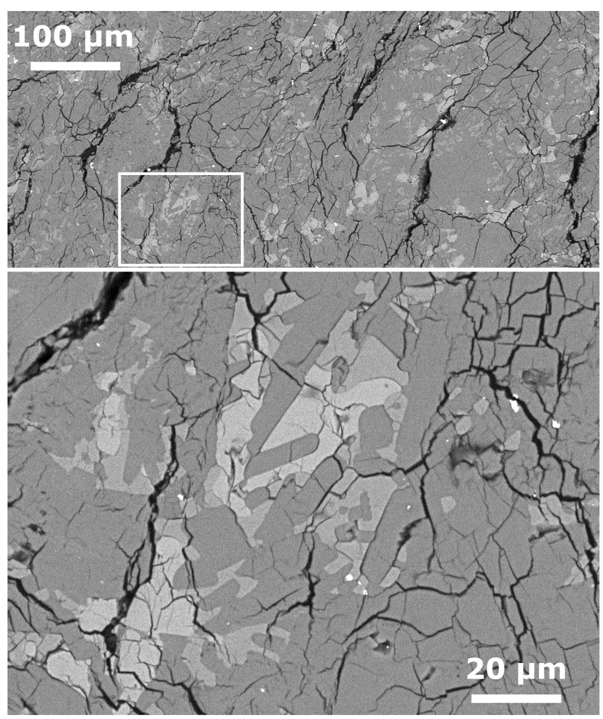

Fig. 1. BSE images of NWA482. The only major phases are plagiolcase (dark grey), olivine (light grey) and pyroxene (medium grey).