PETROLOGY AND COMPOSITION OF LUNAR FELDSPATHIC BRECCIAS NWA 2995, DHOFAR 1180 AND DHOFAR 1428

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A feldspathic breccia from Algeria and two mingled highlands+mare lunar breccias found recently in Oman bring the total number of unpaired lunar meteorites to more than 40.

**Northwest Africa 2995** is a very fresh feldspathic fragmental breccia that contains many highlands fine-grained lithologies: norite (orthopyroxene Fs₂₆.₄Wo₄, FeO/MnO = 66), olivine basalt (olivine Fa₉₇.₂, FeO/MnO = 95; plagioclase An₈₄.₇), subophitic basalt (augite Fs₂₅.₄₈Wo₃₇.₂₅₋₂₉; pigeonite Fs₂₇.₈₃₋₃₁.₇Wo₁₅.₄₋₉.₃, FeO/MnO = 53; olivine Fa₃₆.₃, FeO/MnO = 90; plagioclase An₂₄), gabbronorite (olivine Fa₃₄, FeO/MnO = 95; pigeonite Fs₂₈.₃Wo₈.₉, FeO/MnO = 67; plagioclase An₄₅), KREEP-like basalt (plagioclase Ab₀₉Or₁₇.₄; K-feldspar Ab₁₄.₃Or₈₃.₆; silica, phosphate and Fe-rich pyroxenes), troctolite (olivine Fa₃₀.₈, FeO/MnO = 94; plagioclase An₉₄.₇), granulitic impact melts (olivine Fa₃₁; orthopyroxene Fs₂₅.₃Wo₄.₄; plagioclase An₄₀); anorthosite (An₀₂.₇₋₉₆.₈), glassy impact melts, coarse-grained mineral fragments, and a 0.35 mm-sized grain of meteoritic Ni-Fe metal (Ni = 6.3 wt.%, Co = 1.0 wt.%).

**Dhofar 1180 and Dhofar 1428** are clast-rich, crystalline melt breccias that do not appear to be paired stones. Dhofar 1180 is largely populated with anorthositic lithologies, including ferroan anorthosite (plagioclase An₉₅ with up to 1.1 wt.% FeO), anorthositic gabbro (olivine Fa₃₉, FeO/MnO = 96-101), norite (olivine Fa₁₇), troctolite, minor amounts of ophitic to subophitic basalts (evidently with mare affinities) and impact melt breccias. Dhofar 1428 is dominated by plagioclase and xenolithic breccia clasts with subordinate amounts of norite (olivine Fa₃₆, FeO/MnO = 104; plagioclase An₀₆.₄; orthopyroxene Fs₂₈.₄Wo₅.₁, FeO/MnO = 51), troctolite (plagioclase An₀₅.₅; olivine Fa₂₅.₇, FeO/MnO = 89), and subophitic basalts that contain highly zoned pyroxenes (Fs₁₄.₅Wo₅.₁ to Fs₄₁.₂ Wo₁₅.₂).

**Bulk Compositions:** Dhofar 1180 contains 22.6 wt.% Al₂O₃, 9.3 wt.% FeO and 0.9 ppm Th, and plots at the feldspathic end of the field for mingled highlands+mare lunar breccias [1]. It does not appear to be paired with any other of the known Omani lunar meteorites, and shows compositional similarities to Calcalong Creek and Yamato 983885, but with a lower bulk Mg/Fe ratio and lower concentrations of incompatible elements. Analyses of NWA 2995 and Dhofar 1428 are in progress.