Keeping Up With the Lunar Meteorites - 2014

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Since our abstract of last year [1], 14 new lunar meteorite stones with a total mass of 3535 g have been announced in the Meteoritical Bulletin online database [2]. Eleven are from northwestern Africa one is from Oman, and one is from Saudi Arabia. All but one is a feldspathic breccia. We obtained the compositional data presented here on multiple subsamples of each stone by INAA using methods previously described [3].

Abar al' Uj 012 (123 g), the first lunar meteorite from Saudi Arabia, is a moderately vesicular impact-melt breccia (Figure 1). Compositionally, it is a typical feldspathic lunar meteorite (Figure 2), but one that is not, in detail, similar to any of the Omani stones, the nearest of which was found 684 km to the southeast. Like the Omanian lunars, it is contaminated with terrestrial Sr and Ba.

Dhofar 1766 (292 g) is a feldspathic impact-melt breccia compositionally very similar to, and likely paired with, Dhofar 733, a granulitic breccia (Fig. 1). Both have concentrations of Na and Eu about twice as great as is typical of feldspathic lunar meteorites [4].

NWA 7834 and **7948** (905 g and 59.8 g) are feldspathic regolith breccias containing some mare basalt, leading to moderate concentrations of Fe and Sc. They are compositionally similar to each other (Fig. 1) and both were purchased in Zagora, Morocco, thus we suspect that they are paired stones.

NWA 7931 (5.9 g) is a feldspathic regolith breccia but with lower concentrations of incompatible elements than most others of similar FeO concentration.

With only 3.3% FeO, **NWA 7959** (156 g) is highly feldspathic regolith breccia, but with 1.2 ppm Sm, one that is richer in incompatible elements than most other similarly feldspathic meteorites (Fig. 1). It has high concentrations of terrestrial Br (2.8 ± 0.4 ppm) and Ba (1800 ppm).

NWA 7986 (12.2 g) is another stone of the pair group [3] that includes NWA 4936, 5406, 6221, 6355, 6470, 6570, and 7190. The total mass of the meteorite is now 1949 g.

NWA 8001 (23.4 g) is a feldspathic regolith breccia that, with 3.6 ppm Sm, is compositionally distinct from any others (Fig. 1).

NWA 8010 (58 g) is glassy, a vesicular, feldspathic breccia described in more detail in another abstract [5]. It has a Zn concentration of 380 ± 140 ppm, which is ~20 greater than typically found in lunar regolith breccias. It also has 3 ± 2 ppm Ag. Both values suggest terrestrial contamination, but we have not seen this magnitude of Zn contamination in any other of the ~80 NWA lunar meteorite stones that we have analyzed. NWA 8010 has one of the highest concentrations of terrestrial Br that we have measured in a lunar meteorite, 3.3 ± 0.8 ppm.

NWA 8022 (1226) is a highly feldspathic granulitic breccia. On Fig. 2 it plots with NWA 7959, but it is distinctly richer in Na, Eu, and siderophile elements.

NWA 8046 (47.3 g) is, compositionally, a rather typical feldspathic lunar meteorite but one that is not a compositional match to any others.

NWA 8055 (97 g) has a composition consistent with a mare-basalt-bearing feldspathic breccia.

NWA 8127 (529 g) is another stone of the NWA 773 clan of mafic lunar meteorites (NWA 773, 2700, 2727, 2977, 3160, 3170, 3333, 6950, and Anoual). Like NWA 2700 and NWA 6950, it consists entirely of the olivine gabbro cumulate lithology.

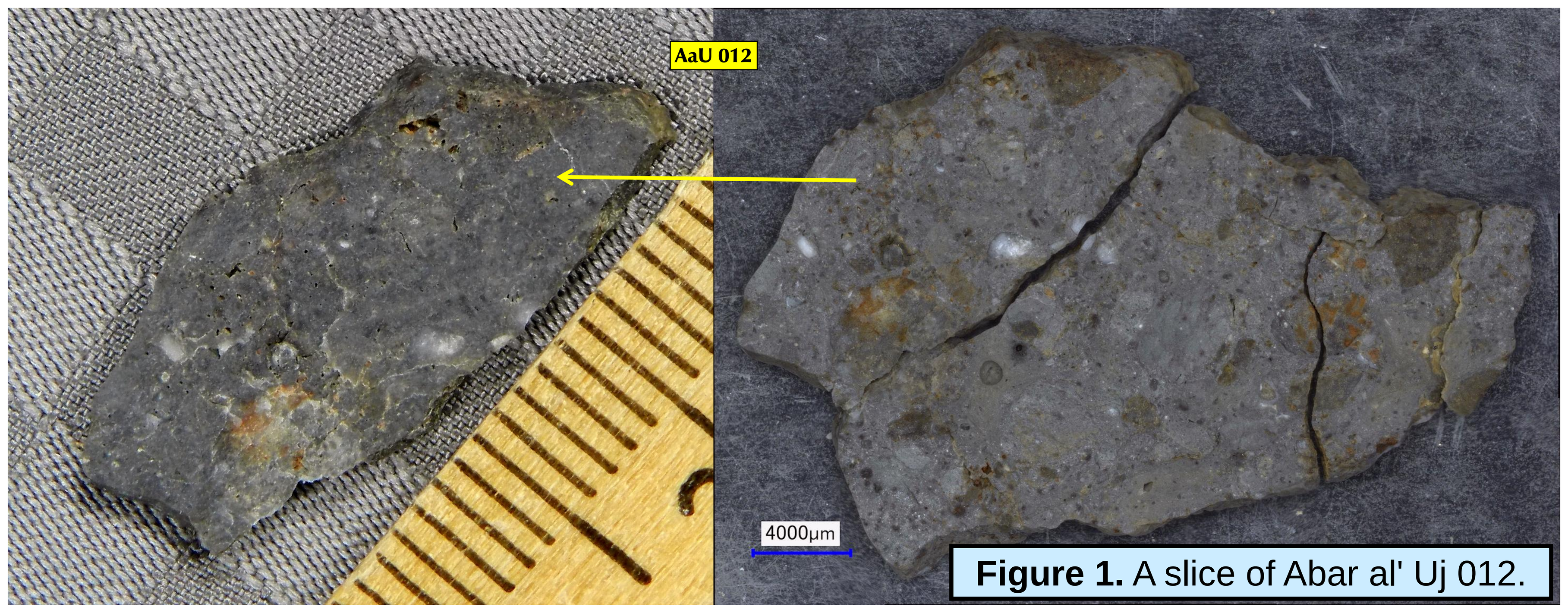
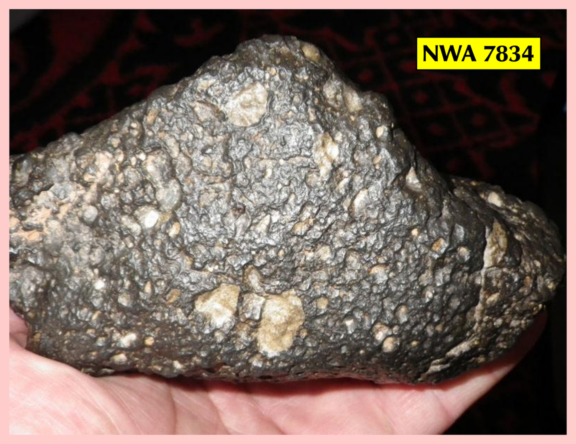


Figure 1. A slice of Abar al' Uj 012.



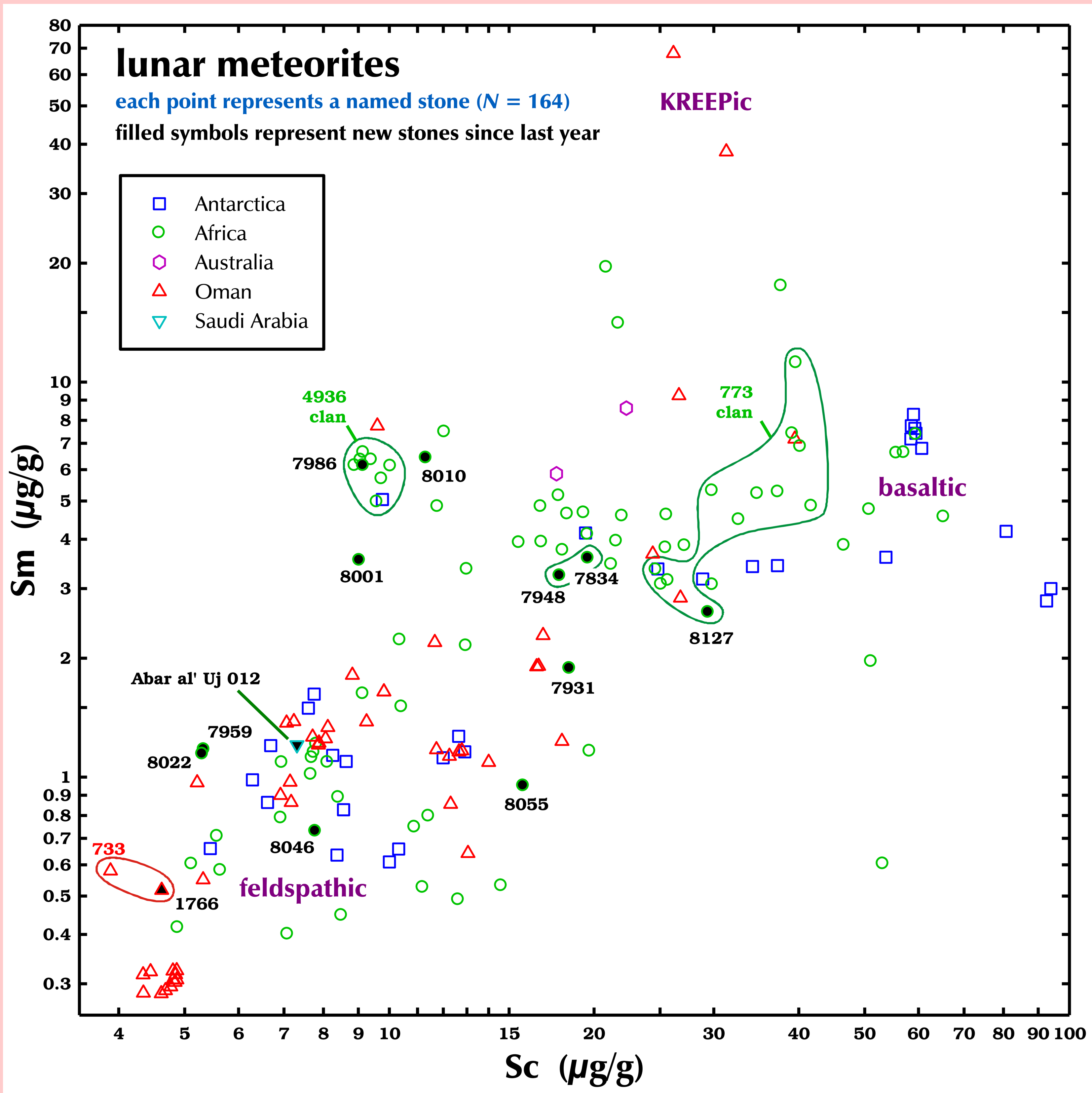


Figure 2. Sc and Sm in subsamples of lunar meteorite stones discussed here.

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