

MARTIAN METEORITE RAIN 2020: PETROLOGY, ELEMENTAL AND ISOTOPIC COMPOSITION OF RECENTLY RECOVERED SHERGOTTITES.

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Introduction: The number of unpaired Martian meteorites continues to increase at the rate of at least 10 per year, especially because of finds in northwest African desert regions. Since our 2019 report [1], 13 new specimens have been recovered, bringing the present total to 139, of which 123 are various sorts of shergottites.

Enriched Mafic Aphyric Shergottites NWA 12564, NWA 12632, NWA 12690, Swayyah 002, Gadamis 001 and others: By far the most common sorts of shergottites are enriched mafic aphyric examples (generally like Shergotty), but it has been difficult to confidently assess pairing relationships among these specimens. Despite differing grainsizes (see Figures 1, 2), some may have been portions of the same heterogeneous meteoroid(s) (i.e., launch-paired). NWA 12564 and NWA 12690 in particular, as well as NWA 12262, NWA 12269, NWA 12335, etc., may together constitute a very large find (> 30 kilograms) from an unknown site.

Whether fine-intersertal/subophitic, diabasic or gabbroic (reflecting differing cooling rates), all of these specimens consist mainly of strongly zoned clinopyroxene and maskelynite with accessory phosphates (merrillite, chlorapatite), ilmenite, Ti-chromite and pyrrhotite.

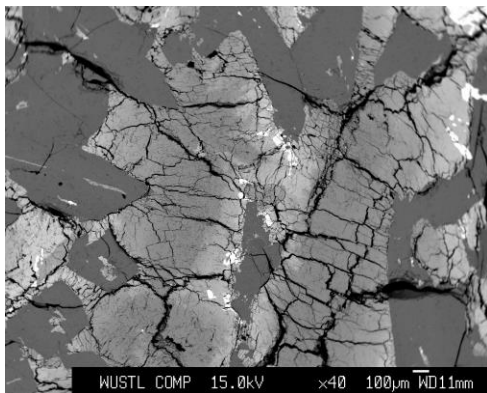


Figure 1. BSE image of *Gadamis 001*

Intermediate Mafic Aphyric Shergottite NWA 13038: This specimen is relatively fine grained (mean 0.4 mm) and composed mainly of polysynthetically-twinned, zoned clinopyroxene and maskelynite with accessory ilmenite, ulvöspinel (both Cr-bearing and Cr-

free), chromite (with Ti-rich lamellae and rims), pyrrhotite, merrillite, chlorapatite and silica polymorph (see Figure 2). One large orthopyroxene grain (2.5 mm across) with a pigeonite rim was observed.

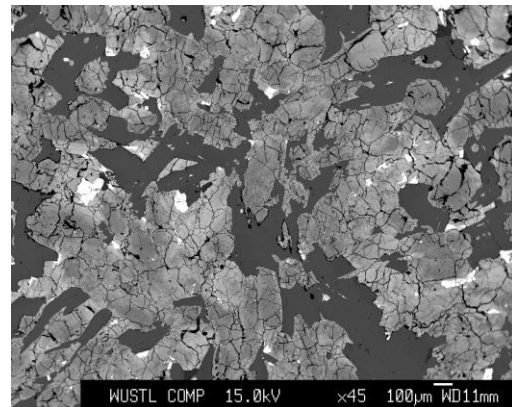


Figure 2. BSE image of *NWA 13038*

Intermediate Mafic Intersertal Shergottite NWA 13031 (with pyroxene macrocrysts): This specimen is a relatively fine grained assemblage (mean grainsize 0.3 mm) of predominantly polysynthetically-twinned, zoned prismatic clinopyroxene and maskelynite with accessory Ti-free chromite, Ti-chromite, ilmenite, ulvöspinel, pyrrhotite, merrillite and silica polymorph. Sparse macrocrysts (up to 2 mm) of orthopyroxene and pigeonite (with included *olivine*) are present (see Figures 3, 4).

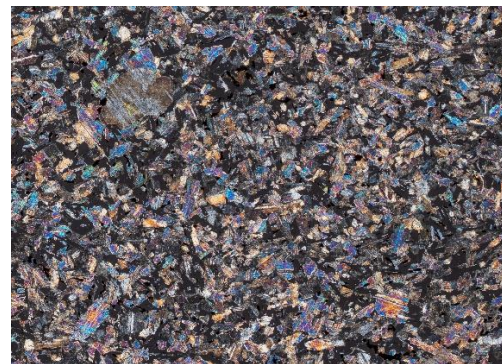


Figure 3. Partially cross-polarized light optical thin section image of *NWA 13031*. Width = 10 mm.

