

NWA 8653 – A NEW BASALTIC SHERGOTTITE.

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Three pieces of partly fusion-crust stones (NWA 8653) with a total weight of 214 g were found in Mauritania in 2014. NWA 8653 is a coarse-grained basaltic shergottite mainly composed of elongated pyroxene prisms (up to ~3.5 mm) with interstitial plagioclase laths (up to ~2.3 mm). Pyroxenes (mostly pigeonite) have core-to-rim zonation in BSE images and plagioclase was completely converted to maskelynite (Fig. 1). Accessory phases include alkali feldspar, coarse-grained or acicular fine-grained ilmenite, chromite, ulvöspinel, troilite, silica, merrillite, apatite, and baddeleyite. Relative proportion of merrillite to apatite is about 3. They are often associated with melt inclusions composed of alkali-rich glass and minor Ca-rich pyroxene. Baddeleyite occurs adjacent to pyroxene, ilmenite, and apatite. It ranges in length up to 20 μm . Raman spectra of baddeleyite are consistent with that of the low pressure monoclinic ZrO_2 polymorphs. Symplectic areas have a vermicular intergrowth of silica and fayalite. The meteorite also contains a micro-graphic intergrowth of silica and alkali-feldspar that has a granitic composition (Al_2O_3 11.8, SiO_2 79.5, CaO 2.1, Na_2O 4.5, K_2O 1.9 wt%). The intergrowth ranges from 200 to 700 μm in size (Fig. 2). The length of alkali-feldspar in the intergrowth is about 10 μm . Shock veins (10-120 μm in width) and impact melt pockets (up to ~1 mm in size) are present. Mineral modes (vol%): pyroxene =61, maskelynite =31, silica=2, ilmenite + chromite =2, phosphate =2, mesostasis + impact melt =2.

Most pyroxene grains have pigeonite ($\text{En}_{46.6-53.1}\text{Wo}_{12.7-13.1}$) and augite ($\text{En}_{36.4-46.2}\text{Wo}_{31.9-32.1}$) cores with more Fe-rich pigeonite rims ($\text{En}_{23.4-41.2}\text{Wo}_{14.8-16.1}$ and $\text{En}_{17.7-22.2}\text{Wo}_{16.9-21.4}$ respectively). The molar Fe/Mn ratio for pigeonite and augite is 37 ± 1 and 31 ± 4 respectively. Plagioclase retains a core-to-rim zonation and exhibits a small intergranular compositional range ($\text{An}_{54.7-38.2}\text{Or}_{1.0-4.1}$). Olivine mainly occurs as fayalite ($\text{Fo}_{8.5-15.2}$) in the mesostasis area. Phosphates have relatively homogeneous compositions. Merrillite contains a significant amount of FeO (4.23 wt%), MgO (1.48 wt%) and Na_2O (1.25 wt%), and apatite shows a wider spread of X-site occupancy of F (20 to 60%) and Cl (20 to 55%) than that of OH (20 to 30%).

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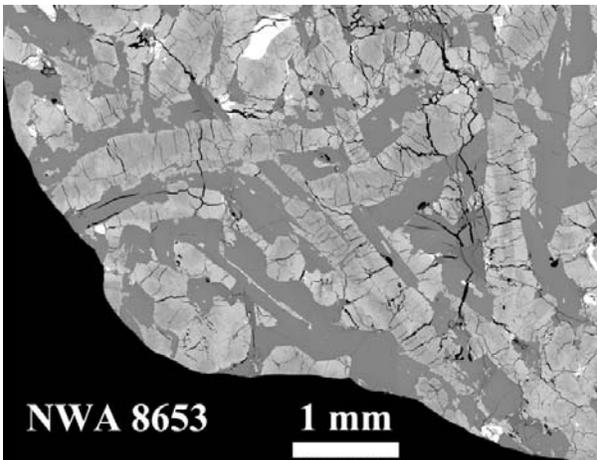


Fig. 1 Zoned pyroxene and maskelynite in NWA 8653

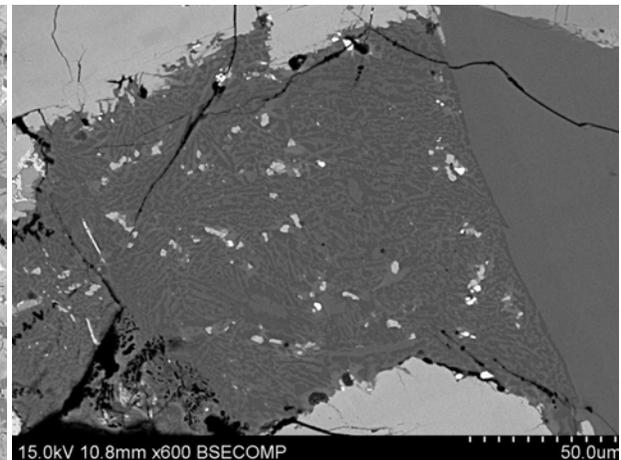


Fig. 2 Graphic texture of the granitic area