

**PETROLOGY AND OXYGEN ISOTOPIC COMPOSITION OF ORTHOPYROXENITIC ACHONDRITE NORTHWEST AFRICA 8777 AND SODIC ULTRAMAFIC ACHONDRITE NORTHWEST AFRICA 10132.**

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As discoveries of meteorites continue apace within northwestern Africa, further examples of ungrouped achondrites come to light that provide important new knowledge about the nature, evolution and age of parent bodies within the early solar system. Here we describe an ungrouped orthopyroxene-rich achondrite containing very calcic plagioclase, and a second example related to remarkable achondrite Northwest Africa 6693/6704, which is enriched in Mg and Ni yet contains albitic plagioclase.

**Northwest Africa 8777:** This 49.1 gram specimen has a texture characterized by triple grain junctions, and consists predominantly of orthopyroxene (88.6 vol.%) with subordinate olivine (9.0 vol.%), minor bytownite ( $An_{77.3-78.8}Or_{1.1-0.5}$ ), Al-bearing chromite, Ni-poor kamacite and troilite. The composition of orthopyroxene is  $Fs_{25.5-25.6}Wo_{3.1-2.7}$  (FeO/MnO = 29-34) and of coexisting olivine  $Fa_{30.7-31.1}$  (FeO/MnO = 46-49).

**Northwest Africa 10132:** This very fresh 940 gram specimen is composed of glistening, vitreous yellow-green crystals with minor tiny black grains. The texture is inequigranular to poikilitic, and the mineral assemblage is dominated by orthopyroxene (up to 4.8 mm,  $Fs_{41.6-42.7}Wo_{3.1-3.4}$ , FeO/MnO = 78-88,  $Cr_2O_3 = 0.3$  wt.%) and olivine (up to 2 mm,  $Fa_{53.3-53.5}$ , FeO/MnO = 115-135, NiO = 1.1 wt.%) with ~5 vol.% interstitial albite ( $Ab_{91.0-92.3}An_{1.8-2.2}Or_{7.2-5.6}$ ), Ti-poor chromite and awaruite.

**Oxygen Isotopes:** Analyses of acid-washed subsamples by laser fluorination gave, respectively: *NWA 8777*  $\delta^{17}O$  1.078, 1.239, 1.257;  $\delta^{18}O$  2.659, 2.912, 2.851;  $\Delta^{17}O$  -0.326, -0.299, -0.248 per mil; *NWA 10132*  $\delta^{17}O$  0.893, 1.373, 1.273, 0.857;  $\delta^{18}O$  3.832, 4.702, 4.557, 3.789;  $\Delta^{17}O$  -1.130, -1.110, -1.133, -1.144 per mil (for a TFL slope of 0.528).

**Discussion:** Although NWA 8777 has oxygen isotopic compositions overlapping those for some (but not all) brachinites [1], it differs significantly in its low olivine content, lack of clinopyroxene and much more calcic plagioclase. Thus we consider it to be an ungrouped achondrite of a type not previously recognized.

In contrast NWA 10132 is almost identical in mineralogy and oxygen isotopic composition to NWA 6693/6704 [2], but texturally it is quite distinct, and empty vesicles so distinctive of NWA 6693/6704 are lacking. Thus we conclude that this new specimen (found at a different location) is a second example derived from the same primitive parent body. Studies of Pb [3], Cr and Os isotopes are in progress to further decipher possible affinities, formation age and petrogenesis.

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**References:** [1] Rumble D. et al. 2008. *LPS XXXIX*, #1974; Day J. et al. 2012. *GCA* **81**, 94-128 [2] Irving A. et al. 2011. *74<sup>th</sup> Meteorit Soc. Mtg.*, #5231; Warren P. et al. 2013. *GCA* **107**, 135-154; Iizuka T. et al. 2013. *LPS XLIV*, #1841; Day J. and Warren P. 2015. *LPS XLVI*, #1254 [3] Koefoed P. et al. 2015. This conference.