# Northwest Africa 2200

Anorthositic impact melt breccia

552 g

*Figure 1: Northwest Africa (NWA) 2200 with a cm rule for scale.*

**Introduction**

Northwest Africa (NWA) 2200 was found in the Atlas Mtns., Morocco, and purchased in August 2004 (Fig. 1). It is completely crusted, ellipsoidal in shape, and contains whiter and grey clasts in a dark, glassy and fine grained matrix (Fig. 2; Connolly et al., 2006).

**Petrography, mineralogy, and chemistry**

NWA 2200 is mainly an anorthositic breccia consisting of many mineral fragments and lithic clasts in a fine grained matrix. The lithic clasts are mainly fine-grained, quench textured, and feldspathic. There are also a small number of ophitic basalts. Mineral clasts include plagioclase feldspar, olivine, pyroxene, chromite, schreibersite, metal, clinopyroxene, ilmenite, troilite and zirconalite (Connolly et al., 2006; Kuehner et al., 2005). Feldspars have a narrow compositional range from $An_{96}$ to $An_{98}$. The prevalence of anorthositic clasts and ferroan mafic silicates has led Kuehner et al. (2005) to propose derivation from a FAN suite (Fig. 3). A small basaltic component is barely reflected in the FeO contents of 3 to 4 wt% (Fig. 4; Korotev, 2006), typical for many feldspathic lunar meteorites. Sc, Sm and Th contents are also similar to feldspathic lunar meteorites analyzed previously (Fig. 4).

Nagaoka et al. (2008, 2009) measured major-element composition for NWA 2200 and found (in wt. %): $SiO_2$ = 42 ± 2, $TiO_2$ = 0.18 ± 0.01, $Al_2O_3$ = 30.0 ± 0.4, FeO = 4.8 ± 0.3, MgO = 3.5 ± 0.6, MnO = 0.055 ± 0.002, CaO = 17 ± 1, $Na_2O$ = 0.33 ± 0.03. Together with Sm of 1.0 ± 0.2 ppm, the bulk composition measured by these authors is in agreement with that measured by Korotev et al. (2008). The iron content is slightly (~1 wt. %) higher than that of Korotev et al. (2008) (FeO = 3.95 wt. %). The Mg# (56) is the lowest among lunar meteorites (57 - 80), and $Al_2O_3$, MgO and FeO are consistent with those of Apollo FAN rocks, in agreement with Kuehner et al. (2005).

*Figure 2: slab cut of NWA 2200 illustrating the feldspathic nature of the sample, as well as the thin veins (photo from R. Korotev).*

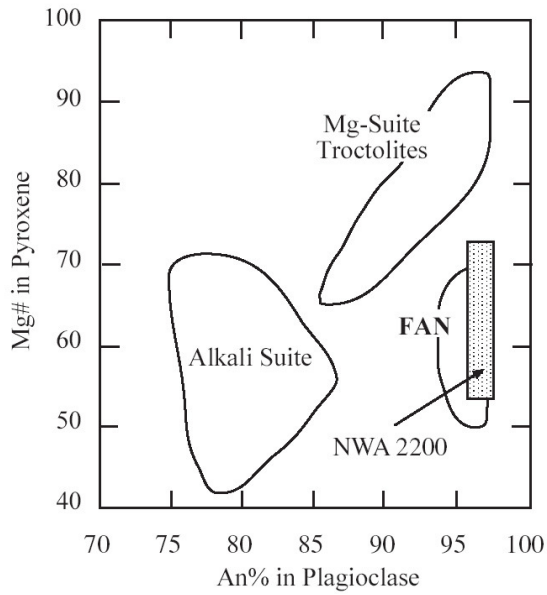


*Figure 3: Mg# vs. An content for clasts from NWA 2200 from Kuehner et al. (2005).*

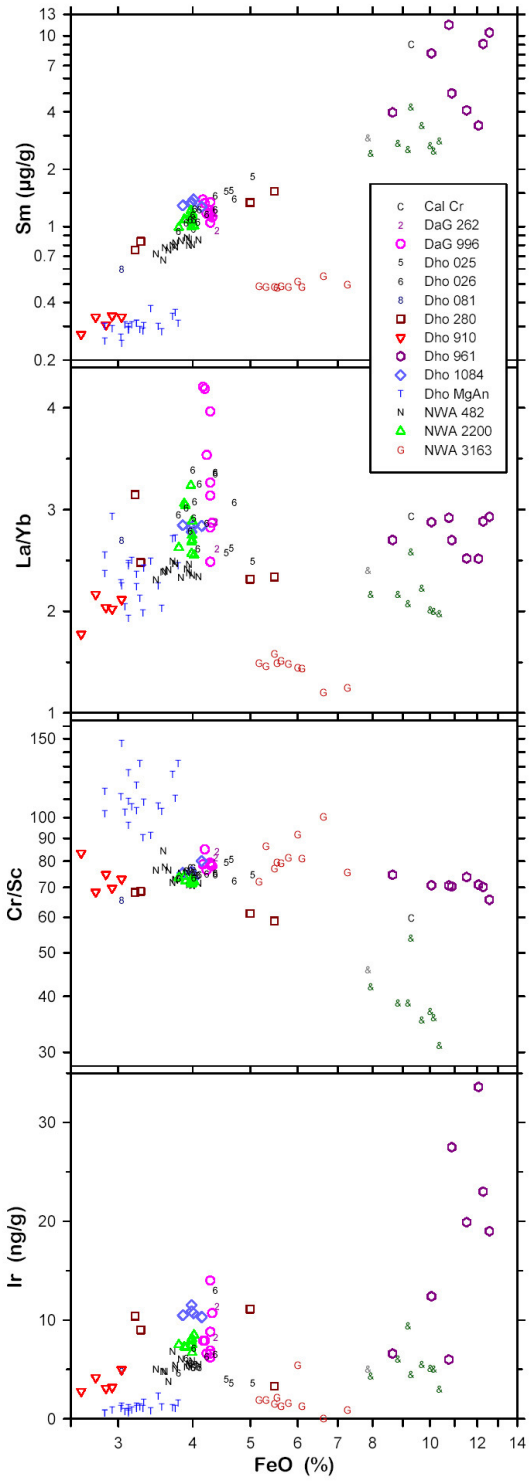


*Figure 4: Chemical composition of NWA 2200 (green triangles) from Korotev (2006).*

**Radiogenic age dating**

None yet reported.

**Cosmogenic isotopes and exposure ages**

None yet reported.