M1640.1

Fig. 3. Cut surface of NWA 5782 showing its brecciated texture. Units on scale (rule) are inches. cm

Northwest Africa 5782

Morocco

Purchased: September 2008

Achondrite (acapulcoite/lodranite)

History and physical characteristics: Purchased by Blaine Reed at the Denver Mineral Show. Two pieces with a total mass of 130 g were found in a batch of meteorites. The stones experienced moderate terrestrial weathering, but some fusion crust is still visible.

Petrography (T. Bunch and J. Wittke, *NAU*; A. Irving, *UWS*; P. Sipiera, *PSF*): A polymict breccia of subrounded to subangular clasts (exhibiting some preferred orientation) set in a cataclastic matrix with minor glass and secondary Fe hydroxide veinlets (Fig. 3). The most abundant clasts (45 vol%) are recrystallized acapulcoites with polygonal texture (mean grain size is 0.225 mm). Coarser grained, protogranular to polygonal textured clasts (25 vol%) are various types of lodranites (mean grain size is 0.745). The matrix (30 vol%) contains debris from both types of lithology, and additionally rare, small xenolithic fragments of augite with exsolution lamellae of Ca-poor pyroxene.

Mineral compositions and geochemistry: *Acapulcoites* Olivine $Fa_{8.7-13.3}$ (FeO/MnO = 17–27); low-Ca pyroxene $Fs_{9.0-4.1}$, $Wo_{2.1-3.0}$; clinopyroxene $Fs_{4.8-7.5}$, $Wo_{45.7-47.9}$. *Lodranites* Olivine $Fa_{8.6-13.7}$ (FeO/MnO = 16–18); low-Ca pyroxene $Fs_{12.7-13.7}$, $Wo_{2.8}$; clinopyroxene $Fs_{4.6}$, $Wo_{46.7}$ (Al_2O_3 1.10 wt%, Cr_2O_3 1.83 wt%, TiO_2 0.63 wt%). Xenolithic fragment clinopyroxene $Fs_{19.5}$, $Wo_{42.8}$ (FeO/MnO = 24); orthopyroxene $Fs_{40.7}Wo_{4.1}$ (FeO/MnO = 32). *Oxygen isotopes* (D. Rumble, *CIW*): acid-washed material analyzed in duplicate by laser fluorination gave, respectively $\delta^{17}O$ = 0.53, 0.66; $\delta^{18}O$ = 3.24, 3.03; $\Delta^{17}O$ = −1.172, −0.936 per mil.

Classification: Achondrite (acapulcoite, anomalous). This specimen is unusual among acapulcoites in that it is a breccia and contains a significant component of lodranite clasts.

Type specimens: A total of 20.8 g of material and one polished thin section are on deposit at *FMNH* in the PSF collection; another thin section is on deposit at *NAU*. The main mass is held by B. Reed.