

### ACAPULCOITE NORTHWEST AFRICA 6557 AND PROPOSED ESTABLISHMENT OF THE ACAPULCOITE-LODRANITE CLAN AS A SINGLE METEORITE CLASS.

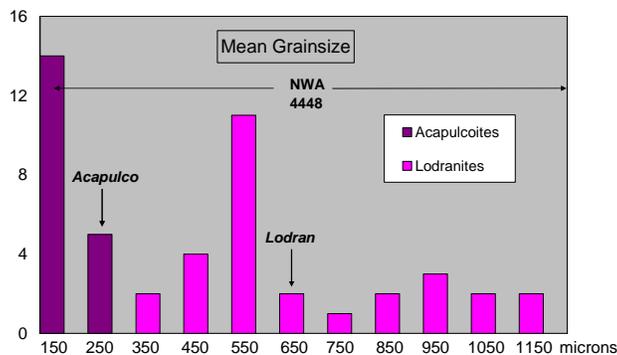
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**Petrography:** NWA 6557 is a very fresh 68 gram crusted achondrite with a mean grainsize (gs) of 240  $\mu\text{m}$  exhibiting equigranular metamorphic texture with triple grain junctions. It is composed of 38 vol.% orthopyroxene ( $\text{Fs}_{12.5}\text{Wo}_{2.1}$ ,  $\text{FeO/MnO} = 12$ ), 35 vol.% olivine ( $\text{Fa}_{13.9}$ ,  $\text{FeO/MnO} = 16$ ), 12 vol.% sodic plagioclase ( $\text{An}_{6.8}\text{Or}_{5.5}$ ), 7 vol.% subcalcic augite ( $\text{Fs}_{8.1}\text{Wo}_{36.8}$ ), and 8 vol.% chromite ( $cr\# = 87$ ) + kamacite ( $\text{Ni} = 6.2$  wt.%).

**Oxygen Isotopes:** Results obtained by laser fluorination of acid-washed NWA 6557 material ( $\delta^{18}\text{O} = 3.05, 2.79$ ;  $\delta^{17}\text{O} = 0.64, 0.55$ ;  $\Delta^{17}\text{O} = -0.962, -0.913$  per mil, respectively) plot within the relatively broad field for acapulcoites and lodranites

**Nomenclature Issues:** Since the falls of Acapulco (mean gs 170  $\mu\text{m}$ ) and Lodran (mean gs 580  $\mu\text{m}$ ), more than 45 separate related meteorites have been found in Antarctica, Africa and elsewhere. There is a continuous range in mean grainsize among specimens assigned the names acapulcoite and lodranite (based on the arbitrary division at 340  $\mu\text{m}$  proposed by [1]), and grain-sizes range widely even within single specimens of some of these achondrites (e.g., 50 to 1700  $\mu\text{m}$  with a mean of 550  $\mu\text{m}$  in NWA 4448). In the column chart below the apparent peak in the 500-550  $\mu\text{m}$  range is an artifact of grainsize estimates reported simply as "0.5 mm" by some classifiers, rather than a precise value.

**Proposal:** We suggest that the term *acapulcoite-lodranite clan* be applied to all of the members of this group (which oxygen isotopes and CRE ages suggest derive from different portions of the same parent body [2]). The terms acapulcoite and lodranite could still be used informally for members at either end of the range, but it seems imprudent to attempt to arbitrarily assign a specific grainsize at which the name changes. The term *transitional* has also been used for specimens of "intermediate" grainsize, but this also seems quite arbitrary and of limited usefulness.



**References:** [1] McCoy T. et al. (1996) *Geochim. Cosmochim. Acta* **60**, 2861-2908 [2] Irving A. et al. (2007) *Lunar Planet. Sci.* **XXXVIII**, #1338; Eugster O. and Lorenzetti S. (2005) *Geochim. Cosmochim. Acta* **69**, 2675-2685.