NORTHWEST AFRICA 10463: A NEW ANGRITE METEORITE.

A. R. Santos[1], C. B. Agee[1], A. S. Bell[1], and C. K. Shearer[1], [1]Institute of Meteoritics, 1 University of New Mexico, MSC03-2050, Albuquerque, NM 87131.

Introduction: The angrites are a small group of meteorites that are compositionally unique among currently sampled planetary materials, being extremely depleted in alkalis and having low silica contents [1]. Due to the small number of angrites, a lack of a confirmed parent body identified among present day asteroids, and their unique nature, interpreting angrite petrogenesis has been less straightforward than for some other achondrite groups [1]. Many angrites appear to sample the same process(es) from the angrite parent body, effectively making our small sample size even less representative. The discovery of new and different angrites, such as Northwest Africa 10463, can therefore greatly increase our knowledge of this meteorite group and their parent body.

Methods: One probe mount of NWA 10463 from the collection of the Institute of Meteoritics at the University of New Mexico was analyzed by scanning electron microscope, electron probe microanalysis, and Cr K-α XANES in order to assess the textures, mineral abundances, mineral compositions, and valence state of Cr in olivine.

Results: NWA 10463 contains feldspar (37%), pyroxene (29%), olivine (26%), Fe-Ti oxides (3%), Fe-sulfides (3%), and Cr-bearing spinel and a phosphate phase (<1%). Mineral compositions are typical of angrites (e.g., anorthite feldspar, Al- and Ti-rich pyroxene). Several textural features of this sample are interesting, as they indicate potentially new or different processes from those seen in most angrites (Figure 1). The overall texture of this sample is more similar to the plutonic angrites, however several minerals retain zoning profiles, suggesting they did not chemically equilibrate. Large low Ca olivine grains are often zoned, with Mg-rich interiors, and nearby high Ca grains have extensive exsolution. Several grains also display morphologies that do not reflect textural equilibrium. Several of the Fe-Ti oxides contain what appears to be a trellis exsolution texture, which is often interpreted to be caused by subsolidus oxyexsolution [2]. Three occurrences of what appears to be partially reacted spinel grains are present, all of which are trapped within plagioclase. These spinels are different in composition than the dominant Fe-Ti-oxide spinels, and instead are dominated by Al and Cr, with greater concentrations of Cr in rim regions and higher Al concentrations in the interiors. The zoning preservation in multiple minerals suggests this sample may have experienced a different cooling history than most angrites, and the partially reacted spinel may provide insight into angrite liquid evolution and phase relations.

References: [1] Keil K. (2012) *Chemie der Erde* 72:191-218. [2] Haggerty S. E. (1991) Reviews in Mineralogy 25:129-219.

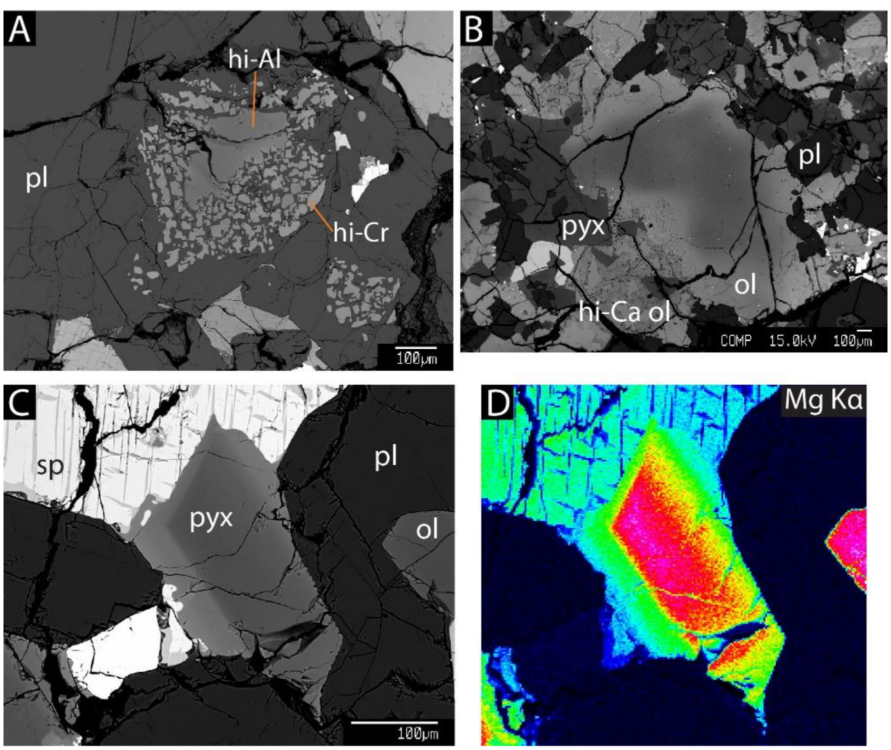

Figure 1: A: BSE image showing reaction texture of spinel surrounded by feldspar. The spinel region goes from high Cr on the edges of the reaction region to high Al in its interior. B: BSE image of olivine with preserved Mg-Fe zoning, with high-Ca olivine at two of its grain boundaries. C: BSE image of zoned pyroxene grain still showing relatively euhedral borders. D: Mg concentration in pyroxene grain from C.