PRESOLAR GRAIN ABUNDANCE VARIATIONS IN THE UNIQUE CARBONACEOUS CHONDRITE MIL 07687. C. Floss[1] and A. J. Brearley[2]. [1]Laboratory for Space Sciences and Physics Department, Washington University, St. Louis, MO 63130, USA. [2]Department of Earth and Planetary Sciences, University of New Mexico, Albuquerque, NM, USA. (Email: floss@wustl.edu).

Introduction: Presolar silicates are easily altered or isotopically re-equilibrated by relatively modest degrees of thermal or aqueous alteration and, thus, can be useful tracers of secondary nebular and/or parent body processes [e.g., 1, 2].

MIL 07687 is an ungrouped carbonaceous chondrite with affinities to the CO chondrites, but with a unique style of partial aqueous alteration [3, 4]. Its matrix consists of distinct irregularly-shaped FeO-rich and FeO-poor regions intermingled with one another, but with clearly defined boundaries. The FeO-poor regions are texturally similar to matrix material from low petrologic type CO chondrites (e.g., ALHA77307), whereas the FeO-rich areas show evidence for aqueous alteration. However, rather than the phyllosilicates typically seen in aqueously altered chondrites, these areas are dominated by Fe-oxyhydroxides, indicative of highly oxidizing conditions [4]. Below we report on the results of our search for presolar grains in this meteorite.

Experimental: We followed standard procedures [e.g., 5] for NanoSIMS C and O ion imaging and subsequent data processing.

Results and Discussion: We analyzed a total of 33,900 μm^2 in six different matrix areas of MIL 07687 and identified a total of 53 O-anomalous grains. The isotopic compositions of the grains are consistent with those observed in other meteorites, with most grains belonging to either Group 1 or Group 4; we also identified 3 grains with highly elevated ^{17}O enrichments (so-called 'extreme Group 1' grains [6, 7]). In addition, we found 28 C-anomalous grains; 21 of these are SiC, while the remaining 7 are other C-rich grains.

The overall abundance of O-anomalous grains is ~110 ± 15 ppm, consistent with the abundances determined by [8] for this meteorite; individual matrix areas range between 35 and 130 ppm. Number densities provide a more useful measure than surface area calculations for evaluating the significance of abundance variations, as they are independent of grain size. For O-anomalous grains, most of the areas we mapped have number densities between 0.18–0.20 grains/μm^2. However, two areas have significantly lower number densities of 0.09 grains/μm^2. Most of the areas targeted for the presolar grain searches are pristine and FeO-poor, but the two matrix areas with low number densities are more FeO-rich, suggesting that they have been aqueously altered and that this processing has affected abundances of presolar O-rich grains.

The overall abundance of SiC in MIL 07687 is ~85 ± 20 ppm, with individual matrix areas ranging from 15 to 190 ppm. The number densities for SiC also reflect this heterogeneity, with a factor of five variation. However, in contrast to the O-anomalous grains, there is no consistent correlation with the degree of alteration experienced by the host matrix area. This likely reflects the more refractory nature of SiC.

References: [1] Floss and Stadermann (2012) *MAPS* 47, 992. [2] Haenecour et al. (2014) *LPSC XLV*, #1316. [3] Brearley (2012) *LPSC XLIII*, #1233. [4] Brearley (2013) *MAPS Suppl.*, #5206. [5] Floss and Stadermann (2009) *GCA* 73, 2415. [6] Vollmer et al. (2008) *ApJ* 684, 611. [7] Gyngard et al. (2011) *LPSC XLII*, #2675. [8] Davidson et al. (2014) *LPSC XLV*, #1376.