PRESOLARSILICATEANDOXIDEDUSTINALHA77307.M. Bose, C.Flossand F. J.Stadermann.Laboratory for Space Sciences and Physics Dept., WashingtonUniversity,St.Louis,MO63130.E-mail:mbose@physics.wustl.edu.Horizon and Horizon and Horizo

**Introduction:** Presolar silicates are the newest addition to the presolar grain inventory. Abundant sub-micrometer silicate grains have been identified and characterized to date [e.g., 1–4]. Here we report results from searches for O-bearing presolar grains in the CO3 chondrite, ALHA77307.

**Experimental:** The NanoSIMS was used to search for isotopically anomalous grains in a thin-section of ALHA77307 by rastering a primary Cs<sup>+</sup> beam of about 1 pA over  $10 \times 10 \ \mu m^2$  areas and collecting <sup>12,13</sup>C<sup>-</sup> and <sup>16,17,18</sup>O<sup>-</sup> secondary ions and secondary electrons in multi-collection mode. Compositional information was obtained for grains with anomalous O isotopic compositions with the Auger Nanoprobe.

**Results and Discussion:** Oxygen-isotopic imaging of 16,900  $\mu$ m<sup>2</sup> of matrix led to the identification of 67 O-anomalous grains. The estimated abundance of O-anomalous grains in ALHA77307 is about 120 ppm (without correcting for detection efficiency) which is similar within errors to that found by [5]. The majority (85%) of the grains exhibit <sup>17</sup>O enrichments with solar to subsolar <sup>18</sup>O/<sup>16</sup>O ratios (group 1). Three grains show <sup>18</sup>O depletions accompanied with <sup>17</sup>O enrichments (group 2). Two grains contain depletions in both of the heavier isotopes of O (group 3) while five grains are <sup>18</sup>O-rich (group 4). Thus the grains cover all four isotopic groups previously identified for presolar oxides [6].

Auger analyses of 44 grains revealed 36 grains with ferromagnesian silicate compositions; a few grains also contain Ca and/or Al. Three additional silicate grains have Mg-rich end-member compositions and two have Fe-rich end-member compositions. The Auger spectra of two grains are dominated by large Si and O peaks with an O/Si ratio of about  $2.2\pm0.3$ , compatible with a SiO<sub>2</sub> stoichiometry. An Fe-oxide grain has also been found. The remaining grains are currently being characterized.

Of the silicate grains investigated so far, 14 are Fe-rich while eight are Mg-rich. The remaining grains have mg#s between 45% and 55%. The high Fe concentrations in many of the grains may be of a primary origin [7] or a result of secondary processing [e.g., 8]. The distribution of Fe contents in the presolar silicate grains in ALHA77307 is similar to that seen in the CR3 chondrites [2]. In contrast, Acfer 094 contains more silicate grains with high Fe contents [9], which may indicate that it experienced more secondary processing than these other meteorites.

Most group 4 (<sup>18</sup>O-rich) silicate grains that have been characterized (e.g., 10 out of 15 [1, 2, 4, this study]) are Fe-rich. It has been argued that these grains formed in supernovae [10]. If this is the case and if the Fe is incorporated into silicates in stellar outflows, this may imply that non-equilibrium condensation is the preferred mechanism for dust formation in supernovae.

References: [1] Bose M. et al. (2009) *ApJ*, in preparation. [2] Floss C. & Stadermann F. J. (2009) *GCA*, 73, 2415-2440. [3] Nguyen A. N. et al. (2007) *ApJ*, 656, 1223-1240. [4] Vollmer et al. (2009) *GCA*, submitted. [5] Nguyen et al. (2008) *LPSc XXXIX*, #2142. [6] Nittler et al. (1997) *ApJ*, 483, 475-495. [7] Ferrarotti A. S. & Gail H. -P. (2001) *A&A*, 371, 133-151. [8] Jones R. H. & Rubie D. C. (1991) *E&PScL*, 106, 73-86. [9] Bose M. et al. (2008) *M&PS*, 43, A27. [10] Nittler et al. (2008) *ApJ*, 682, 1450-1478.