C AND N ION IMAGING IN THE EH3 CHONDRITE SAH 97159. M. Bose[1], X. Zhao[2], C. Floss[1], F. J. Stadermann[1], and Y. Lin[2]. [1]Laboratory for Space Sciences and Physics Department, Washington University, St. Louis, MO 63130. E-mail: mbose@physics.wustl.edu. [2]Laboratory of Earth's Deep Interior, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China.

Introduction: The insoluble organic matter (IOM) in numerous primitive meteorites, notably the CR chondrites, is ^{15}N-rich in bulk. Carbon and N isotopic imaging shows that discrete hotspots with large enhancements in ^{15}N are often present in this matter; some of these also have associated anomalous C isotopic compositions [1-3]. Coordinated NanoSIMS and TEM analyses of C- and N-anomalous hotspots show that the isotopic hotspots are often associated with carbonaceous grains with variable morphologies [3, 4].

To date, C and N ion imaging measurements have been reported for a variety of carbonaceous chondrites [e.g., 5], but no enstatite chondrites have been explored as yet. We recently identified presolar silicate and C-anomalous grains in the paired EH3 chondrites SAH 97096 and SAH 97159 [6], indicating that high temperatures conditions in the nebular phase did not destroy stardust materials completely in these meteorites. Indeed, fifteen C-anomalous grains were identified in SAH 97159 on the basis of C and O imaging [6], of which six are most likely SiC grains. We, therefore, decided to explore whether N-anomalous material may have survived in this meteorite.

Experimental: We carried out NanoSIMS C and N ion imaging searches in the matrix of a thin-section of SAH 97159. Instrument tuning and standard measurements were carried out on terrestrial kerogen standards [7].

Results and Discussion: We identified five additional C-anomalous grains in the SAH 97159 matrix, with ^{12}C/^{13}C ratios from 52–110; the ^{14}N/^{15}N ratios range from 190–441. On the basis of the isotopic compositions and the $^{12}C^-/^{28}Si^-$ elemental ratios two grains may be SiC, while the others may be carbonaceous material intermixed with silicates in varying proportions.

Nitrogen-anomalous hotspots were absent in the area analyzed. This is consistent with the N isotopic compositions of bulk IOM in enstatite chondrites [8]. In contrast, the most pristine CR chondrites, MET 00426 and QUE 99177 contain large isotopic anomalies both in bulk and in the form of localized hotspots [2]. The CO chondrite ALHA77307 shows only localized hotspots, at levels that are consistent with the lack of bulk ^{15}N enrichment in the IOM of this meteorite [3]. It has been suggested that the material from which the enstatite chondrites formed experienced high temperature processing in the solar nebula [9]; the lack of N isotopic anomalies in SAH 97159 is consistent with this scenario.

References: [1] Busemann H. (2006) *Science* **312**, 727. [2] Floss C. and Stadermann F. J. (2009) *ApJ* **697**, 1242. [3] Bose M. et al. (2010) *MAPS* **45**, A19. [4] Floss C. et al. (2011) LPSC XLII, #1455. [5] Davidson J. et al. (2009) LPSC XL, #1853. [6] Bose M. et al. (2010) *POS-NIC* **XI**, 138. [7] Hayes J. M. et al. (1983) In *Earth's earliest biosphere: its origin and evolution*. pp. 93-134. [8] Alexander C. M. O'D. et al. (2007) *GCA* **71**, 4380. [9] Huss G. et al. (2003) *GCA* **67**, 4823.