PRESOLAR GRAINS IN PRIMITIVE CARBONACEOUS CHONDRITE NORTHWEST AFRICA 5958.

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Introduction: NWA 5958 is a 'uniquely primitive' carbonaceous chondrite (CC) with bulk CI-like elemental composition, a bulk ^{16}O enrichment and anhydrous mineralogy [1, 2]. The abundances of isotopically anomalous presolar grains, especially silicates, vary among chondrites and are sensitive probes of parent-body and nebular processing [3-5]. Anhydrous interplanetary dust particles (IDPs) have CI-like chemistry and presolar silicate abundances higher than those in primitive CCs by a factor of a few [6, 7]. We report here a preliminary search for presolar grains in NWA 5958.

Methods: We used the NanoSIMS 50L ion microprobe to scan ~25,000 μm^2 of two matrix areas of a polished section of NWA 5958. Secondary images (256×256 pixel) of ^{12,13}C, ^{16,17,18}O, ^{28,30}Si and secondary electrons were acquired on 20×20 μm^2 areas. Image processing was used to identify isotopically anomalous grains in images; SEM work is in progress to locate the identified grains for future elemental/structural analysis.

Results and Discussion: A total of nine ^{13}C-rich grains (probably SiC) and 13 O-anomalous grains (silicates and/or oxides) were found, giving abundances in matrix of 45 ppm and 65 ppm, respectively. However, the abundance of O-anomalous grains reflects derived abundances of 20 and 100 ppm, respectively, for the two analyzed matrix areas. The O isotopic measurements were sub-optimal for the first area due to a rapidly aging ion detector, so we consider ~100 ppm to be a better estimate for the matrix abundance (not correcting for the non-unity detection efficiency of the NanoSIMS imaging technique [8], which affects all published abundances). This abundance is comparable to, but slightly lower than, typical values observed for other primitive type 3 CCs [6,8] and much lower than primitive IDPs. This suggests that the fine-grained matrix of NWA 5958 has experienced somewhat more thermal processing than other type 3.0 CCs, perhaps similar to Adelaide [9], and also argues against thermal processing in the nebula as a common cause of elemental fractionations and presolar grain abundance variations in meteorites [4]. The SiC abundance of NWA 5958 matrix is quite similar to that of other CCs, especially CI, and CR classes [10].

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