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RELEASE PROFILE AS AN INDICATOR OF SOLAR-WIND NEON LOSS FROM *GENESIS* COLLECTORS. A. P. Meshik[1], C. M. Hohenberg[1], D. S. Burnett[2], D. S. Woolum[3], and A. J. G. Jurewicz[2], [1]Campus Box 1105, Washington University, One Brookings Drive, St. Louis MO 63117, USA (am@howdy.wustl.edu), [2]Geology Department, Mail Code 100-23, California Institute of Technology, Pasadena CA 91125, USA, [3]Physics Department, California State University, Fullerton CA 92834, USA.

During the course of solar-wind-collector studies for the *Genesis* mission, we investigated retention of solar-wind Ne in Al deposited on sapphire (AloS). Temperature and lattice distortion effects caused by solar-wind H can affect the retention of light noble gases, but there is generally no way to identify that loss has occurred. We report here experimentally derived signatures that can characterize and identify such losses.

Samples of AloS were irradiated at Los Alamos National Laboratory with doses of ~10^{12} and 3×10^{16} atoms/cm^2 of ^{20}Ne and H, respectively, at solar-wind energies, to model the expected fluences for the mission. Selected areas of the AloS were cut from the implanted wafers and held in vacuum for 46 d at 300° and 400°C to simulate thermal conditions that might be encountered during the mission (real flight condition will be <200°C, 2 yr). A reference sample was held in vacuum at room temperature. The retained gases were then extracted by controlled (±0.25°C) stepped pyrolysis using 100°C temperature increments.

Results and Discussion: Figure 1a shows the fractional ^{20}Ne release profiles. Both extended heating and high doses of coimplanted H seem to remove low-temperature Ne. Although generally small, these losses affect the low-temperature tails of the release profiles, providing a means for prior loss detection. Diffusive loss removes noble gases that would otherwise have come out in the low-temperature extraction steps. There should, therefore, be a connection between low-temperature fractional releases and overall Ne retention, and we do observe such a correlation in Fig. 1b.

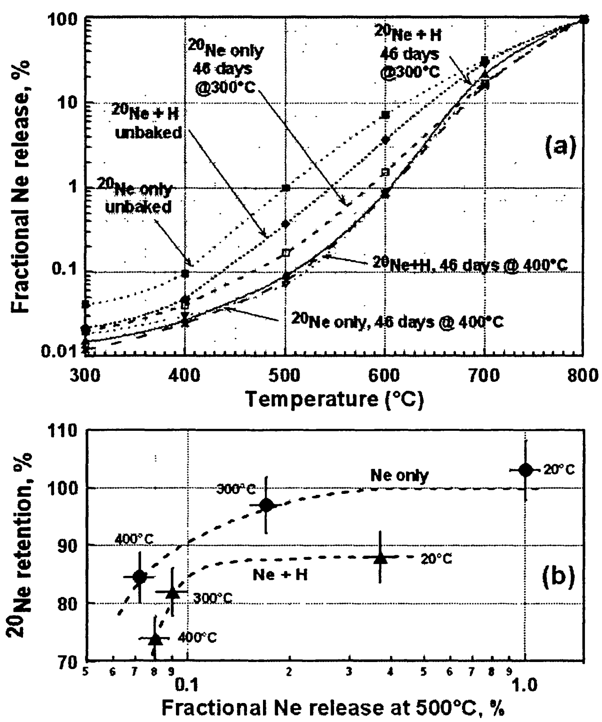

Fig. 1. **(a)** Fractional release of ^{20}Ne implanted in six different samples of AloS (with and without accompanying H; maintained for 46 d at ~20°C, 300°C, and 400°C). Data below 300°C and above 800°C are not shown (negligible gas amounts). **(b)** Fractional release in the 500°C extraction correlates with overall solar-wind retention.

Neon-20 retention was determined by comparisons of surface densities measured by laser extraction from small areas prior to heating. Since losses are most pronounced in the 500°C step (Fig. 1a), we use this temperature to quantify losses. The lowest retention, about 80%, occurred in AloS samples, which released less than 0.1% of the implanted ^{20}Ne at 500°C. The most retentive AloS was implanted with ^{20}Ne only and not heated. This sample retained all of its implanted gas and released about 1% in the 500°C fraction (Fig. 1b).

Conclusion: Analysis of the differential release profiles provides a diagnostic tool for the discovery and quantification of losses of implanted solar-wind gases that may occur during the *Genesis* mission. Empirically determined relationships between the low-temperature release profiles of implanted Ne and the overall Ne retention can potentially identify diffusive losses from collector films in real flight samples. What is not clear is whether the lower H flux during the mission (for the same fluence) still results in the ~12% loss of Ne observed in these samples.

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SEARCH FOR PRESOLAR SILICATES IN ACFER 094. S. Messenger and T. J. Bernatowicz, Laboratory for Space Sciences and Physics Department, Washington University, St. Louis MO 63130, USA, (dbunny@howdy.wustl.edu).

Introduction: A growing variety of circumstellar grains has been identified in primitive meteorites, establishing a new branch of laboratory astrophysics [1]. The grains found to date are highly refractory phases (e.g., graphite, silicon carbide, corundum) and are typically 0.1–1 µm in size. However, these phases are thought to be rare in the interstellar medium, and the most abundant type of interstellar grain, silicates, has yet to be identified in meteorites. Locating presolar silicates in meteorites is an experimental challenge, requiring one to locate potentially very rare presolar grains among a sea of isotopically normal solar system silicates. The automated-isotopic mapping system developed by Nittler [2] is well suited for locating such rare, isotopically distinct grains. Here we have applied this ion imaging technique to chemically untreated, dispersed matrix material from the Acfer 094 (CM3?) chondrite, which is known to have high abundances of refractory circumstellar grains and appears to be minimally altered [3,4]. This extends an earlier search of ~20,000 grains from the Tieschitz ordinary chondrite performed by Nittler [2].

Experiments: A sample of 160 mg of Acfer 094 matrix material was crushed and ultrasonically disaggregated in a mixture of 80% isopropanol and 20% H_2O. Three size separates were produced by centrifugation: <2.0 µm, <0.3 µm, and 0.03–0.1 µm. Aliquots of each size separate were dispersed on Au substrates for analysis by secondary ion mass spectrometry (SIMS) ion imaging with the Washington University CAMECA IMS 3f ion microprobe. Low-mass-resolution images of $^{16}O^-$ and $^{18}O^-$, produced by a primary Cs^+ ion beam, were acquired with a CCD camera coupled to a multichannel plate/fluorescent screen detector. For the largest grain size separate, 100 ms ^{16}O images preceding and following a 45-s ^{18}O image were acquired. For the smaller grain size separates, multiple (4–6) cycles of ^{16}O and ^{18}O images were acquired in order to enable correction for rapidly changing count rates of small particles.

Results: Approximately 100,000 grains were analyzed, including roughly 50,000 < 2.0-µm, 40,000 < 0.3-µm, and 10,000 0.03–0.1-µm grains. No definitive presolar silicates have been identified among the current dataset (see Fig. 1). Figure 1 shows the measured $^{16}O/^{18}O$ ratios determined by ion imaging, normalized to the mean value of the grains in each image, relative to the solar system average. The standard deviation of the measurements is approximately 3.5% for the two largest grain size separates, and ~4.5% for the smallest grains. The tail of the distribution toward low $^{16}O/^{18}O$ ratios is due to contamination by residual $H_2{}^{16}O$ on the sample surface. There are several ^{18}O-poor candidates, with $^{16}O/^{18}O$ ratios near 1.2× solar. Most presolar silicates would be deficient in ^{18}O, if they had O-isotopic distributions similar to presolar corundum [5] grains. With one exception, the ^{18}O-poor candidate grains are small grains that sputtered away during the imaging run,