DEPTH PROFILING ANALYSIS OF SOLAR WIND HELIUM COLLECTED IN DIAMOND-LIKE CARBON FILM FROM *GENESIS*. K. Bajo[1], C. T. Olinger[2], A. J. G. Jurewicz[3], D. S. Burnett[4], I. Sakaguchi[5], T. T. Suzuki[5], S. Itose[6], M. Ishihara[7], K. Uchino[8], R. Wieler[9], and H. Yurimoto[1]. [1]Department of Natural History Sciences, Hokkaido University, IIL, Sapporo 001-0021, Japan. [2]Applied Modern Physics Group, Los Alamos National Laboratory, Los Alamos, NM 87545, USA. [3]CMS/SESE, Arizona State University, Tempe, AZ 85287-1404, USA. [4]Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA 91125, USA. [5]National Institute for Materials Science, Tsukuba, Ibaraki 305-0044, Japan. [6]JEOL Ltd., Musashino, Akishima, Tokyo 196-8558, Japan. [7]Department of Physics, Osaka University, Toyonaka, Osaka 560-0043, Japan. [8]Graduate School of Engineering Sciences, Kyushu University, Kasuga, Fukuoka 816-8580, Japan. [9]Institute for Isotope Geology and Mineral Resources, ETH Zurich, Clausiusstrasse 25, 8092 Zurich, Switzerland.

NASA's *Genesis* mission collected samples of solar wind that can be analyzed with high precision in laboratories with the ultimate goal of determining the composition of the sun and the solar nebula from which it was formed [1].

In this study, we used a sputtered neutral mass spectrometry using strong-field ionization to measure He profiles in *Genesis* collectors. We can depth-profile because our instrument can quantify ^{4}He present at tens of ppma by analyzing an area of a solid surface only a few-microns in size. Here we report depth distribution profile of solar wind ^{4}He from a *Genesis* collector, a diamond-like carbon film on a silicon (DOS) wafer [2].

A volume of 2.5 × 4 μm^2 and 140 nm in depth was measured for the depth profiling. The peak concentration of implanted solar wind ^{4}He was about 2.2 × 10^{20} cm^{-3} at ~20 nm in depth. The implantation profile was traced to 100 nm in depth until the blank level was reached. The blank of He was ~3 × 10^{18} cm^{-3}. The solar wind He fluence calculated using depth profiling is ~8.5 × 10^{14} cm^{-2}. The shape of the solar wind ^{4}He depth profile is consistent with TRIM [3] simulations using the observed ^{4}He velocity distribution during the *Genesis* mission. It is therefore likely that all solar-wind elements heavier than H are completely intact in this *Genesis* collector and, consequently, the solar particle energy distributions for each element can be calculated from their depth profiles. Ancient solar activities and space weathering of solar system objects could be quantitatively reproduced by solar particle implantation profiles when we measure natural sample surface irradiated by solar wind, such as Moon regolith grains and Itokawa particles.

References

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