NEW OXYGEN ISOTOPE MEASUREMENTS OF FOUR STARDUST IMPACT CRATER RESIDUES SHOW IDP-LIKE COMPOSITIONS. C. J. Snead[1] and K. D. McKeegan[1]. [1]Dept. of Earth, Planetary, and Space Sciences, University of California, Los Angeles, Los Angeles, CA 90095-1567, USA. E-mail: stardust2006@ucla.edu.

Introduction: NASA's Stardust Mission to return samples from comet 81P/Wild 2 provided the first opportunity to perform laboratory analyses on samples from a known comet. Determining the oxygen isotopic composition of comet dust has important implications for models of early solar nebula processes. Most analyses have focused on large terminal particles [1-3] because fine-grained material residing in aerogel walls, which represents the majority of collected grain mass [4], suffered severe alteration by heating and mixing with the oxygen-rich collecting medium. Aluminum foil substrates on the Stardust collector provide a low background alternative for the O-isotope measurement of both the coarse and the fine-grained components of Wild 2 dust that has been captured as residues deposited on the walls of impact craters. We previously reported the oxygen isotope composition of three crater residues [5,6]; here we report the results of the oxygen isotope analyses of four additional Stardust crater residues.

Analytical Conditions: Stardust craters C2102N,1; C2102N,1a; C2116W,0; and C2049N,1 were measured with the UCLA Cameca IMS-1270 using a 0.5nA, 20KeV, 15μm rastered cesium primary beam. Secondary ions were counted via multicollection using two electron multipliers and one Faraday cup. A mass resolving power of 6000 was used to separate the interfering ^{16}OH peak from the ^{17}O signal. Individual crater analyses consisted of 100 count cycles of five seconds per cycle. We counted ions from the onset of sputtering and then performed a change-point analysis in order to determine when the sample attained sputtering equilibrium; data points for the crater residues collected prior to the change point were excluded. Wild 2 crater measurements were normalized to San Carlos olivine that had been powdered and fired at foil targets at 6 km/s to produce crater residues of standard material.

Results and Discussion: Three of the analyzed craters have oxygen isotope compositions that plot in the range of measurements of bulk anhydrous IDPs, Antarctic micrometeorites, and some CI chondrite components [7], with Δ^{17}O values of 0–4‰. One crater, C2116W,0, has a heterogeneous composition, with Δ^{17}O values ranging from 1–2‰ in one analyzed spot, to 12–14‰ in a second analyzed spot; the later compositions are similar to those found in Semarkona magnetite and some hydrated IDPs, and may suggest interaction with cometary heavy water [7,8]. Thus far, no evidence of abundant presolar material has been found in any of the measured crater residues, nor has ^{16}O-rich dust been observed.

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