PRELIMINARY STUDIES OF Xe AND Kr FROM THE GENESIS POLISHED ALUMINUM COLLECTOR.

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Introduction: Low solar wind (SW) abundances of Xe and Kr require a large collector area to provide measurable quantities of these rare gases. Originally we planned to use large areas of Al on Sapphire (AloS) collectors, but the hard landing of Genesis fractured these collectors, changing our initial plans. The only large, relatively intact, surface exposed to SW was the kidney-shaped polished aluminum T6-6061 alloy (AlK) designed to serve as a thermal shield rather than a SW-collector. Here we describe what has been done and the problems remaining to be solved for optimized Xe and Kr abundances and isotopic compositions from the AlK.

Experimental: A laser extraction technique was developed for the AlK with controlled depth resolution using 7 ns-pulsed (30Hz) UV laser (266nm). Longer focal length (100 mm) optics and a deeper cell were needed for acceptable laser extraction from the distorted surface of the post-impact AlK collector. A large area (~ 10 cm^2) is needed to recover enough Kr and Xe for reasonably precise measurement. A sliding shutter with a narrow slit was installed in the cell to protect the sapphire viewport from deposition of some of the Al sputtered during raster of these large areas. Noblesse, our new 8-multiplier mass spectrometer, was designed for Kr and Xe measurements and, prior to this, it has only been exposed to atmospheric noble gases.

Results: Diffusion losses from the aluminum alloy heat shield are much greater than from the AloS collectors. AlK has apparently lost ~ 35% of SW-He and ~15% of SW-Ne [1], but this trend suggests that the AlK retained most of its Kr and Xe. Blanks for Kr and Xe remain a problem due to the complex design including a linear-motion feedthrough for the shutter and the long raster times required for the areas extracted. Electropolishing of all internal surfaces, two-week bake (with AlK samples included) at 215ºC, and extensive exercising of moveable parts to reduce gas release in flexing have allowed us to reduce Xe blanks to about 1×10^{-15} $cm^3STP\,^{132}Xe$, equivalent to that contained in ~2 cm^2 of this collector. However, the first attempt to study the AlK revealed a new problem – an unknown contaminant released from AlK that was not completely removed by gettering. Nevertheless, both the observed $^{84}Kr/^{132}Xe$ ratio of ~ 16 and the lighter than atmospheric Xe composition suggest a mixture of ~1 part SW-Xe and ~ 3 parts atmospheric Xe, about 3 times more than expected from blanks. Work is underway to discover the contaminant and develop a more efficient cleaning protocol for heavy noble gases released from AlK Genesis collector. We will report data from areas large enough for reasonably precise Kr and Xe once proper gettering is established.

References: [1] Meshik A., Marrocchi Y., C. Hohenberg, et al. 2006. *Meteoritics & Planetary Science*, Vol. 41, Suppl. p.5083. Supported by NASA grant NNJ04HI17G.