ELEMENTAL COMPOSITION OF COMET 81P/WILD 2 DERIVED FROM STARDUST SAMPLES.

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Introduction: To determine the elemental composition of 81P/Wild 2 is one of the prime objectives of analyzing cometary dust returned by the Stardust mission [1]. Samples were collected by two capture media, silica aerogel and Al foils. While aerogel was meant for sampling the cometary dust almost intact, on Al foils, impacting cometary dust particles formed hypervelocity craters with residual cometary matter [2].

First results on elemental composition were recently reported by [3], mainly focusing on data from entire particle tracks and data from Al foil craters. In the present study, the elemental compositions of various samples investigated during the preliminary examination phase are discussed comparatively to extract a comprehensive data set from various sources, and from there, conclusions are drawn on the Wild 2 nucleus composition.

The available data set: For the present comparison, data obtained by three different techniques were used: (1) synchrotron-based X-ray microprobe analysis (SXRM) of entire particle tracks [3], (2) scanning electron microscopy using energy-dispersive X-ray analysis (SEM-EDX) of cometary residues associated with impact features on Al foils [3], and (3) time-of-flight secondary ion mass spectrometry (TOF-SIMS) of particles extracted from aerogel [4], of residual cometary matter in aerogel tracks [3,5], as well as of impact residues on Al foils [3,6].

Results: Fig. 1 shows geometric mean values of element ratios from samples captured by aerogel and from impact residues on Al foils. Besides an enrichment of some volatile elements like Li, Cu, K, Ga, and Na that might be attributed to contamination of the capture media, most elements show within a factor of two abundances close to average solar system (CI) composition (Fig. 1). However, for impact residues on Al foils, a slight trend of increasing depletion with increasing volatility was observed (dotted line in Fig. 1), maybe indicative for a slight element fractionation during impact, while for samples captured by aerogel, no such trend is visible, except for a general depletion in S.

Conclusions: Besides deviations that can be explained by the capture process, Wild 2 dust shows a rather CI-like composition.

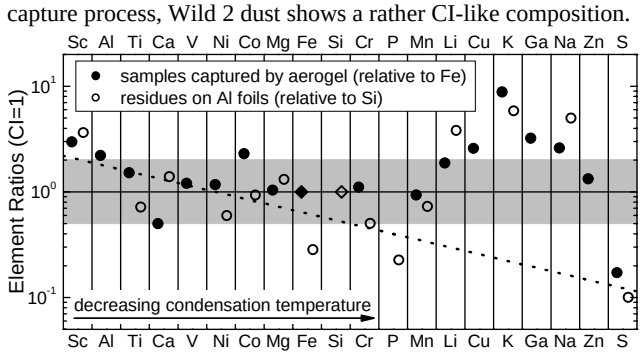

Fig. 1. Geometric mean values of element ratios normalized to CI chondritic element ratios.

References: [1] Brownlee D. et al. 2006. *Science* 314:1711–1716. [2] Hörz F. et al. 2006. *Science* 314:1716–1719. [3] Flynn G. J. et al. 2006. *Science* 314:1731–1735. [4] Stephan T. et al. 2007. *Meteoritics & Planetary Science,* submitted. [5] Stephan T. et al. 2007. *Meteoritics & Planetary Science,* in press. [6] Leitner J. et al. 2007. *Meteoritics & Planetary Science,* submitted.