GENESIS SOLAR WIND SAMPLES: UPDATE OF AVAILABILITY. C. P. Gonzalez[1], K. K. Allums[2], and J. H. Allton[3], [1]Jacobs, NASA Johnson Space Center, Houston, TX 77058, USA, [2]HX5,LLC– Jacobs JETS Contract, NASA Johnson Space Center, Houston, TX 77058, USA, [3]NASA Johnson Space Center, Houston, TX 77058, USA

Introduction: The Genesis mission collected solar wind atoms for 28 months with a variety of collectors. The array wafer collector availability is displayed in the online catalog. The purpose of this report is to update the community on availability of array wafer samples and to preview other collectors which are in the process of being added to the online catalog (Fig. 1). A total of fifteen pure materials were selected based on engineering and science requirements. Most of the materials were semiconductor wafers which were mounted on the arrays. An excellent description of the materials and their intended use as collectors is given in [1] and summarized in Table 1.

Collector Material	Target element/ Intended use
13C Diamond (CVD)	O, N, F
Silicon Carbide (SiC)	O, N, Li, Be, B, F
Diamond-like Carbon on silicon (DOS)	N, noble gas isotopes
Aluminum on saphire (AlOS)	Noble gases
Czochralski-grown silicon (CZ-Si)	Same as FZ, except for C and O. CZ was used because it was obtained with very clean surfaces
Float-zone silicon (FZ-Si)	FZ is exceptionally pure. All elements except those which diffuse rapidly (Fe, alkalis)
Silicon on saphire (SOS)	C; epitaxial-silicon layer potentially simplifies extraction
Germanium (Ge)	No detectable impurities. Ge complements Si for SIMS analysis because of greatly reduced molecular interferences.
Gold on saphire (AuOS)	N, Fe, alkalis
Saphire (SAP)	Unable to detect any impurities. Potentially useful for alkalis
Carbon+cobalt+gold on saphire (CCoAuOS)	Layered film; SEP-particles
Bulk metallic glass (BMG)	Noble gases; SEP-particles
Aluminum alloy	Bulk solar wind
Gold foil	N, bulk solar wind
Molybdenum on Platinum (Mo-Pt)	Radionuclides (e.g., 10Be, 14C)

Table 1: Collector material list and intended use, from [1].

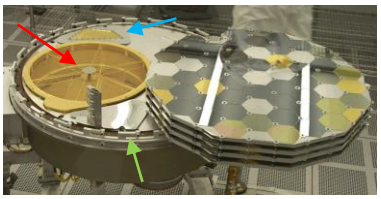

Fig. 1. Hexagon array wafers, concentrator target (red), gold foil (blue), polished aluminum (green).

Array Samples: Since the return of Genesis on September 8, 2004, steady progress has been made in characterizing the array samples. A tally of larger samples characterized with size distribution was presented in January 2009 [2] and 2011 [3]. As of January 2015 there have been a total of 2,441 fragments characterized by material, regime, and area. Also 1,397 fragments have been characterized by material only (Table 2).

The curatorial staff at JSC characterized 358 flight fragments in 2014. Figure 2 A-D are 5X mosaic images of typical samples that were characterized in 2014. Potentially hundreds of additional samples are in the 600 containers (96-array, post-it notes, jars, etc.) that contain multiple fragments which have not yet been characterized.

	B/C	E	H	L	Unknown at this time
AlOS	124	44	41	36	336
AuOS	106	76	69	39	342
CCoAuOS	6	0	0	0	11
DOS	110	42	36	44	26
Ge	5	2	0	2	7
SAP	167	39	32	16	131
CZ-Si	257	65	57	62	6
FZ-Si	350	65	68	45	22
Si	74	32	76	22	302
SOS	94	56	43	39	214

Table 2: Total number of characterized wafer fragments based on material and regime. This list includes current samples that are allocated, subdivided, and consumed.

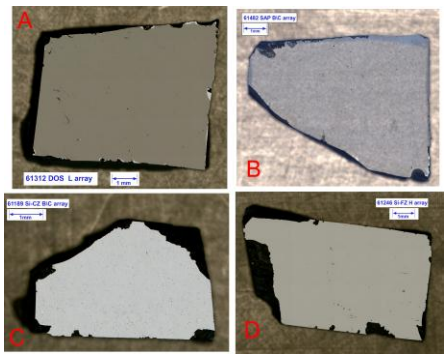

Fig. 2: Preview of samples that were characterized in 2014. None of the samples have been cleaned nor allocated. **A)** 61312 DOS L array; **B)** 61482 SAP B/C array; **C)** 61189 CZ-Si B/C array; **D)** 61246 FZ-Si H array

Concentrator Target Samples: The concentrator targets, their condition after return and solar wind fluence, measured and modeling, is described by [4]. The target holder, focal point of the concentrator, contained four quadrants: two SiC targets, a CVD target, and a DOS target. All targets survived intact except for the DOS target (Figs. 3 & 4). SiC target sample 60001 has been allocated and returned. SiC target 60003 and CVD target 60002 have not been allocated. The smaller fragments of the DOS target are numbered in [5]. DOS target largest fragment, sample 60000, has been subdivided by laser scribing [6, 7]. The remaining unallocated portion of 60000 is shown in Fig. 5.

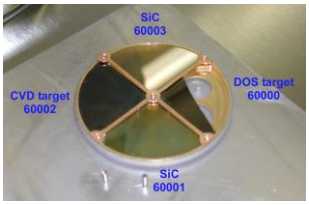

Fig. 3: Targets in mount after the sample return to earth.

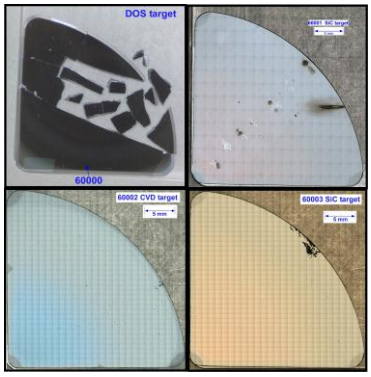

Fig. 4: Post-landing images of target quadrants (3-cm radius), left to right: DOS recovered 16 pieces, SiC analyzed and returned, SiC, CVD.

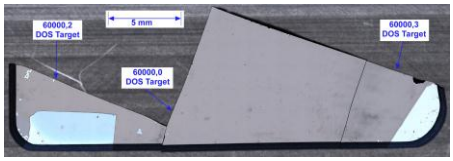

Fig. 5: Sample 60000 (DOS) after laser scribe cleaving.

Polished aluminum Samples: The polished aluminum has been subdivided, by hand saw, as shown in Fig. 6. Twelve subsamples remain available, including the largest piece.

Gold Foil Samples: The gold foil was subdivided by a rotary blade into 24 subsamples, some very small. Fifteen pieces of gold foil remain available, including the largest piece.

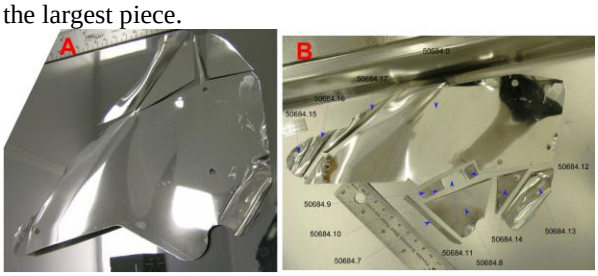

Fig. 6: A) Polished aluminum initial subdivision; B) subsequent subdivision of larger piece.

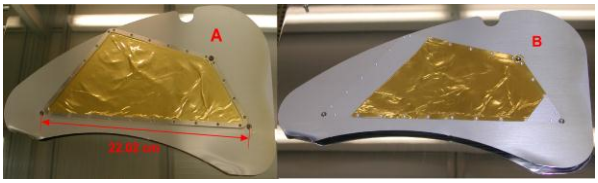

Fig. 7: A) Golf foil after the return sample capsule landed; B) Gold foil after subdivision

Sample Catalog: The Genesis curation lab has a webpage with information about the mission and flight samples: http://curator.jsc.nasa.gov/genesis/index.cfm. All characterized array flight samples can be found within the webpage in the Genesis sample catalog: http://curator.jsc.nasa.gov/gencatalog/index.cfm. The search is done by material and regime. Each sample has an image, dimensions, and shows its availability. The SiC targets, CVD target, DOS targets, gold foil, and polished aluminum will soon be added to the catalog collection.

References: [1] Jurewicz A. J. G. *et al.* (2003) *Space Sci. Rev.*, **105**, 535-560. [2] Burkett P. J. *et a.l* (2009), LPSC 40th, Abst. #1371. [3] Burkett P. J. *et al.* (2011), LPSC 42nd, Abst. #1964. [4] Wiens *et al.* (2013) *Space Sci. Rev*. **175**, 93-124. [5] Rodriguez M. C. *et al.* (2009) LPSC 40th, Abst. #1337. [6] Burkett P. J. et al. (2013) LPSC 44th, Abst. #2837. [7] Lauer Jr. H. V. et al. (2013) LPSC44th, Abst. #2691.