



**Cosmic Dust
Courier**



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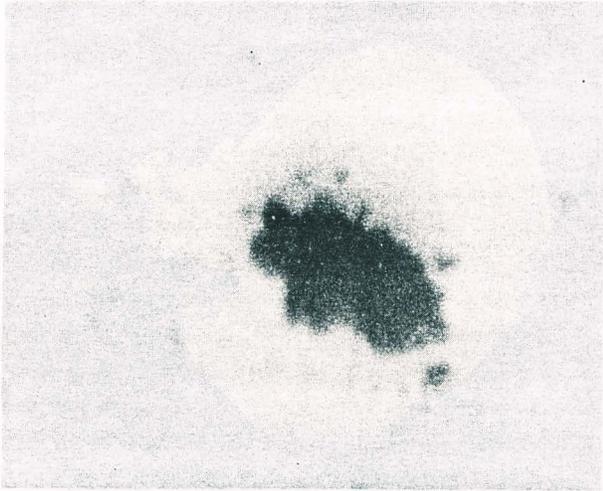
NEW "LARGE" COSMIC PARTICLES AVAILABLE FOR STUDY

During its processing into sample inventory, each stratospheric collection surface is examined under a binocular light microscope, with special attention given to the search for individual particles > 20-micrometer size that might be extraterrestrial in origin. Recent reconnaissance work revealed eight new "large" cosmic particles that are now available for allocation. The catalog-style data pages that follow describe the new particles. Those and other large cosmic particles that were previously identified are listed in Table 1 (see "Itemized Listing of Available Samples").

Flags included in the most recent survey (W7066, W7068, W7069, W7071, W7073, U2011, U2013, U2015) were selected from among those flown in late 1983 and early 1984 and that appeared, under binocular light microscope, to be comparatively free of volcanic products of the types encountered by collectors flown since the 1982 eruption of El Chichon volcano (see Courier No. 3). Each candidate particle was probed with a glass needle in order to extract a fragment of approximately 10-micrometer size that could be subjected to preliminary characterization and classification. Some candidate particles did not yield samples and were left on their respective collection surfaces and remain unidentified. For each particle that did yield samples, the major portion of the particle was left in otherwise pristine condition on its collection surface and is available for allocation. The appearance of each candidate particle involved in the operation was photographically documented before and after reconnaissance probing. All samples generated during the reconnaissance work are included in the comprehensive inventory that comprises Table 1. However, only those samples that were judged to be "cosmic" in origin are described on the data pages that follow. In addition to the information contained on each data page, the following comments should be noted:

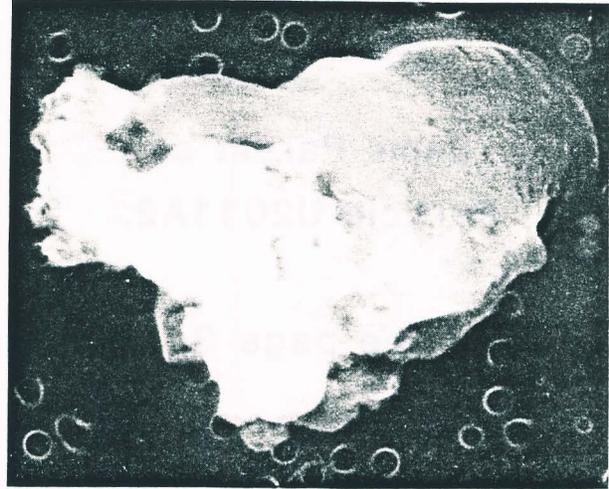
- U2015*A: The "cosmic" identity of this particle is uncertain because of the large variation of properties between individual fragments. Fragment #1 best fits the criteria for catalog-level identification as a natural terrestrial contaminant (TCN), possibly a fragment of silica (crystal system unidentified). However, it is closely associated with fragments #2, #3, and #4 that would otherwise be considered as possibly "cosmic" according to catalog-level classification criteria.
- W7066*A: Most fragments of this particle fit the "cosmic" classification criteria. However, fragment #5 is troublesome because it appears to consist of a porous-aggregate-type cosmic particle attached to an aluminum oxide spherule (AOS) that is believed to be a rocket-exhaust product. At least one other AOS (free, no other particle attached) was found among the other fragments of this reconnaissance sample. This parent particle definitely deserves a research-level examination in order to establish its identity and history.
- W7069*A: The parent "particle" has been defined as a set of three individual particles that occur on the flag in very close proximity to each other and which are interpreted to be fragments of a single impact on the collector. However, this interpretation might be subject to revision if a detailed research-level investigation was performed.
- W7071*A: The "cosmic" identity of this particle is in serious doubt because only fragment #2 possesses an elemental composition that fits the "cosmic" classification criteria. Other fragments have been tentatively classified as artificial terrestrial contaminants (TCA), possibly aluminum oxide related to rocket exhaust.

U2011*A



Parent Particle
on Flag

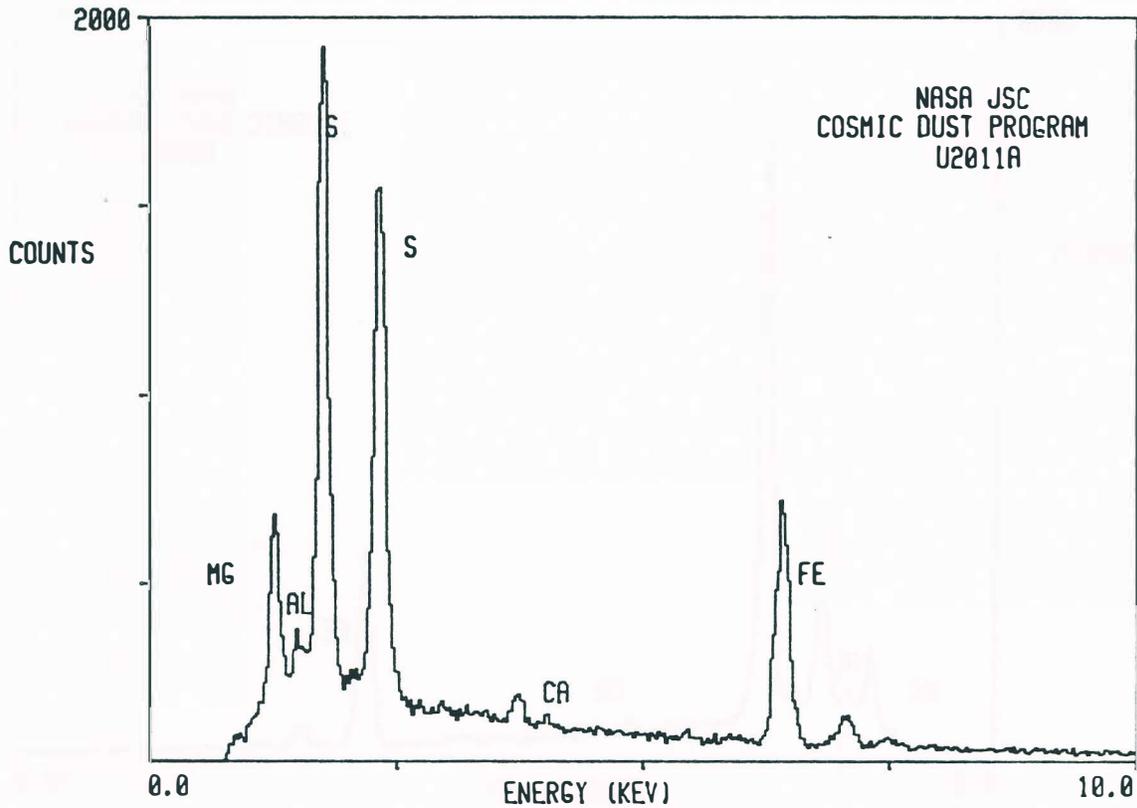
50 μm



U2011A2

U2011A2			
SIZE (μm)	SHAPE	TRANS.	COLOR
6x9	I	0	Red-Brown
LUSTER	TYPE	COMMENTS	
D/SV	C	Related to U2011A4	

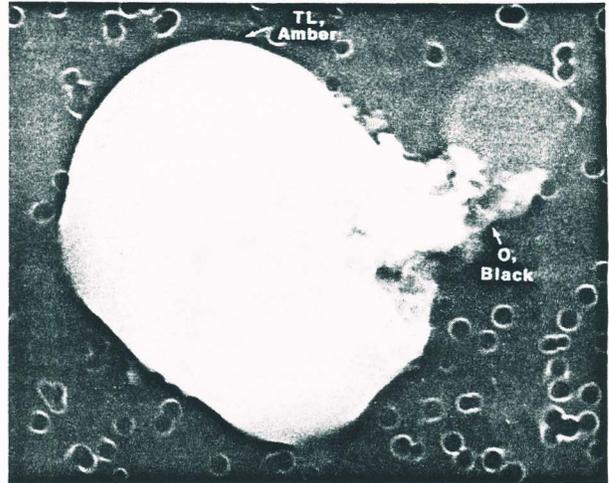
U11A2



U2011*A

Same Parent as
Particle U2011A2.

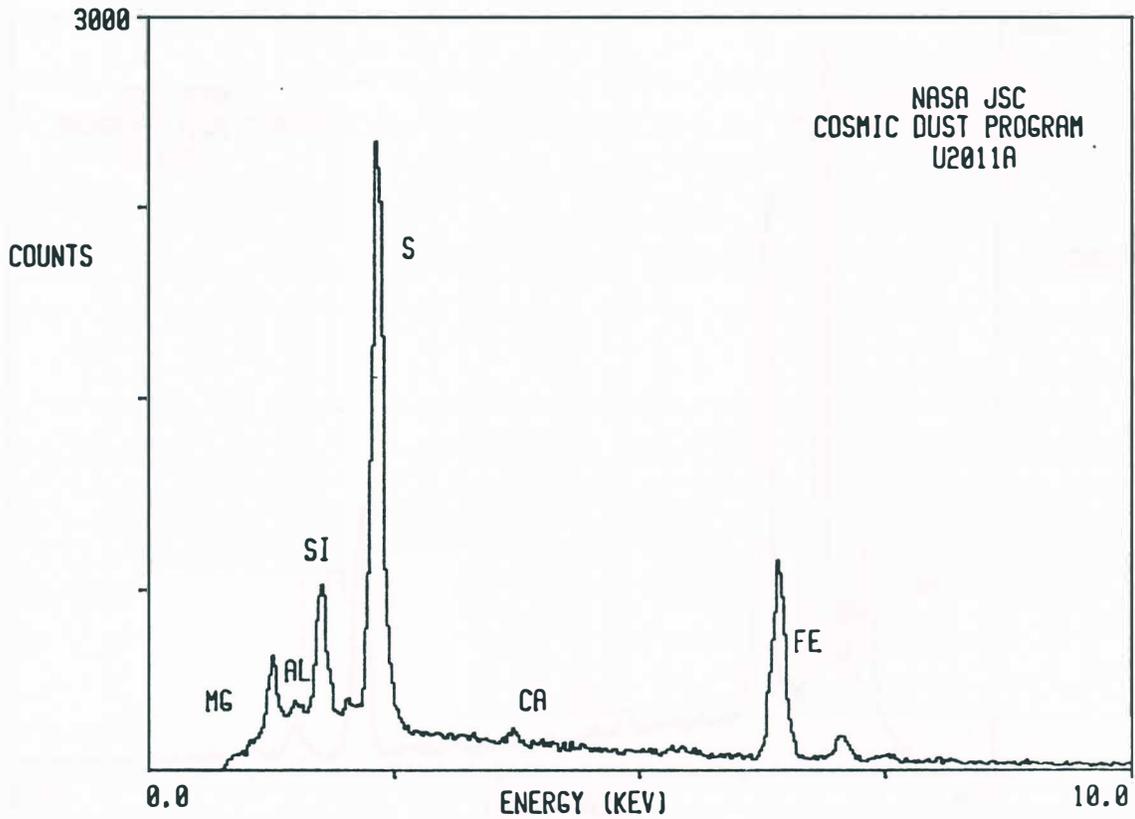
See page 3.



U2011A4

U2011A4			
SIZE (μm)	SHAPE	TRANS.	COLOR
9x11	E/I	TL	Amber
LUSTER	TYPE	COMMENTS	
D/SV	C	Related to U2011A2	

U11A1

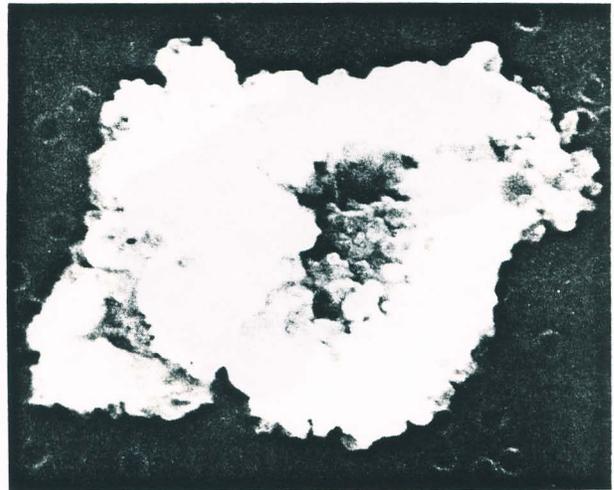


U2011*B



Parent Particle
on Flag

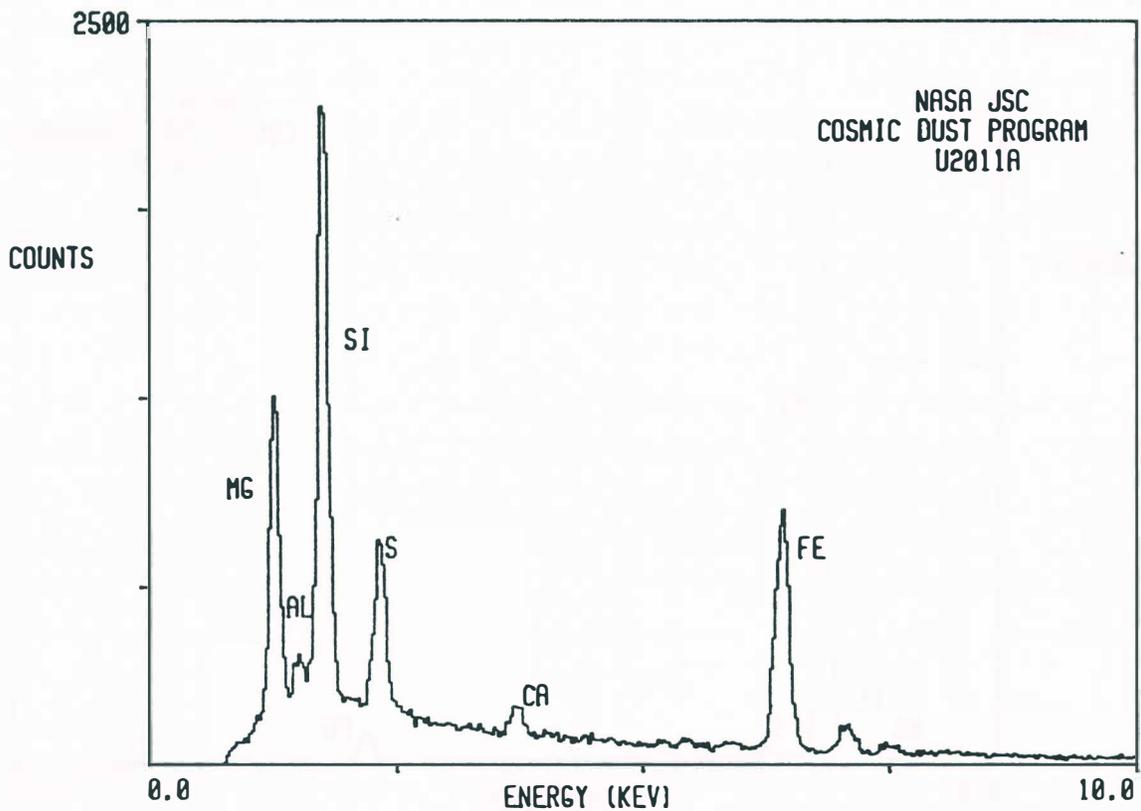
50 μm



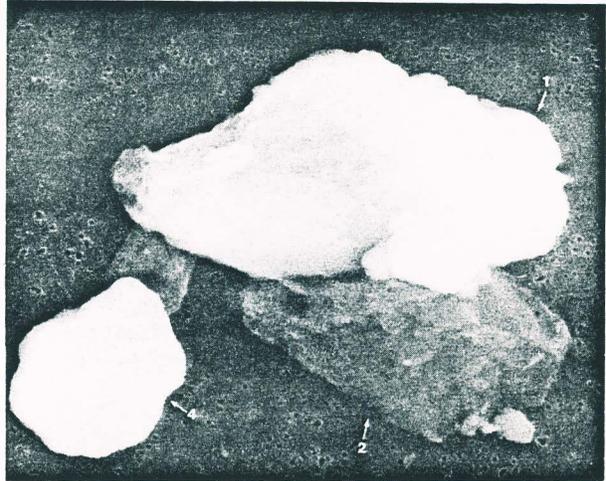
U2011A5

U2011A5			
SIZE (μm)	SHAPE	TRANS.	COLOR
7x10	I	O/TL	Black to Red
LUSTER	TYPE	COMMENTS	
D/SM	C	Other fragments are similar to that depicted but contain less Fe and S	

U11A5



U2015*A



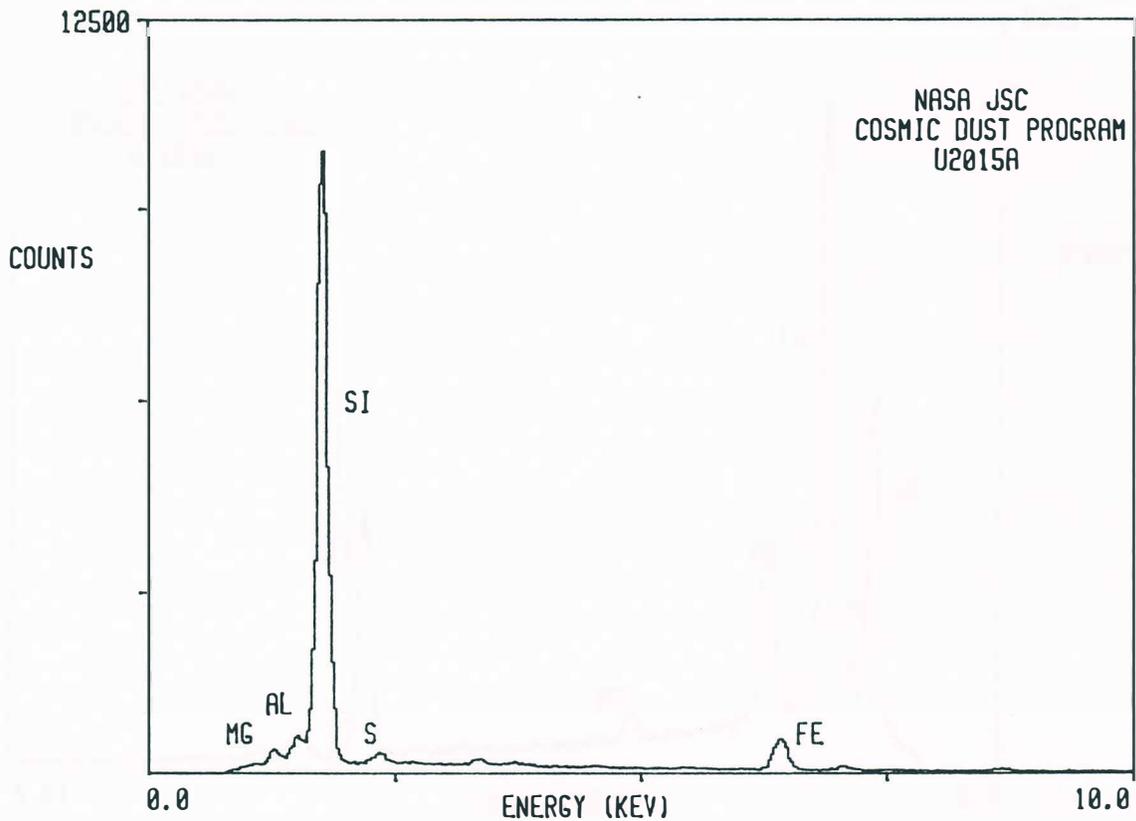
Parent Particle
on Flag

50 μ m

U2015A1

U2015A1			
SIZE (μ m)	SHAPE	TRANS.	COLOR
15x29	I	T	Colorless to Pale Yellow
LUSTER	TYPE	COMMENTS	
SV/V	TCN?	Same parent as for U2015A2 and A3	

U15A1



U2015*A

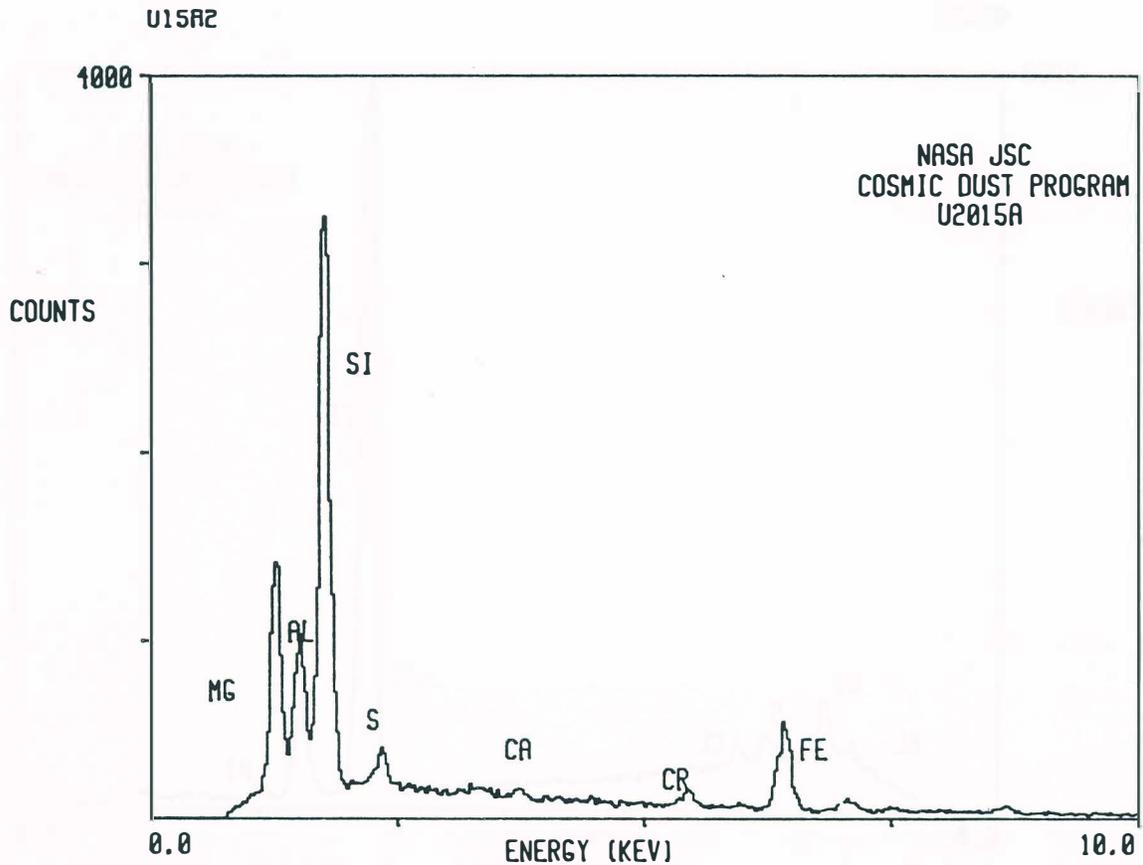
Same Parent as
Particle U2015A1.

See page 6.



U2015A2

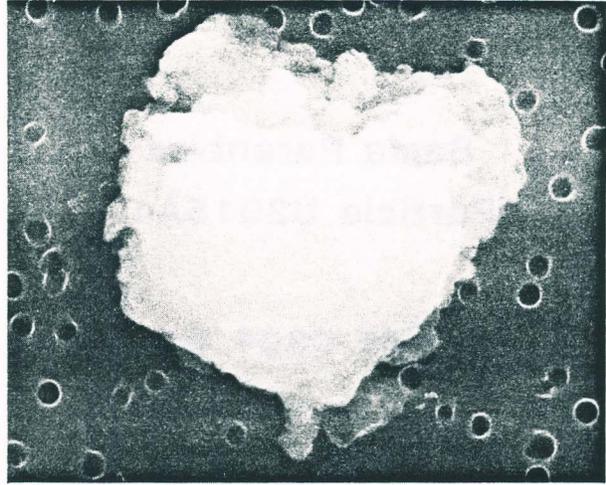
U2015A2			
SIZE (μm)	SHAPE	TRANS.	COLOR
11x22	I	T	Gray
LUSTER	TYPE	COMMENTS	
SV/V	C?		



U2015*A

Same Parent as
Particle U2015A1.

See page 6.

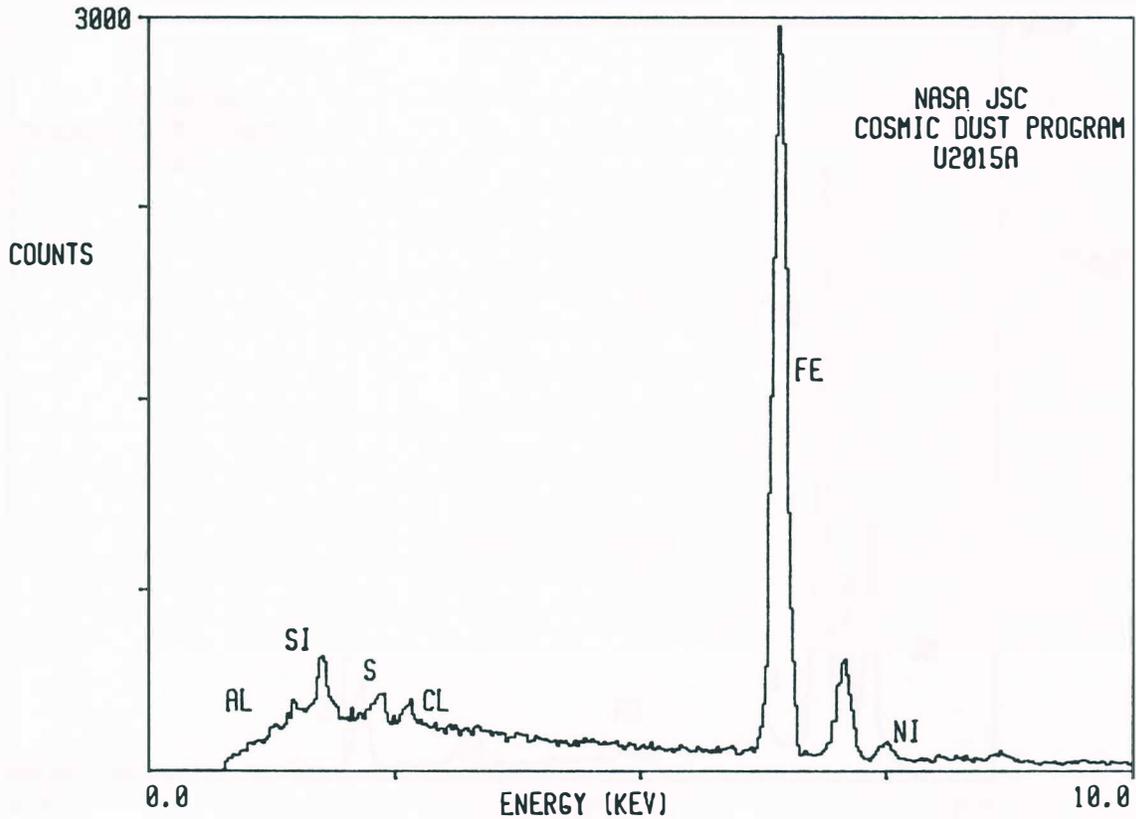


U2015A3

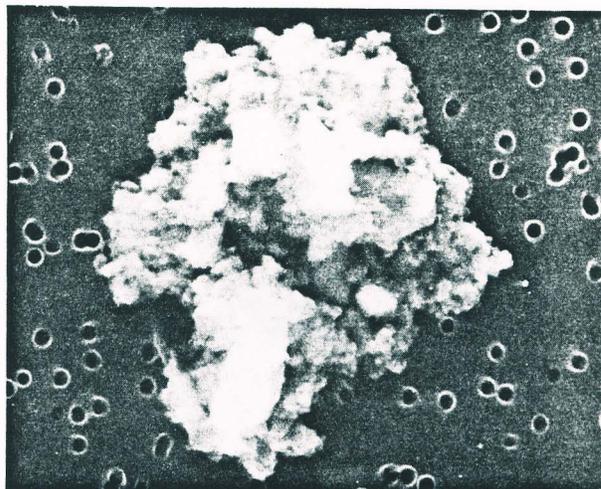
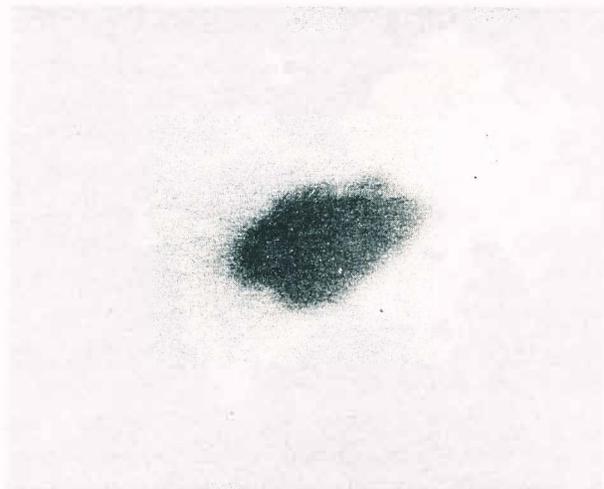
U2015A3

SIZE (μm)	SHAPE	TRANS.	COLOR
7x7	E/I	TL	Ruby Red
LUSTER	TYPE	COMMENTS	
V	C?		

U15A3



U2015*B



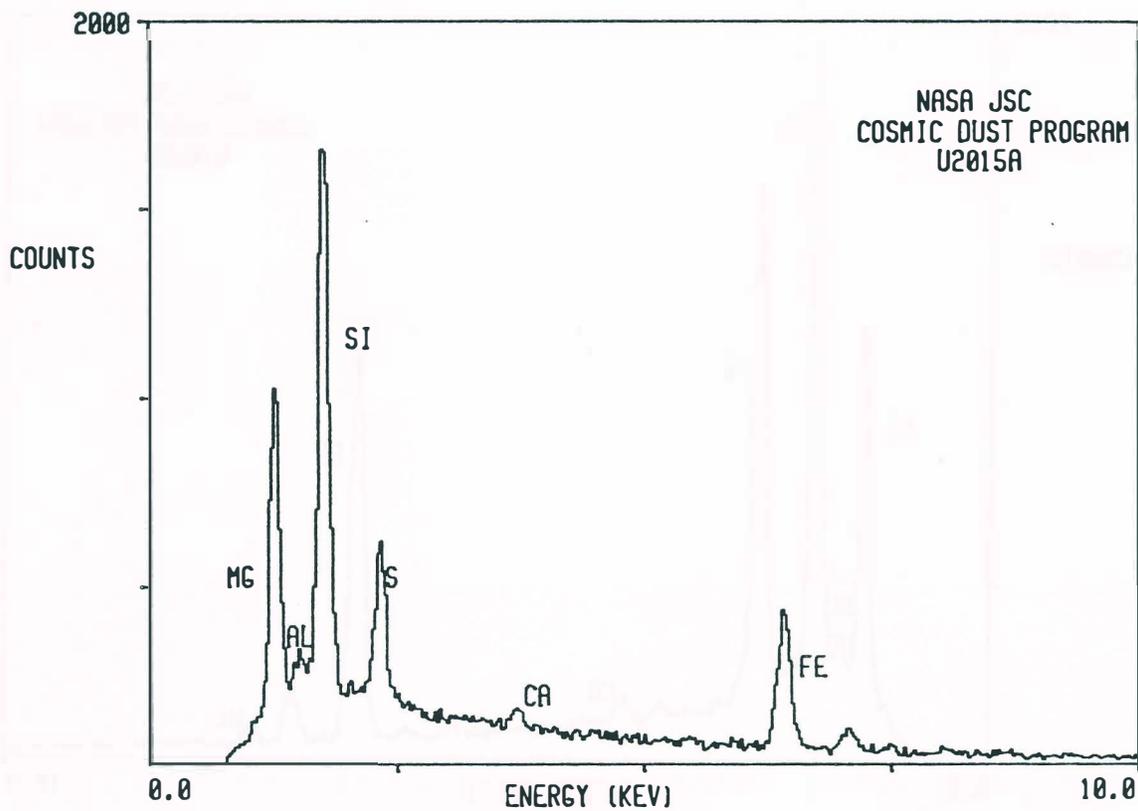
Parent Particle
on Flag

50 μm

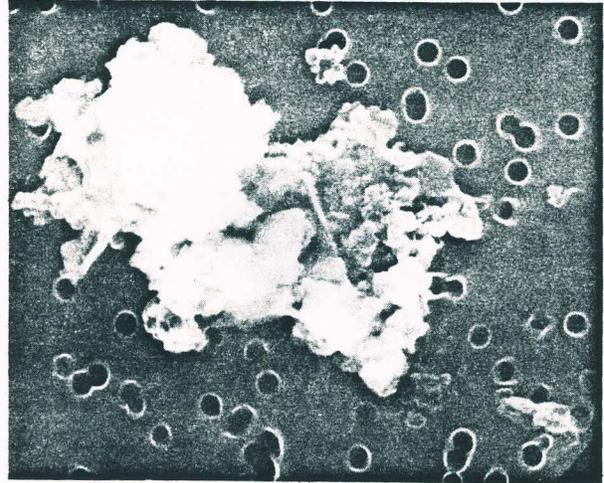
U2015A8

U2015A8			
SIZE (μm)	SHAPE	TRANS.	COLOR
9x10	I	0	Gray to Black
LUSTER	TYPE	COMMENTS	
D/SM	C	Very friable parent	

U15A8



W7066*A



Parent Particle
on Flag

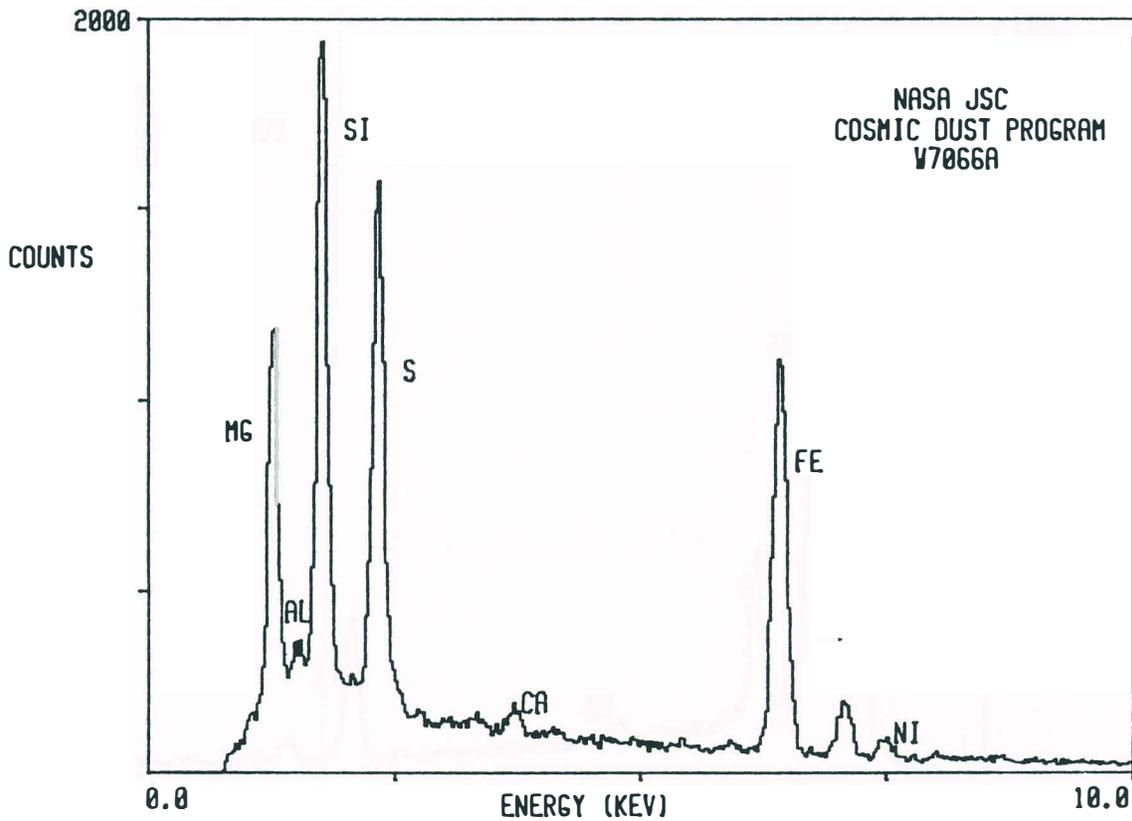
50 μm

W7066A 1

W7066A 1

SIZE (μm)	SHAPE	TRANS.	COLOR
5x7	I	0	Gray to Black
LUSTER	TYPE	COMMENTS	
D/SM	C	Related to W7066A	

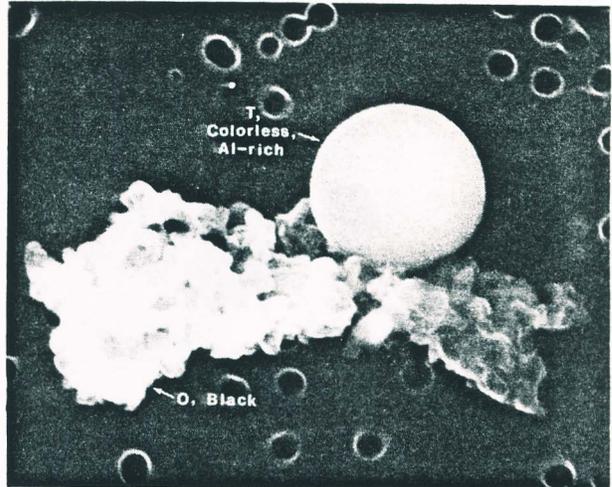
W66A1



W7066*A

Same Parent as
Particle W7066A 1.

See page 10.

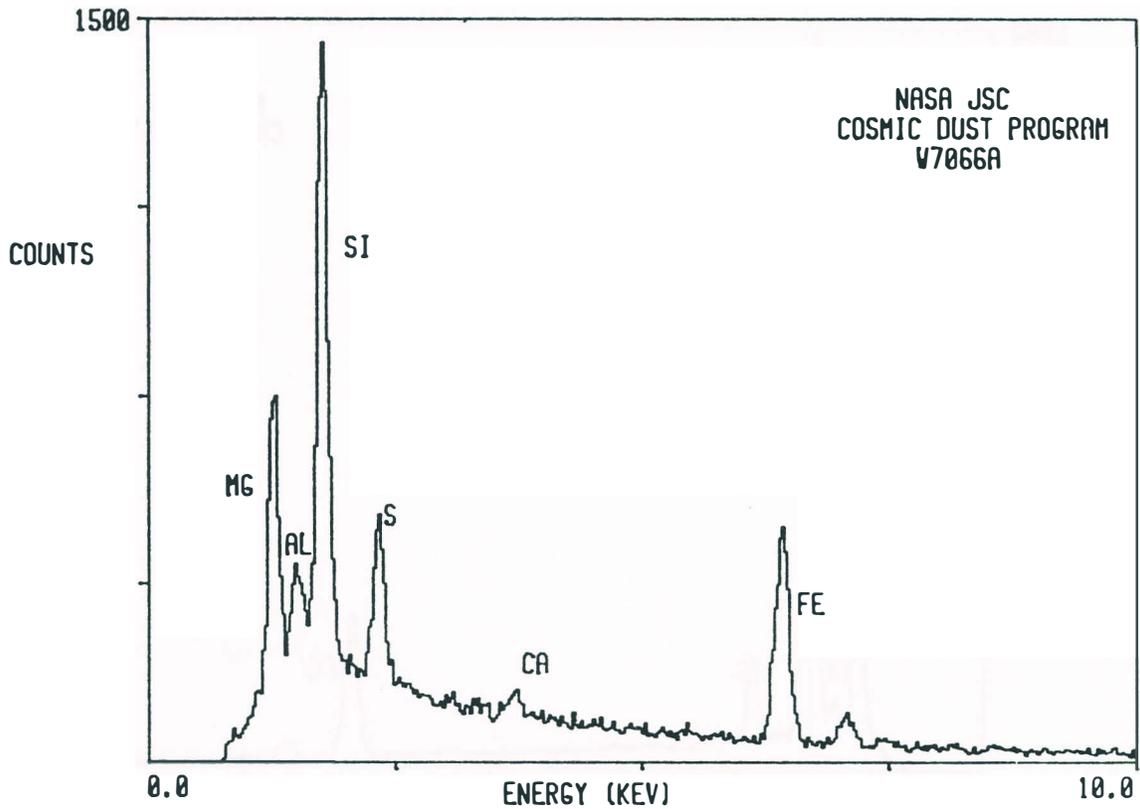


W7066A5

W7066A5

SIZE (μm)	SHAPE	TRANS.	COLOR
3x7	I	O/T	Gray to Black to Colorless (sphere)
LUSTER	TYPE	COMMENTS	
D/SM/V	C?	C-type fragment attached to aluminum oxide sphere	

V66A1A

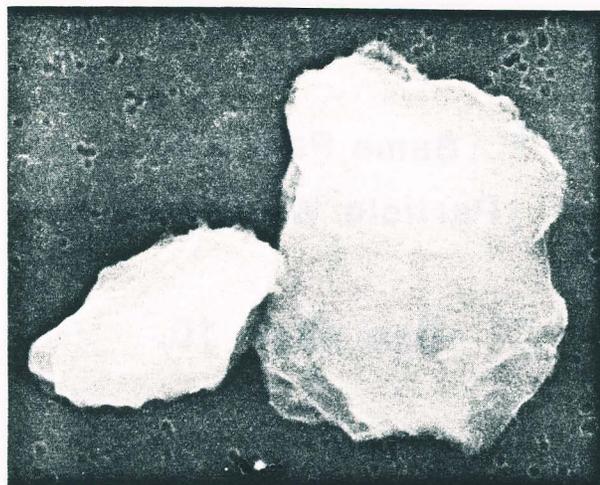


W7069*A



Parent Particle
on Flag

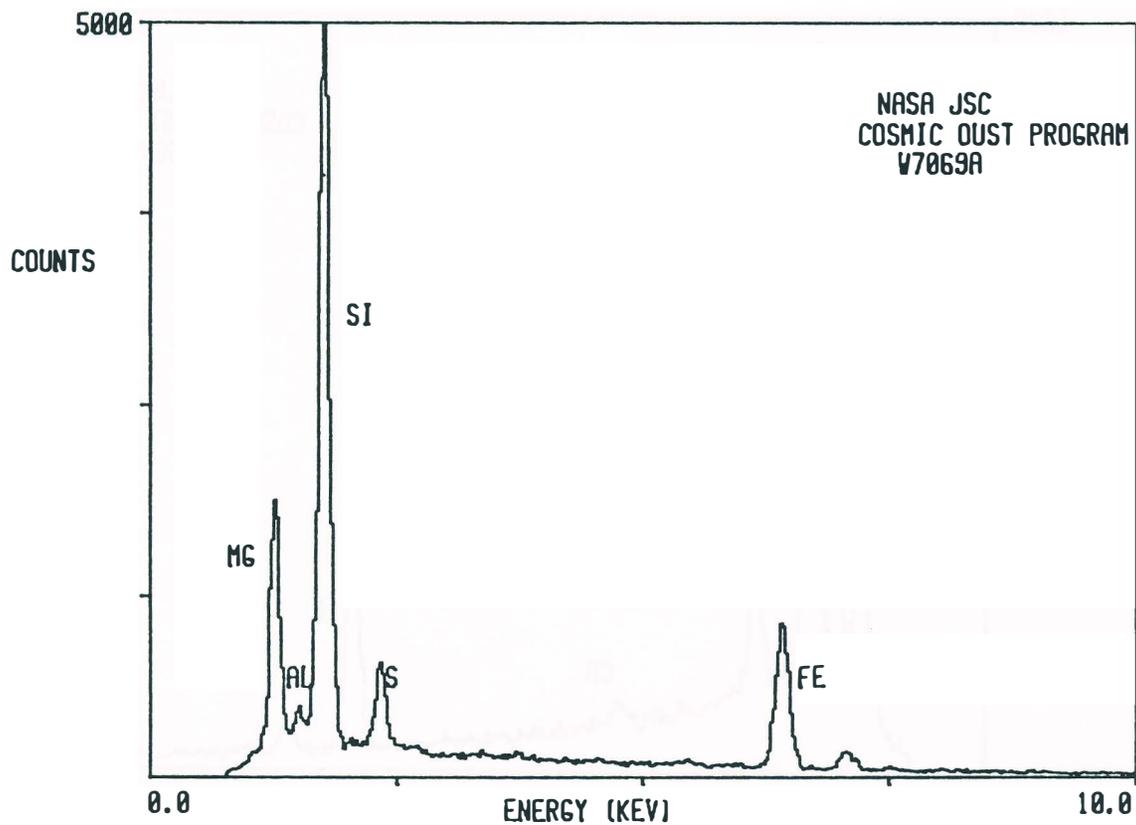
50 μm



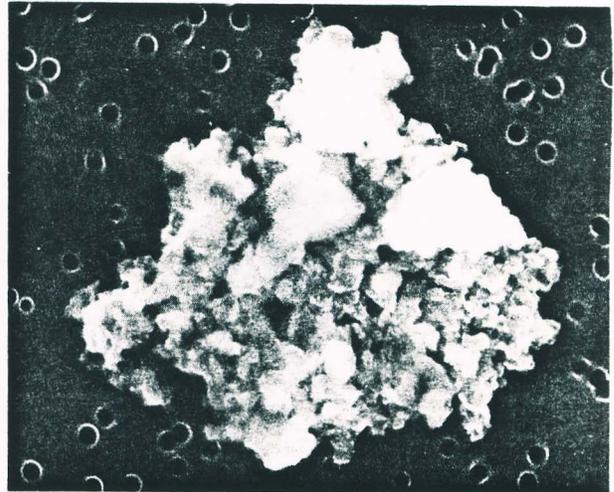
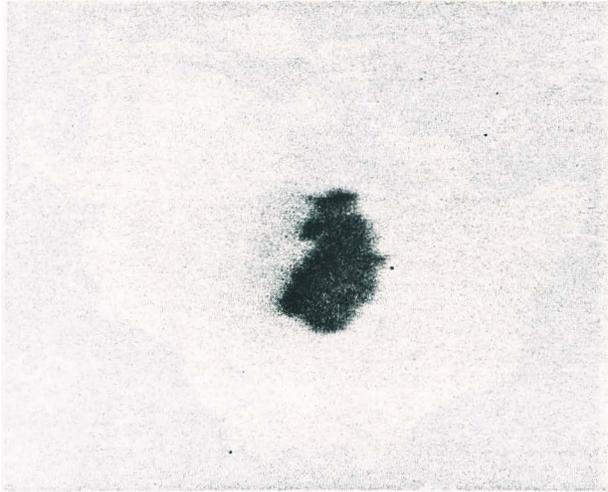
W7069A 1

W7069A 1			
SIZE (μm)	SHAPE	TRANS.	COLOR
10x12	I	0	Dark Brown to Black
LUSTER	TYPE	COMMENTS	
D	C		

V69A1



W7069*B



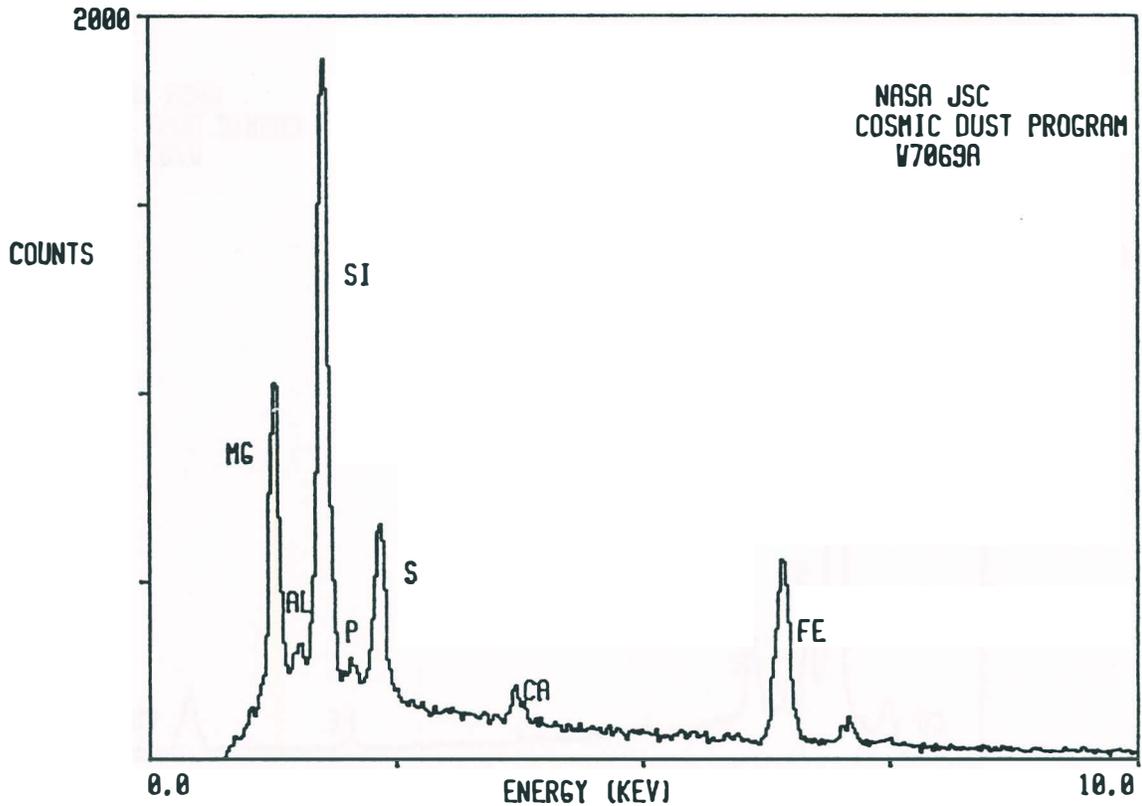
Parent Particle
on Flag

50 μm

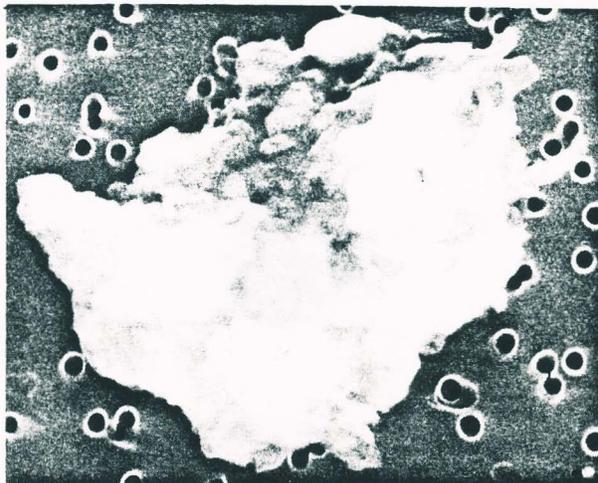
W7069A2

		W7069A2			
SIZE (μm)	SHAPE	TRANS.	COLOR		
8x9	I	0	Dark Gray to Black		
LUSTER	TYPE	COMMENTS			
D/SM	C				

V69R2



W7071*A



Parent Particle
on Flag

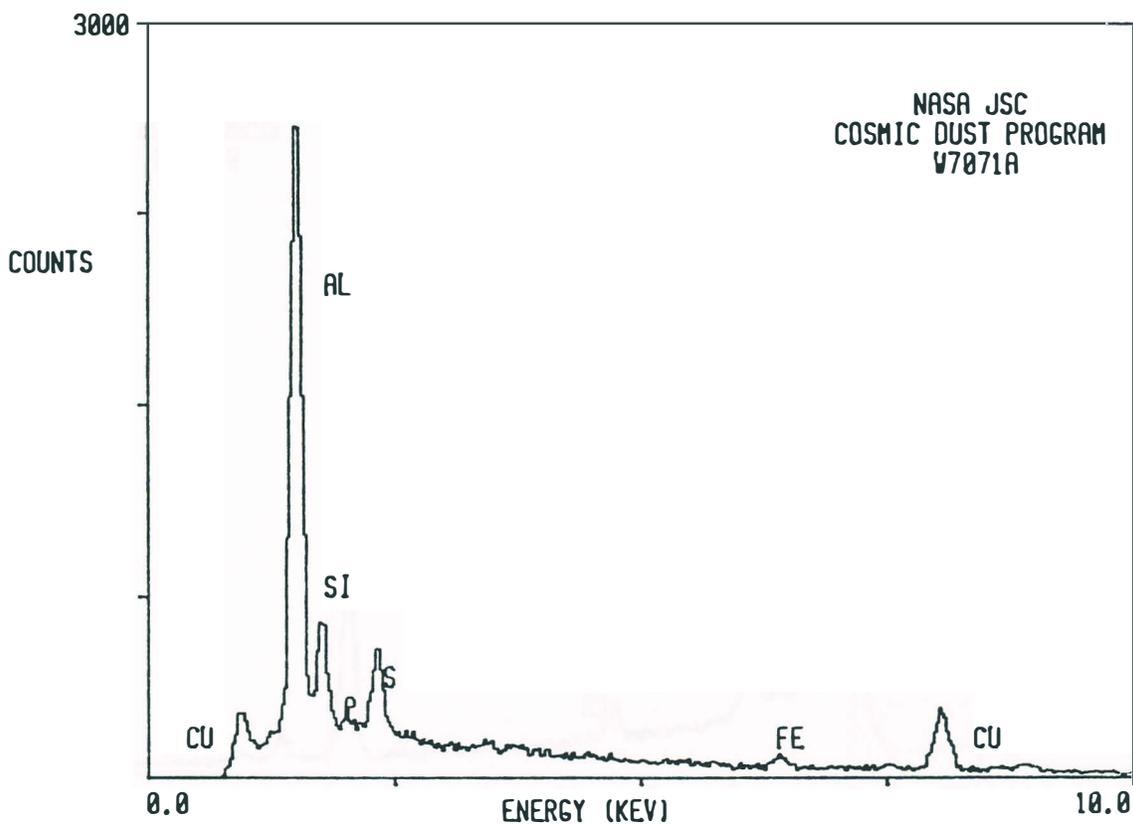
50 μm

W7071A1

W7071A1

SIZE (μm)	SHAPE	TRANS.	COLOR
9x10	I	TL	Pale Brown-Gray
LUSTER	TYPE	COMMENTS	
V	TCA?		

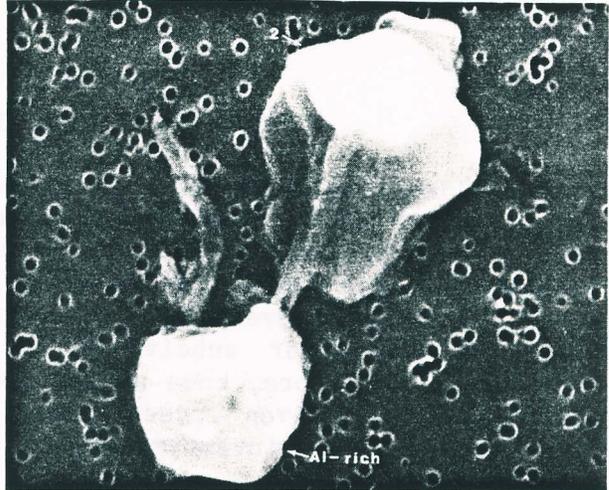
W71A01



W7071*A

Same Parent as
Particle W7071A1.

See page 14.

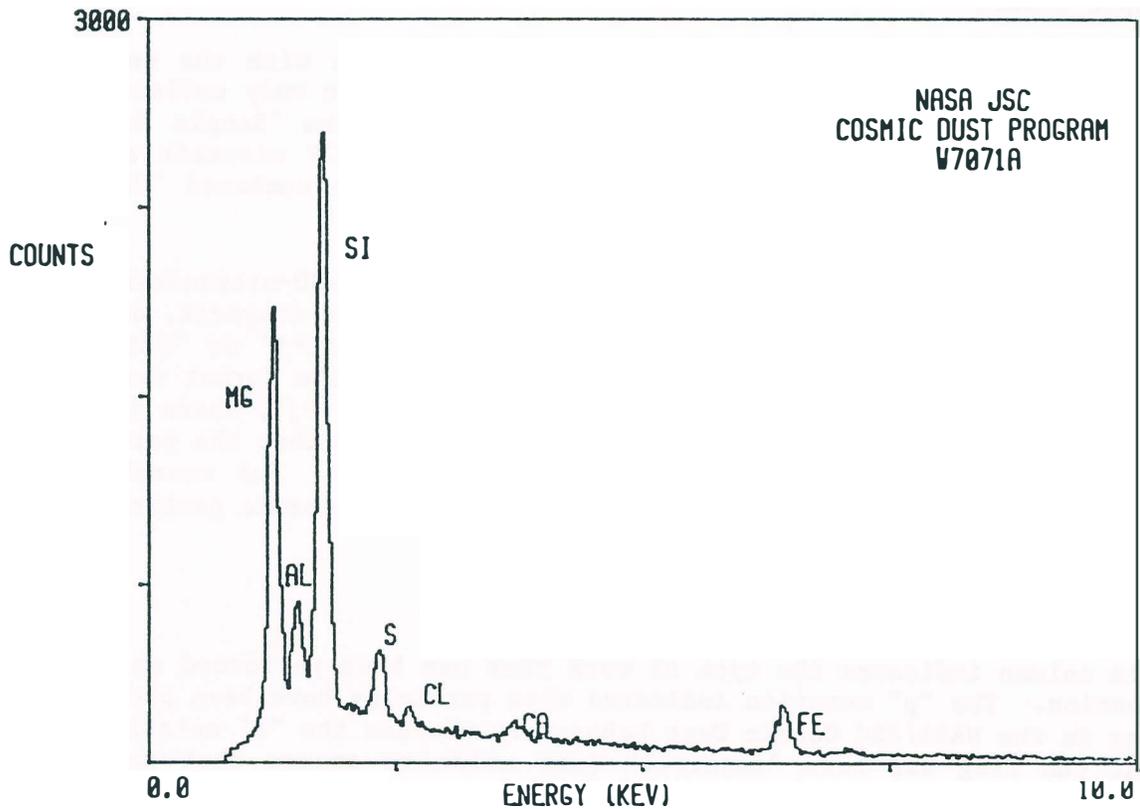


W7071A2

W7071A2

SIZE (μm)	SHAPE	TRANS.	COLOR
5x7	I	TL	Colorless
LUSTER	TYPE	COMMENTS	
V	C?		

W71R00



ITEMIZED LISTING OF AVAILABLE SAMPLES

Prompt allocation of samples in response to approved sample requests serves the interests of the cosmic dust science community but also creates a minor problem in parallel efforts to publicize the current status of available samples. Unlike lunar and meteorite samples, cosmic dust samples, with the exception of relatively rare particles greater than 20-30-micrometer size, cannot be split or subdivided for allocation to more than one sample requestor. Therefore, once an individual dust particle has been approved for allocation to a given investigator, it immediately becomes unavailable for allocation to other investigators.

As an aid to researchers planning future sample requests, the current availability of samples in inventory (both cataloged and uncataloged) is summarized in Table 1. The information in Table 1 is explained in the accompanying "Key to Table 1" and in the following discussion. The key to Table 1 is mostly self-explanatory. For complete clarity, though, the following additional explanations are offered for each column of the table.

Line Number

The first and last columns of the table are simply reference numbers that identify the respective lines in the table. Those numbers are included as an aid in reading individual lines in the table.

Sample Number

The generic designation of each dust particle begins with the number of the collection surface on which it was collected. Because only collection "flags" (small-area collectors) are currently being flown, the "Sample Number" entry refers to the flag number. Flags flown on the WB57F aircraft are numbered "W7iii," and those flown on U-2 or ER-2 aircraft are numbered "U2iii," where "...iii" is a three-digit (integer) number.

"Cosmic" particles of unusually large size (i.e., 20-30-micrometer or larger) that might be cleavable into more than one allocatable fragment, or that might be useful for special analyses, are designated "W7iii*j" or "U2iii*j". The first five characters of such sample numbers follow the format used for other sample numbers whereas the last two characters, ".....*j", where j is an upper case letter of the alphabet (A, B, C, etc.), indicate that the parent particle is a member of the special subset of large particles. For example, lines 72 through 75 of Table 1 show that four different large cosmic particles occur on flag W7031.

Flag Status

This column indicates the type of work that has been performed on the flag in question. The "p" notation indicates that particles have been picked from the flag in the NASA/JSC Cosmic Dust Laboratory whereas the "r" notation indicates that the flag has been "reserved" (set aside to assure that representative sample material will be available for future scientific studies). An entry of

"I..." indicates that the entire flag has been allocated to a cosmic dust investigator (see "Key to Table 1" for identification). A blank entry in the "Flag Status" column indicates that no sample processing has yet occurred for that flag.

Mount Status

For flags from which particles have been picked, the "Mount Status" column identifies the sample mounts that have been created during the picking operation. The current procedure for picking and preliminary examination of particles utilizes a scanning electron microscopy (SEM) mount with 16 uniquely defined particle storage locations. The mounts that receive particles from a given flag are designated "A, B, C, ..., etc." in the order that they are filled with particles. A blank entry in the "Mount Status" column indicates that no particle mounts have yet been created for the flag in question.

Particle Status

This group of 16 columns summarizes the status of each of the 16 particles that comprise the normal sample load of the SEM mount identified under the "Mount Status" column on the same line. An entry of "I..." indicates that the particle has been allocated to a sample investigator (see "Key to Table 1" for identification). An entry of "n" indicates that the particle was lost during handling whereas an entry of "u" indicates that no particle has yet been assigned the sample number in question. If the "Mount Status" column indicates that a particle mount has been created, a blank entry under one of the "Particle Status" columns on the same line indicates that the particle in question exists and is available for allocation. If more than 16 particles were documented on the mount, status of each of the extra particles is given in the "Comments" column (see below) using the same notation just described.

Comments

This column provides additional information that is needed to supplement or clarify entries made elsewhere in the table. Types of information listed under "Comments" include identification of flags that contain abundant terrestrial contamination (e.g., volcanic material), allocation status of particles existing on individual sample mounts but numbered outside the normal 1-16 series, and cross-references to samples that have been renumbered.

If the "Comments" column indicates that a flag is significantly contaminated (entry of "Ground contam.", "Volcanic ash", etc.), other areas on that line in the table will commonly contain descriptive information that does not follow the normal column-by-column definitions given above. In that case, the information given reflects the fact that, because of fundamental differences between "contamination" and "cosmic" material, processing and sample allocations of the "contamination" followed a different course than is normally followed for "cosmic" samples. "Volcanic" contaminants, as listed for most of the flags in the sequences W7033-W7065 and U2003-U2008 in Table 1, are attributable to the March/April 1982 eruption of El Chichon volcano (see Courier 3) whereas "ground" contaminants accrue from instances in which flight crew errors lead to exposure of flags at undesirably low (tropospheric)

altitudes. Although "cosmic" particles may occur on some of the contaminated flags, their selection from among abundant contaminant particles would be extremely time-consuming.

Allocation status information found in the "Comments" column follows the same format described above for the "Particle Status" column, except that the allocation status code is separated from the particle number by a "/" symbol. For example, the entry of "Also 17/I7; 18-19" under "Comments" on line 203 in the table indicates that, in addition to the normal complement of 16 particles on sample mount U2001D, particles 17-19 were also deposited but that particle U2001D17 has been allocated to investigator I7.

Cross-references to other sample numbers occur under "Comments" in those cases where sample renumbering has occurred. Normally, sample renumbering is avoided but does occur in each case where preliminary examination of a small fragment of a large (usually, > 20-micrometer size) particle indicates that the large particle is probably of extraterrestrial ("cosmic") origin. Then, the number assigned to the preliminary examination fragment will be replaced by a new number indicating that the fragment was the first split of a large cosmic particle. For example, preliminary examination of a large particle on flag W7029 indicated that the particle was cosmic, leading to the naming of the particle as W7029*A. Therefore, as shown on line 55 of the table, the preliminary examination fragment that was originally named W7029C1 was renamed as W7029*A1. By referring to the status information for W7029*A, given on line 64 of the table, it is clear that W7029*A1 was allocated to investigator I1 and that additional fragments of the particle were allocated to several other investigators.

TABLE 1

NASA/JSC COSMIC DUST PROGRAM: SAMPLE AVAILABILITY SUMMARY

Effective Date: June 1, 1984

SAMPLE NUMBER	FLAG STATUS	MOUNT STATUS	PARTICLE STATUS																COMMENTS	
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16		
1 W7001																			Ground contam.	1
2 W7002																			Ground contam.	2
3 W7003																			Ground contam.	3
4 W7004																			Ground contam.	4
5 W7005																			Ground contam.	5
6 W7006																			Ground contam.	6
7 W7007																			Ground contam.	7
8 W7008																			Ground contam.	8
9 W7009																			Ground contam.	9
10 W7010	p	A	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	Also 17-32/I1;	10
11																			8 = W7010*A1	11
12		B	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	Also 17-39/I1	12
13 W7010*A			I1	I1																13
14 W7011	r																			14
15 W7012	I2																			15
16 W7013																				16
17 W7014																				17
18 W7015																				18
19 W7016	r																			19
20 W7017	p; I1	A	n	I1	I1	I1	I1	I1	I1	I1	I1	n	I1	I1	I1	I1	n	I1	Also 17/n, 18/I1	20
21		B	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	n	I1		21
22		C		I1				I1				n			n	n	n		Also 17	22
23		D	n		I6	n					n	n			n	n	n			23
24		E	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	Also 17-19/I1	24
25		F			I4	I1			n			n	I6				I4	I1		25
26		G	I1		I1	I5			I1			I1	n	I5	I1	I1	I3			26
27		H	u	u	u	u	u	u	u	u	u	u	u	u	u	u	u	u	Storage only	27
28		I	u	u	u	u	u	u	u	u	u	u	u	u	u	u	u	u	Storage only	28
29 W7018	I3																			29
30 W7019																				30
31 W7020	r																			31
32 W7021	I3																			32
33 W7022																				33
34 W7023	r																			34
35 W7024																				35
36 W7025	r																			36
37 W7026	p	A	I4			u	u	u	u	u	u	u	u	u	u	u	u	u	1 = W7026*A1	37
38 W7026*A			I4	u	u	u	u	u	u	u	u	u	u	u	u	u	u	u		38
39 W7027	(I2); p	A			c	I11	n			I12	n	n	I2	I12	I11		I11	I12	Also 17; 18/n	39

- - - - - C o n t i n u e d - - - - -

SAMPLE NUMBER	FLAG STATUS	MOUNT STATUS	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	COMMENTS
40	W7027	B								I9		n	n	n				n	40
41		C	n			I2		n	I9					I12					41
42		D				n				I12		n							Also 17-18
43		E								I12				n					Also 17/I2
44		F				I12													Also 17
45		G																	Also 17-27
46		H	u																Also 17-19
47		I															u	u	
48	W7028	p A				I4										u	u	u	4 = W7028*C1
49		B	I4x	I4x	I4x	I4x	I4x	I4x	I4x	I4x	I4x	I4x	I4x	I4x	I4x	I4x	I4x	I4x	Also 17/I4x
50	W7028*C		I4	u	u	u	u	u	u	u	u	u	u	u	u	u	u	u	
51	W7029	p A							I6	I1			I4						Also 17-19
52		B	I4	I4		I1				I1						I6			Also 17/I6;
53																			13 = W7029*B1
54		C	I1	n	I1	n	n	n	I1	I1	I1	n	n	I1	I1	I1	I1	I1	Also 17/n;
55																			1 = W7029*A1
56		D														I1			
57		E				I1							I1		I4	I11			Also 17-20/n
58		F	n			I4					n		n	I7	n	n	n	n	Also 17/I1
59		G		I7	I1						I1	I4	I1			I7	I4		
60		H							I4	I4	I1	I1	I1		I7	n	I1	n	
61		I	I1							I1					n	I7			Also 17-20;18/I11
62		J	n					n	n		n								Also 17/n, 19/I1,
63																			18, 20
64	W7029*A		I1	I8						I3				n	I3		I2	I3	Also 17/I8,
65																			22-26/I1
66	W7029*B			I3	I6	I1	I1	I1	I1										
67	W7030	r																	
68	W7031	(I2), p A					I4										n	n	1 = W7031*A1,
69																			2 = W7031*B1,
70																			5 = W7031*C1
71																			9 = W7031*D1
72	W7031*A			I1	u	u	u	u	u	u	u	u	u	u	u	u	u	u	
73	W7031*B			u	u	u	u	u	u	u	u	u	u	u	u	u	u	u	
74	W7031*C		I4	u	u	u	u	u	u	u	u	u	u	u	u	u	u	u	
75	W7031*D			u	u	u	u	u	u	u	u	u	u	u	u	u	u	u	
76	W7032	p A								u	u	u	u	u	u	u	u	u	
77	W7033	Rinsed onto	Nucleopore filter membrane																Volcanic ash
78	W7034	Rinsed onto	Nucleopore filter membrane																Volcanic ash
79	W7035	r																	Volcanic ash
80	W7036	p A	Contingency sample "scoops"																Volcanic ash
81		B	Contingency sample "scoops"																
82		C-K	"Scoops" onto electron microscopy substrates / I5																
83	W7037	Rinsed onto	Nucleopore filter membrane / I10																Volcanic ash
84	W7038	Rinsed onto	Nucleopore filter membrane																Volcanic ash
85	W7039	Rinsed into	Freon-113																Volcanic ash

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SAMPLE NUMBER	FLAG STATUS	MOUNT STATUS	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	COMMENTS		
86	W7040	r																	Volcanic ash	86	
87	W7041	Rinsed into Freon-113																	Volcanic ash	87	
88	W7042	Rinsed into Freon-113																	Volcanic ash	88	
89	W7043	Rinsed into Freon-113																	Volcanic ash	89	
90	W7044	Rinsed into Freon-113																	Volcanic ash	90	
91	W7045	Rinsed into Freon-113																	Volcanic ash	91	
92	W7046	Rinsed into Freon-113																	Volcanic ash	92	
93	W7047	Rinsed into Freon-113																	Volcanic ash	93	
94	W7048	r																	Deployment failed	94	
95	W7049	Rinsed into Freon-113																	Volcanic ash	95	
96	W7050	Rinsed into Freon-113																	Volcanic ash	96	
97	W7051	r																	Volcanic ash	97	
98	W7052	Rinsed into Freon-113																	Volcanic ash	98	
99	W7053	r																	Volcanic ash	99	
100	W7054	Rinsed into Freon-113																	Volcanic ash	100	
101	W7055	Rinsed into Freon-113																	Volcanic ash	101	
102	W7056	r																	Volcanic ash	102	
103	W7057	r																	Broken flag	103	
104	W7058	p	A-B	Droplets mounted on electron microscopy substrates / I5																Volcanic aerosol	104
105	W7059																		Volcanic aerosol	105	
106	W7060																		Volcanic aerosol	106	
107	W7061																		Volcanic aerosol	107	
108	W7062																		Volcanic aerosol	108	
109	W7063																		Volcanic aerosol	109	
110	W7064																		Volcanic aerosol	110	
111	W7065																		Volcanic aerosol	111	
112	W7066	p	A					u	u	u	u	u	u	u	u	u	u	u	1 = W7066*A1;	112	
113																			5 = W7066*A2	113	
114	W7066*A																			114	
115	W7067	r																		115	
116	W7068	p	A			u	u	u	u	u	u	u	u	u	u	u	u	u		116	
117	W7069	p	A		u	u	u	u	u	u	u	u	u	u	u	u	u	u	1 = W7069*A1	117	
118																			2 = W7069*B1	118	
119	W7069*A																			119	
120	W7069*B																			120	
121	W7070	r																		121	
122	W7071	p	A		u	u	u	u	u	u	u	u	u	u	u	u	u	u	1 = W7071*A1	122	
123	W7071*A																			123	
124	W7072	I3																		124	
125	W7073	p	A	u	u	u	u	u	u	u	u	u	u	u	u	u	u	u		125	

----- C o n t i n u e d -----

KEY TO TABLE 1

A, B, C, etc.	= SEM particle-mount designation used in preliminary examination or storage.
I . . .	= sample allocated to Investigator "I . . ." (see separate listing, below).
I . . . x	= sample allocated to Investigator "I . . ." but without prior SEM examination (i.e., no catalog-type data were published).
(I . . .)	= sample now at NASA/JSC but previously allocated to Investigator "I . . .".
c	= particle tentatively identified as a laboratory contaminant.
n	= sample lost during handling or preliminary examination.
p	= particles "picked" (i.e., retrieved from collection surface) to yield samples as listed.
r	= reserved for posterity.
u	= unassigned sample number (i.e., no sample having this number exists in inventory).

Investigators:

- I1: D. S. McKay (NASA/Johnson Space Center, Houston, TX, USA)
- I2: D. E. Brownlee (Univ. of Washington, Seattle, WA, USA)
- I3: R. M. Walker (Washington Univ., St. Louis, MO, USA)
- I4: P. R. Buseck (Arizona State Univ., Tempe, AZ, USA)
- I5: M. Maurette (Laboratoire Rene Bernas, Orsay, France)
- I6: G. L. Nord, Jr. (U. S. Geological Survey, Reston, VA, USA)
- I7: R. H. Hewins (Rutgers Univ., New Brunswick, NJ, USA)
- I8: J. C. Laul (Battelle Pacific Northwest Labs, Richland, WA, USA)
- I9: E. K. Gibson, Jr. (NASA/Johnson Space Center, Houston, TX, USA)
- I10: W. H. Zoller (Univ. of Maryland, College Park, MD, USA)
- I11: T. Esat (Australian National Univ., Canberra, Australia)
- I12: K. Yamakoshi (Univ. of Tokyo, Japan)

GUIDELINES FOR PREPARING A SAMPLE REQUEST

All sample requests should be made in writing to:

Curator/Cosmic Dust
Code SN2/Planetary Materials Branch
NASA/Johnson Space Center
Houston, TX 77058 USA.

Information may be obtained by telephone via (713) 483-6241 or -3274 [FTS 525-6241 or -3274].

Each request should refer to specific samples by their official identification numbers and should contain enough information to permit evaluation of the proposed study and the adequacy of the requestor's facilities. All necessary information should probably be condensable into a one- or two-page letter, although informative attachments (e.g., copies of pages from related proposals, reprints of publications, flow diagrams for analyses) are welcome. In addition, a brief statement regarding the desired method of mounting or containerizing the samples for shipment to the requestor should be included (see article on "Sample Containers for Shipment of Allocated Dust Particles" on pages 14-21 of Cosmic Dust Courier No. 4). Each sample request will be reviewed by the Lunar and Planetary Sample Team (LAPST), a committee of scientists that advises NASA on matters related to the curation and allocation of lunar samples and cosmic dust samples. LAPST meetings occur at intervals of approximately three months. The NASA/JSC Planetary Materials Branch will arrange for all required LAPST reviews and will inform requestors of results as rapidly as possible.

Prospective sample requestors may select samples from among those described in any issue of the Cosmic Dust Catalog or Cosmic Dust Courier series. However, reference should be made to Table 1 of this newsletter to check the availability of each sample before it is requested. In addition, we encourage investigators to contact us in advance of submitting their sample requests if further information is desired. If one or more of the samples listed in a sample request have already been allocated, LAPST will confer with the Cosmic Dust Curator to identify suitable substitute samples. To the extent possible, each substitute particle will be chosen on the basis of its overall resemblance (size, morphology, optical properties, major-element composition, etc.) to a particle that was requested. The initiator of an approved sample request will be informed of any contemplated sample substitutions in the allocation plan pertaining to that request.