

COSMIC DUST CATALOG

(PARTICLES FROM COLLECTION FLAG W7074)

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Houston, Texas

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(Particles from Collection Flag W7074)

Compiled by

Cosmic Dust Preliminary Examination Team (CDPET)*

NASA/Johnson Space Center
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1. INTRODUCTION

Since May, 1981, the National Aeronautics and Space Administration (NASA) has used aircraft to collect cosmic dust (CD) particles from Earth's stratosphere. Specially designed dust collectors are prepared for flight and processed after flight in an ultraclean (Class 100) laboratory constructed for this purpose at the Lyndon B. Johnson Space Center (JSC) in Houston, Texas. Particles are individually retrieved from the collectors, examined and cataloged, and then made available to the scientific community for research. Cosmic dust thereby joins lunar samples and meteorites as an additional source of extraterrestrial materials for scientific study.

This catalog summarizes preliminary observations on 147 particles retrieved from collection surface W7074. This surface was a flat plate "flag" (with a 30 cm² surface area) which was coated with silicone oil and then flown aboard a NASA WB-57 aircraft during a series of flights that were made within North America during 1988. This flag was installed in a specially constructed wing pylon which ensured that the necessary level of cleanliness was maintained between periods of active sampling. During successive periods of high altitude (20 km) cruise, the flag was exposed in the stratosphere by pilot command and then retracted into sealed storage containers prior to descent. In this manner, a total of 32 hours of stratospheric exposure was accumulated for flag W7074.

2. PROCESSING OF PARTICLES

Particle mounts designed for the JEOL 100CX scanning transmission electron microscope (STEM) are currently the standard receptacles for CD particles in the JSC laboratory. Each mount consists of a graphite frame (size $\sim 3 \times 6 \times 24$ mm) onto which a Nucleopore filter ($0.4 \mu\text{m}$ pore size) is attached. A conductive coat of carbon is vacuum evaporated onto the mount and then a microscopic reference pattern is "stenciled" onto the carbon-coated filter by vacuum evaporation of aluminum through an appropriately sized template. CD particles are individually removed from collection flags using glass needle micromanipulators under a binocular stereomicroscope. Each particle is positioned on an aluminum-free area of a Freon-cleaned, carbon-coated filter and washed in place with hexane to remove silicone oil. Each mount is normally limited to 16 particles. All processing and storage of each particle is performed in a Class 100 clean room.

3. PRELIMINARY EXAMINATION OF PARTICLES

Each rinsed particle is examined, before leaving the Class 100 clean room processing area, with a petrographic research microscope equipped with transmitted, reflected and oblique light illuminators. At a magnification of 500X, size, shape, transparency, color, and luster are determined and recorded for each particle.

After optical description, each mount (with uncoated particles) is examined by scanning electron microscopy (SEM) and X-ray energy dispersive spectrometry (EDS). Secondary-electron imaging of each particle is performed with a JEOL 100CX STEM operated in the SEM mode and at an accelerating voltage of 40 kV. Images are therefore of relatively low contrast and resolution due to deliberate avoidance of conventionally applied conductive coats (carbon or gold-palladium) which might interfere with later elemental analyses of particles. EDS data are collected with a JEOL-35CF SEM equipped with a Si(Li) detector and PGT 4000T analyzer. Using an accelerating voltage of 20 kV, each particle is raster scanned and its X-ray spectrum recorded over the 0-10 keV range by counting for 100 sec. No system (artifact) peaks of significance appear in the spectra.

It should be pointed out that the SEM/EDS procedure used in preparing this catalog is different than that used in preparing Cosmic Dust Catalogs, Volumes 1-3 and 8. In these catalogs, EDS analysis was performed using the JEOL 100CX STEM operated at 40 kV. Only the EDS spectra exhibit differences that are likely to be noticed. These differences are a slightly higher background and more efficient excitation of high atomic number elements for EDS spectra collected at 40 kV relative to those collected at 20 kV. However, each catalog includes spectra of the same selected comparison standards, which allows comparison of spectra from one catalog to the next to be made. Please refer to Section 5 for a more complete discussion.

Following SEM/EDS examination, each particle mount is stored in a dry nitrogen gas atmosphere in a sealed cabinet.

4. CATALOG FORMAT

Each page in the main body of the catalog is devoted to one particle and consists of an SEM image, an EDS spectrum, and a brief summary of preliminary examination data obtained by optical microscopy. The unique identification number assigned to the particle appears at the top of the page. Sources of the descriptive data are as follows:

SIZE (μm) is measured using the original SEM image and its known magnification factor. For an irregularly shaped particle, the minimum dimension in the plane of the field of view is located and determined; then a second (maximum) dimension is measured at a right angle to the first. For a spherical or equidimensional particle, only a single size is recorded.

SHAPE is generalized to be spherical (S) or irregular (I). Particles having shapes intermediate between S and I are not uncommon and may be denoted as S/I.

TRANSPARENCY (abbreviated TRANS.) is determined by optical microscopy to be transparent (T), translucent (TL), or opaque (O). Significant variations in transparency within a particle are annotated on the SEM image.

COLOR is determined by optical microscopy using oblique (fiber optic, quartz halogen) illumination supplemented with normal reflected (tungsten lamp) illumination. The distinction of dark (Dk.) from light (Lt.) particles is unambiguous, although the distinction of colorless (CL) from pale-colored conditions is sometimes problematical. Complex colorations of individual particles may be noted in the "COMMENTS" column and annotated on the SEM image.

LUSTER is determined by optical microscopy using reflected normal (tungsten lamp) illumination and supplemented with oblique (fiber optic, quartz halogen) illumination. Commonly applied descriptions, adopted from mineralogical usage, include dull (D), metallic (M), submetallic (SM), subvitreous (SV), vitreous (V), and resinous (R). Lusters transitional between categories or difficult to identify are indicated accordingly (D/SM, SV/V, etc.).

TYPE indicates a provisional first order identification of each particle based on its morphology (from SEM image), elemental composition (from EDS spectrum), and optical properties. We emphasize that, for catalog purposes, types are defined for their descriptive and curatorial utility, not as scientific classifications. These tentative categorizations, which reflect judgments based on the collective experience of the CDPET, should not be construed to be firm identifications and should not dissuade any investigator from requesting any given particle for detailed study and more complete identification. In the absence of any generally accepted taxonomy for stratospheric dust, the precise identification of each particle in our inventory is beyond the scope and intent of our collection and curation program. Indeed, the reliable identification and scientific classification of cosmic dust is one of many important research tasks that we hope this catalog will stimulate. We indicate particle "TYPE" only to aid the users of this catalog (especially those new to small-particle analysis) in distinguishing possible cosmic dust

particles from other particles which are invariably collected during stratospheric dust sampling. In this catalog, particles are organized according to their type. Categories used in this catalog are defined as follows:

C: Cosmic dust (variety unspecified) or other extraterrestrial material. In the strict sense, "cosmic dust" refers only to those particles which have not been modified during passage from interplanetary space to Earth's stratosphere. In this catalog, though, particle type "C" is used to conveniently group together all particles which are judged to be of extraterrestrial origin, including those that have apparently experienced strong ablatational heating or melting. Type "C" particles are provisionally identified as those having one of the three following sets of attributes:

- (a) irregular to spherical, opaque, dark-colored particles composed mostly of Fe with minor Ni or S.
- (b) irregular to spherical, translucent to opaque, dark-colored particles containing various proportions of Mg, Si, and Fe with traces of Al, Ca, S, or Ni.
- (c) irregular to faceted or blocky, transparent to translucent particles containing mostly Mg, Si, and Fe but with traces of Al or Ca, S, or Ni.

Category (a) and (b) particles commonly display either complex, porous aggregate type morphologies or distinctively spherical shapes and dull to metallic lusters which distinguish them from terrestrial minerals. Their EDS spectra are reminiscent of those exhibited by meteoritic Fe Ni or FeS minerals, or combinations of Fe Ni S phases with olivine and/or pyroxene. Category (c) particles display morphologies and EDS spectra which suggest that they are fragments of olivine or pyroxene crystals, neither of which are significant components of stratospheric volcanic ash. Particles which do not fall easily into categories (a), (b), or (c) but which possess some of the same attributes may be classified here as "C?".

TCA: Terrestrial contamination (artificial or man-made). Particles included in the "TCA" category are commonly irregular in shape (though a few may be spherical) and may be transparent, translucent, or opaque. Their EDS spectra commonly show Al, Fe, or Si as the principal peaks but with a variety of minor peaks including those of Ti, V, Cr, Mn, Ni, Cu, or Zn and at abundances which are frequently much greater than those expected in common minerals. However, such compositions are similar to those

expected for certain metal alloys. In some cases, a high intensity (relative to intensities of characteristic X-ray peaks) of continuum radiation occurs in the EDS spectrum, suggesting that low atomic number elements not detectable by the EDS (e.g., H, C, N, O) are abundant in the particle. Such "TCA" particles are tacitly inferred to be synthetic carbon-based materials. (This category probably includes particles produced by or derived from aircraft operation or collector hardware, or possibly spacecraft debris. However, some of these particles are worthy of additional research and may represent true extraterrestrial "low Z" material.)

TCN: Terrestrial contamination (natural). "TCN" particles may be transparent to opaque and may exhibit a variety of colors. However, they are commonly irregular in shape and distinctively rich in Si and Al with minor abundances of Na, K, Ca, or Fe. Morphologies and EDS spectra of most "TCN" particles compare favorably with respective properties of silica polymorphs, feldspar, or silicic volcanic glass, three materials which are principal components of stratospheric volcanic ash. In addition, platy or porous aggregate type particles of light color and Si, Al-rich composition may be silicic clay minerals, common phases in Earth's surface soils. Irregular, reddish Fe-rich particles may also be products of terrestrial rock weathering. Recognition of these and other phases as "TCN" particles is based mostly on CDPET's collective mineralogical experience and comparison with reference samples. Less commonly, the "TCN" category may include distinctive particles with apparently non-random shapes which are rich in low atomic number elements (as inferred from their EDS spectra having high levels of continuum X-radiation and relatively small peaks for characteristic X-rays). Those rare particles are distinguished from "TCA" particles by their unusual, organized morphologies and probably represent biological contaminants.

AOS: Aluminum oxide sphere. An "AOS" is transparent, subvitreous to vitreous in luster, colorless to pale yellow and at least approximately spherical. However, shape may range from nearly perfect sphericity to pronounced ellipticity, and surface texture may range from very smooth to rough. Other spheres or irregularly shaped material may be attached to its surface. Al is the distinctively dominant (or only) peak in its EDS spectrum. A sphere displaying the attributes of an "AOS" except with major elements in addition to Al may be listed as "AOS?" or "?". Transparent Al-rich particles of

irregular shape would probably be listed as "TCA?". ("AOS" particles are products of solid fuel rocket exhausts.)

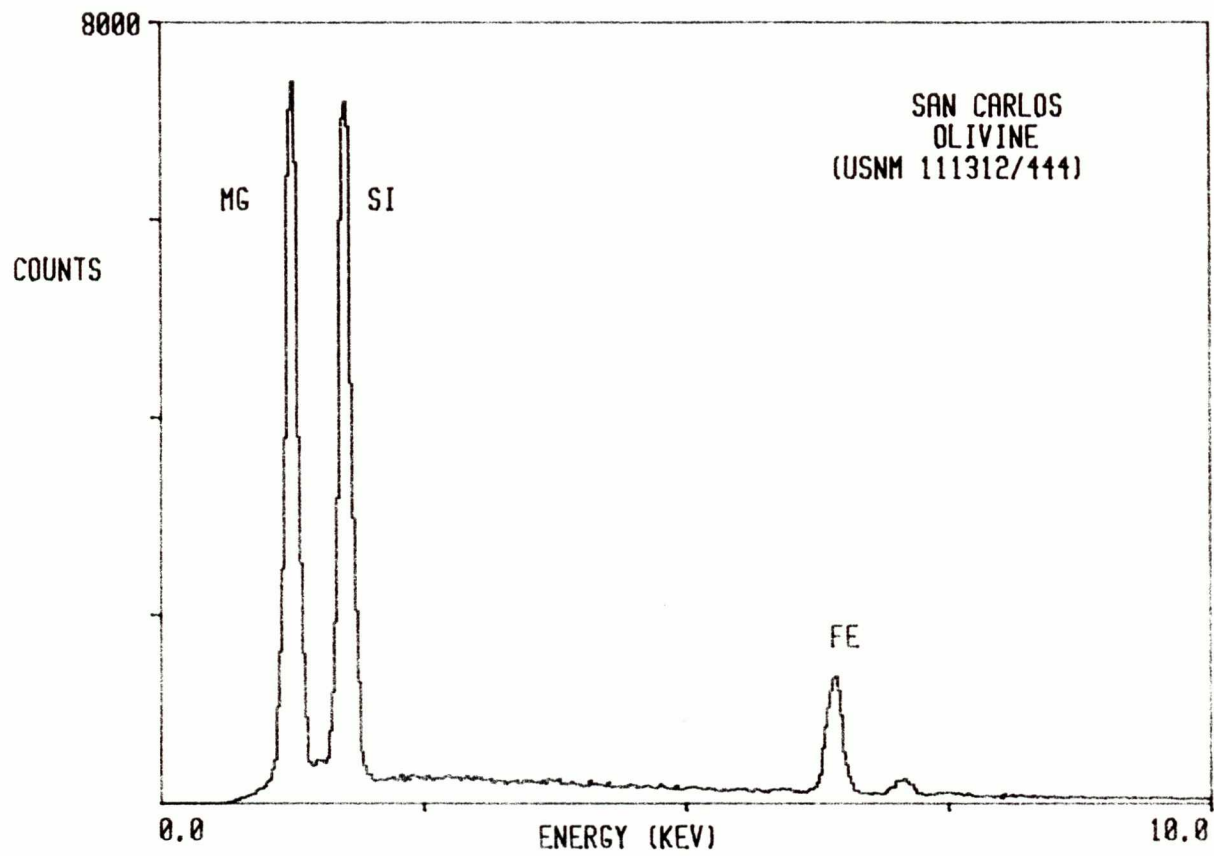
Again, this system for provisional classification of particles is presented only as a first-order attempt to distinguish particles which are probably extraterrestrial in origin from those which are probably contaminants. All particles will require careful research examination before they can be satisfactorily identified.

COMMENTS are included for particles with special features or histories. Particles lost during or after preliminary SEM examination or particles with possible genetic relationships to other particles are noted here.

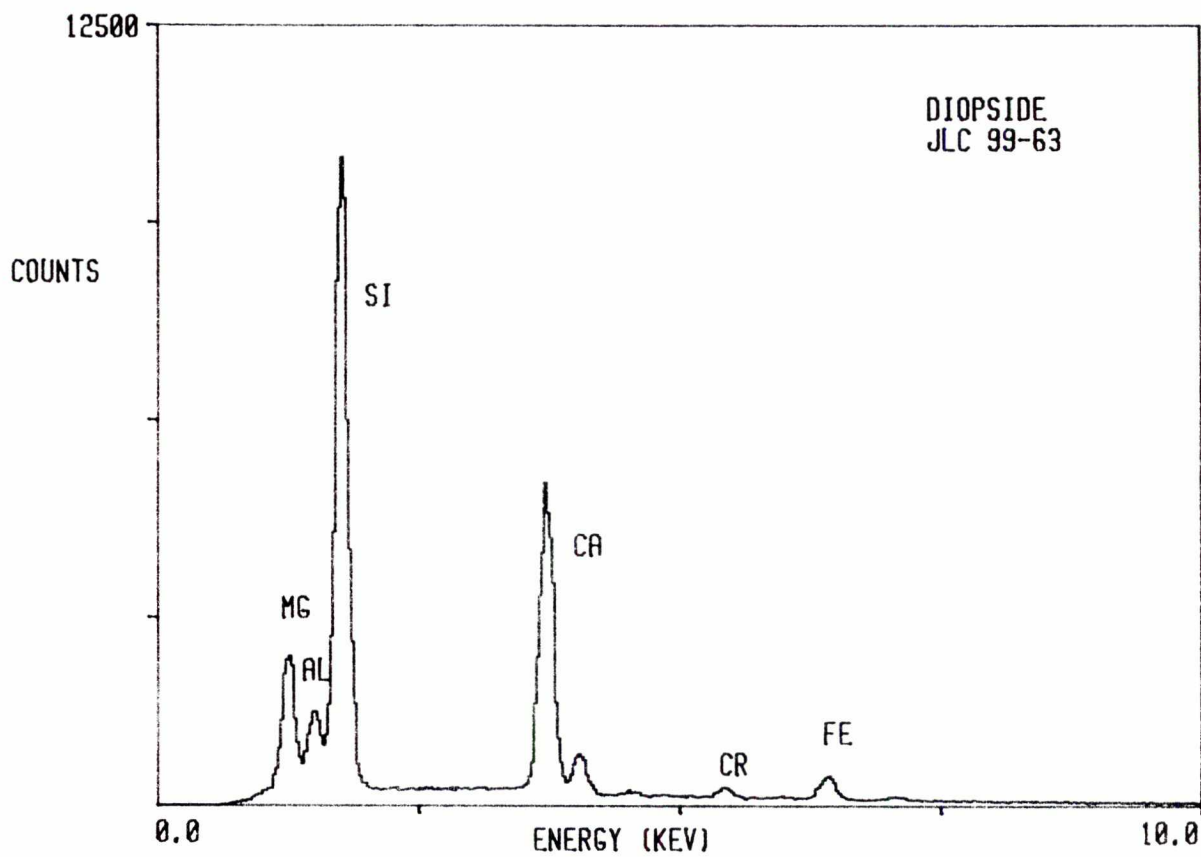
5. ANALYSES OF REFERENCE MATERIALS

The usefulness of the SEM images and EDS spectra provided for particles in this catalog is enhanced by comparison with similar data products obtained for mineral standards of known composition. Accordingly, a typical EDS spectrum is presented for each of three standard minerals prepared as polished grain mounts (San Carlos olivine, USNM 111312/444; diopside JLC 99 63; Kakanui hornblende, USNM 143965; Allende Meteorite Bulk Powder, NMNH 3529). Analyses of these optically flat surfaces eliminate inter-sample geometrical variations so that effects of detection limits and compositional variations, in general, on relative peak heights in the raw spectra can be more readily assessed. Even so, the polished grain spectra should not be over-interpreted because no corrections have been attempted for atomic number, absorption, or fluorescence effects. The spectra are presented simply as additional aids to the meaningful use of the sample particle EDS spectra. Investigators who might wish to compare performance characteristics of their EDS analytical systems with those of the system used by CDPET in preparing these catalog data should contact Curator/Cosmic Dust at the address given in Section 6. A short-term loan of a polished grain mineral standard can then be arranged.

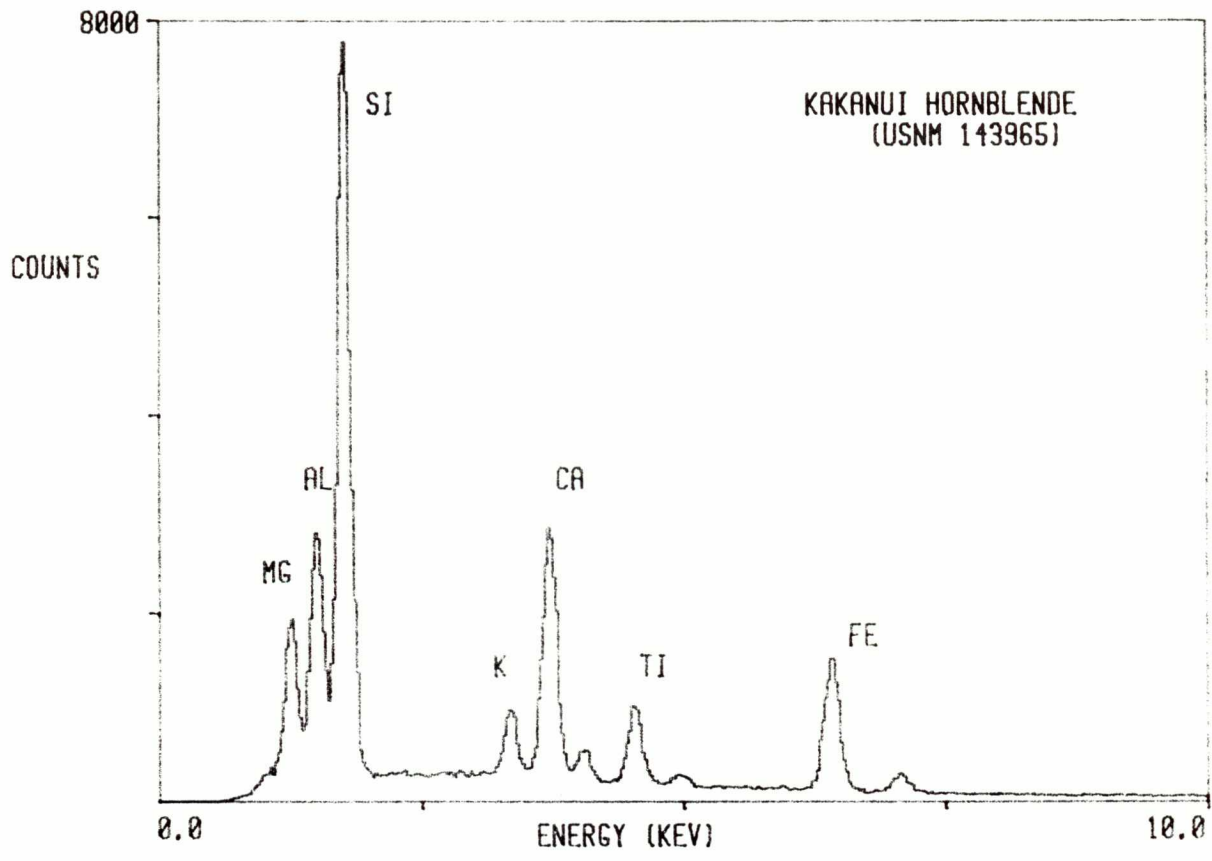
As pointed out in Section 3, the EDS spectra included in this catalog were obtained using a primary electron energy of 20 kV, whereas spectra in Catalogs 1-3 and 8 were obtained with a different instrument operated at 40 kV. Although the effects on EDS spectra to be expected from such a change are well known from X-ray spectrometric analysis, they are worth pointing out to avoid confusion among the readers of this catalog. The major effects of concern to Cosmic Dust Catalog users can be seen by comparing the two "Allende (C3) Meteorite Bulk Powder" spectra, one of which was obtained at 20 kV and the other at 40 kV, as presented in Cosmic Dust Catalogs 1-3 and 8 (only spectra collected at 20 kV are presented in this catalog). In the 20 kV spectrum, the Si peak is more intense than the principal peak of Fe, whereas the opposite is true for the 40 kV spectrum. In general, the 20 kV spectra in this catalog will show peaks of light elements enhanced relative to peaks of heavy elements when compared with 40 kV spectra published in Catalogs 1-3 and 8. The explanation is based both on geometrical differences between X-ray paths in the two EDS systems (the JEOL 35CF system is actually more favorable for light element analysis) and on electron and X-ray physics (X-ray emission by heavy elements is more intense at 40 kV than at 20 kV). Thus, readers are cautioned against attempting to quantitatively intercompare 40 kV spectra with 20 kV spectra. Still, the spectra in each catalog should continue to serve as originally intended. Namely, the sample and standard spectra in any given catalog will represent a self-consistent data set.



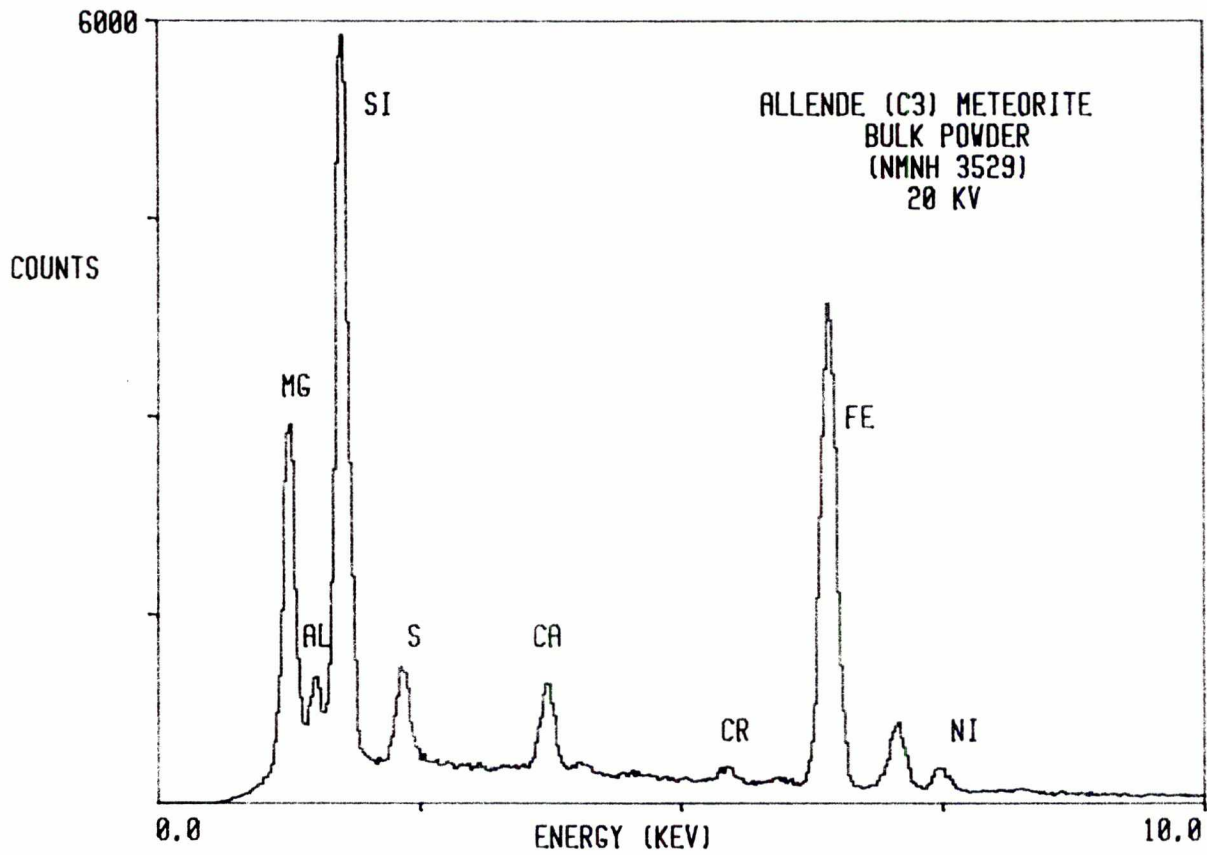
WEIGHT %													TOTAL
SiO ₂	TiO ₂	Al ₂ O ₃	Cr ₂ O ₃	Fe ₂ O ₃	FeO	NiO	MnO	MgO	CaO	Na ₂ O	K ₂ O	H ₂ O	
40.81	-	-	-	-	9.55	0.37	0.14	49.42	<0.05	-	-	-	100.29



WEIGHT %													TOTAL
SiO ₂	TiO ₂	Al ₂ O ₃	Cr ₂ O ₃	Fe ₂ O ₃	FeO	NiO	MnO	MgO	CaO	Na ₂ O	K ₂ O	H ₂ O	
51.93	0.46	6.31	0.96	1.80	2.34	0.04	0.07	16.05	18.64	1.39	-	-	99.99



WEIGHT %													TOTAL
SiO ₂	TiO ₂	Al ₂ O ₃	Cr ₂ O ₃	Fe ₂ O ₃	FeO	NiO	MnO	MgO	CaO	Na ₂ O	K ₂ O	H ₂ O	
40.37	4.72	14.90	-	3.30	7.95	-	0.09	12.80	10.30	2.60	2.05	0.94	100.02



WEIGHT %											
SiO ₂	TiO ₂	Al ₂ O ₃	Cr ₂ O ₃	FeO	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	C
34.23	0.15	3.27	0.52	27.15	0.18	24.62	2.61	0.45	0.03	0.23	0.29
FeS	NiS	CoS	Fe ⁰	Ni ⁰	Co ⁰	TOTAL					
4.03	1.60	0.08	0.17	0.36	0.01	99.98					

6. SAMPLE REQUESTS

Scientists desiring to perform detailed research on particles described in this catalog should apply in writing to:

Curator/Cosmic Dust
Code SN2
NASA/Johnson Space Center
Houston, Texas 77058
U.S.A.

Telephone: (713) 483-5128

FTS: 525-5128

Sample requests should refer to specific particle identification numbers and should describe the research being proposed as well as the qualifications and facilities of the investigator making the request. Additionally, requests for particles not yet passed through preliminary examination will be considered if the requester can demonstrate a strong need for them. NASA will arrange for a review of the scientific merits of each request and will inform the requester of the results. Approval of a sample request does not imply or include funding for the proposed research. Questions about NASA funding should be directed to:

Dr. Donald D. Bogard
Discipline Scientist
Planetary Materials and Geochemistry Program
Code SN2
NASA/Johnson Space Center
Houston, TX 77058

Although foreign scientists are welcome to request samples, NASA cannot provide funds to be spent outside the U.S.A. by citizens of other countries.

7. ACKNOWLEDGEMENTS

WB-57 support personnel at Ellington Field performed the loading and unloading of the cosmic dust collectors on the WB-57 aircraft and provided flight log data.

Eugene Jarosewich (Smithsonian Institute, Washington, D.C.) kindly provided mineral standards and the Allende chondrite powder.

8. PARTICLE TABLE OF CONTENTS

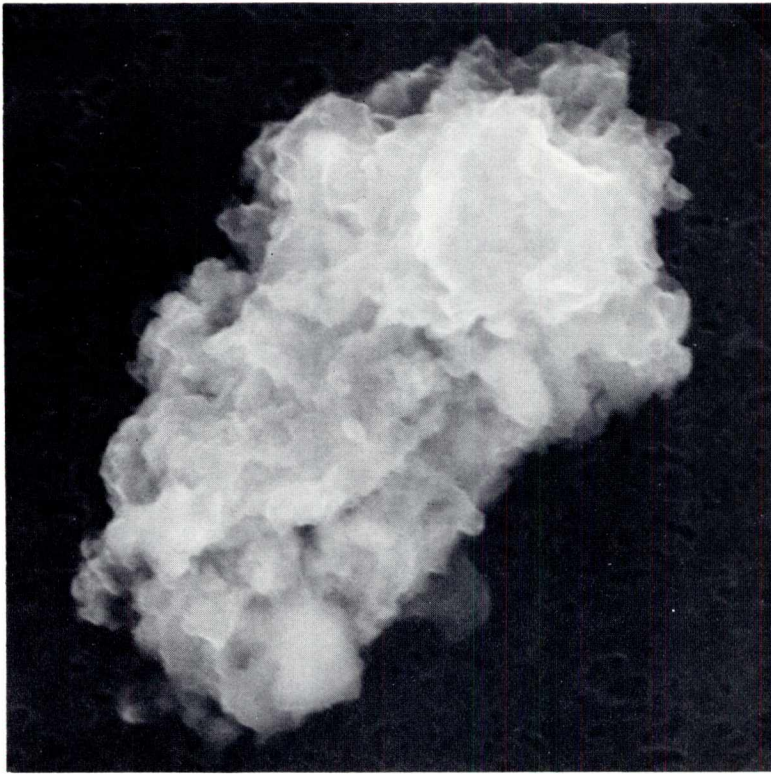
Since particles are arranged in this catalog by type, rather than sequentially by mount and number as in previous catalogs, we include a sequential listing of particles and the page on which they may be found, for the user's reading pleasure.

<u>PARTICLE</u>	<u>PAGE</u>	<u>PARTICLE</u>	<u>PAGE</u>	<u>PARTICLE</u>	<u>PAGE</u>	<u>PARTICLE</u>	<u>PAGE</u>
A1	24	B12	104	C21	153	F4	130
A2	25	B13	3	C22	11	F5	48
A3	26	B14	4	C23	12	F6	18
A4	27	B15	105	D1	39	F7	131
A5	28	B16	106	D2	117	F8	132
A7	2	B17	33	D3	40	F9	49
A8	84	B18	34	D5	41	F10	133
A9	85	B19	107	D6	118	F11	50
A10	29	B20	108	D8	42	F12	51
A11	86	B21	109	D9	13	F14	52
A12	30	B22	110	D10	14	F15	53
A13	87	B23	111	D11	15	F16	54
A15	88	B24	112	D12	43	F17	55
A16	89	C1	113	D13	16	G1	56
A18	90	C2	5	D14	119	G2	57
A20	91	C3	6	D19	120	G4	134
A21	92	C4	7	E1	44	G5	58
A22	93	C5	114	E3	121	G6	135
A23	94	C6	8	E4	45	G7	136
A24	95	C10	35	E8	46	G8	59
A25	96	C11	115	E9	47	G9	60
A27	97	C12	9	E10	122	G11	137
B1	98	C13	36	E11	123	G12	61
B2	99	C14	37	E12	17	G13	62
B3	100	C15	10	E15	124	G14	63
B4	101	C16	116	E16	125	G15	64
B6	102	C17	38	E18	126	G16	65
B7	103	C18	150	F1	127	G17	66
B8	31	C19	151	F2	128	G19	67
B9	32	C20	152	F3	129	H1	138

<u>PARTICLE</u>	<u>PAGE</u>	<u>PARTICLE</u>	<u>PAGE</u>	<u>PARTICLE</u>	<u>PAGE</u>	<u>PARTICLE</u>	<u>PAGE</u>
H2	19	H9	71	I1	76	I9	78
H3	139	H10	72	I2	144	I11	79
H4	140	H11	73	I3	77	I12	21
H5	68	H12	74	I4	145	I13	80
H6	69	H13	75	I6	146	I14	148
H7	141	H14	142	I7	147	I16	81
H8	70	H15	143	I8	20		

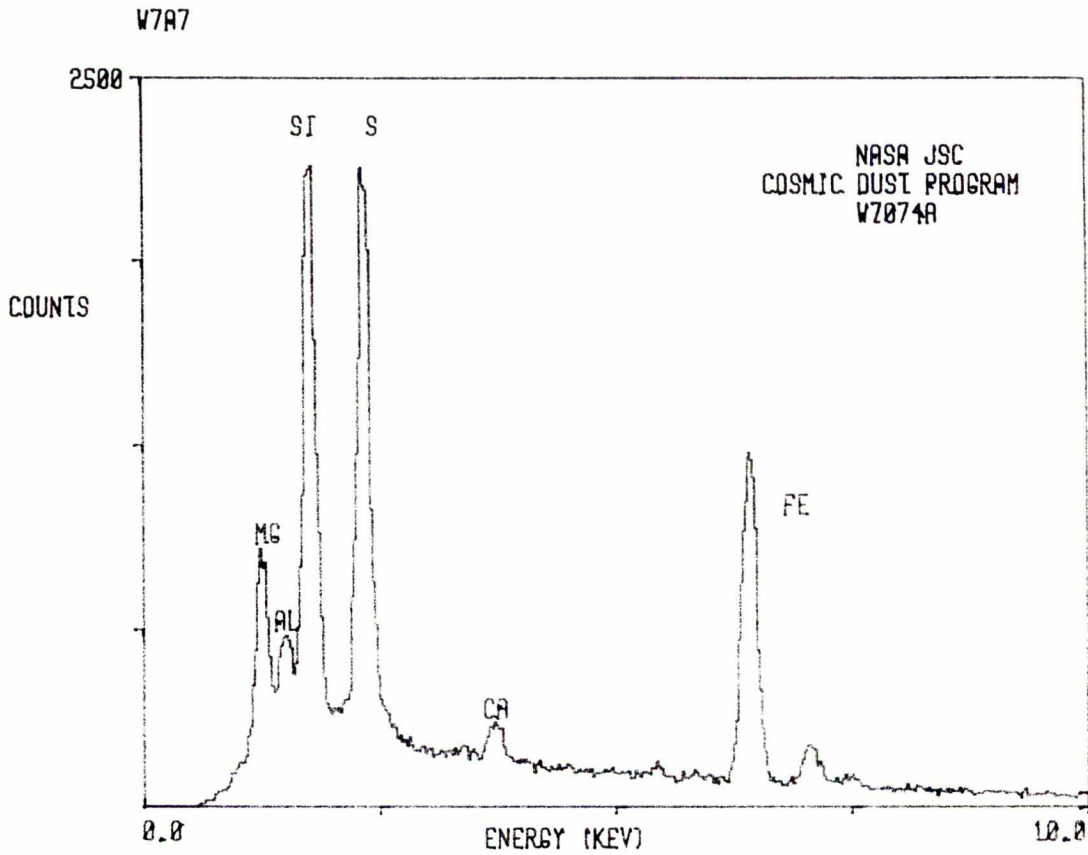
COSMIC DUST

W7074 A 7

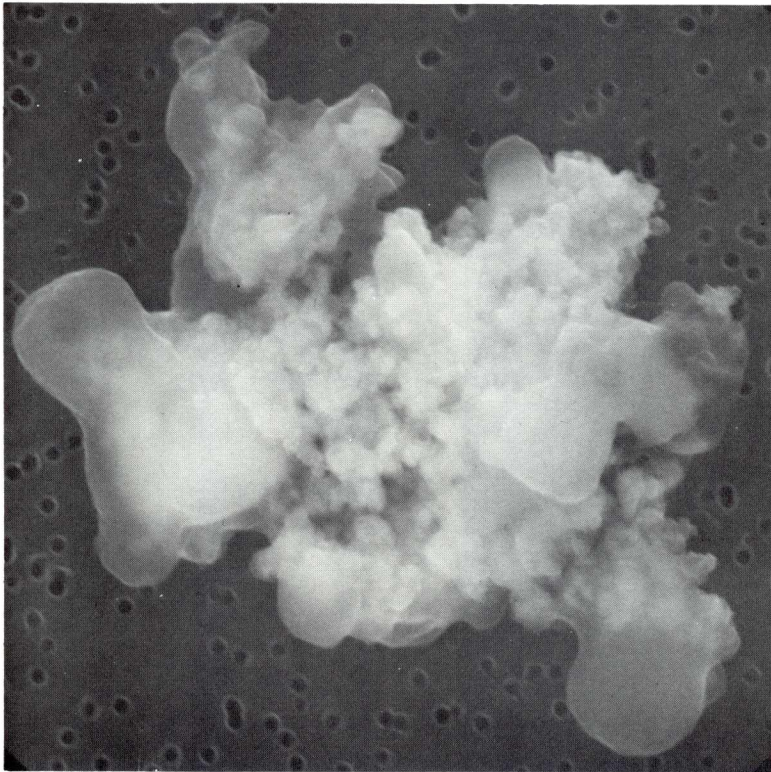


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S-88-53252



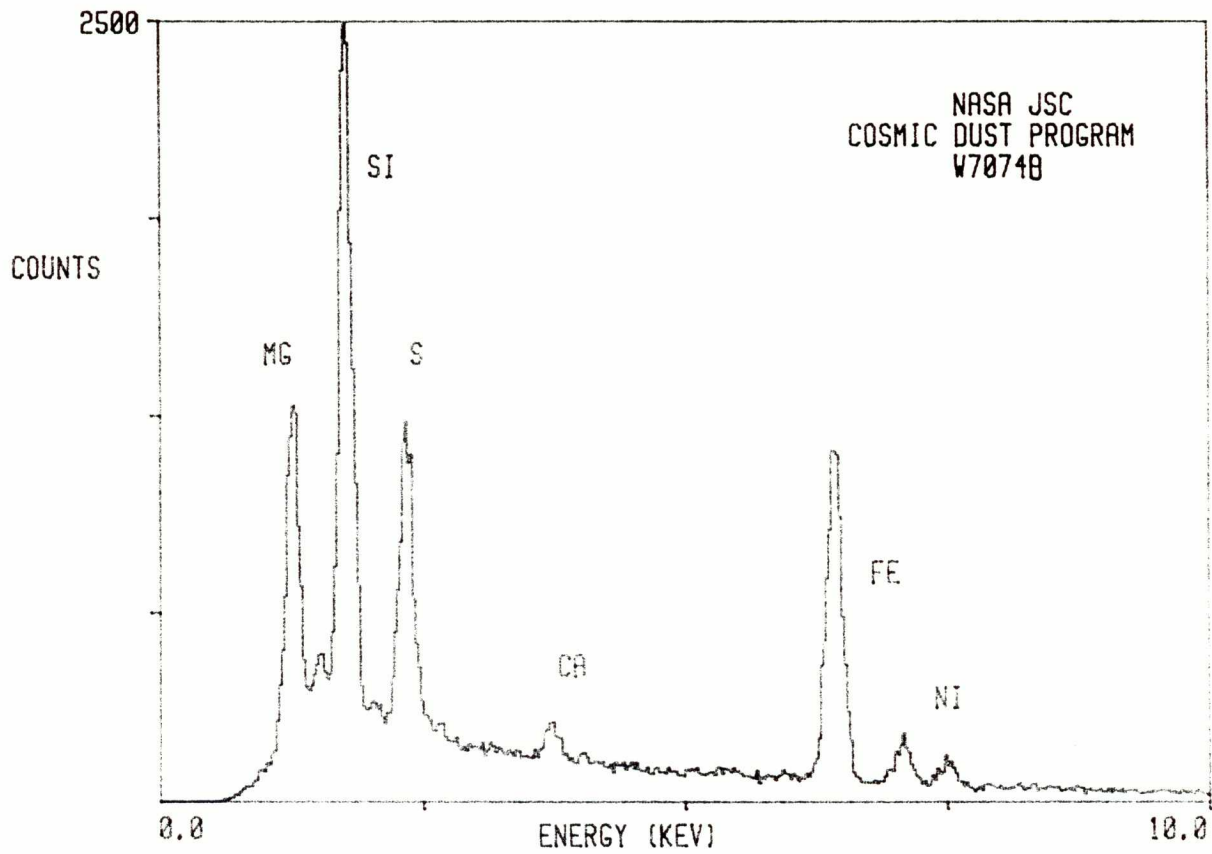
W7074 B 13



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S-88-53278

W7B13

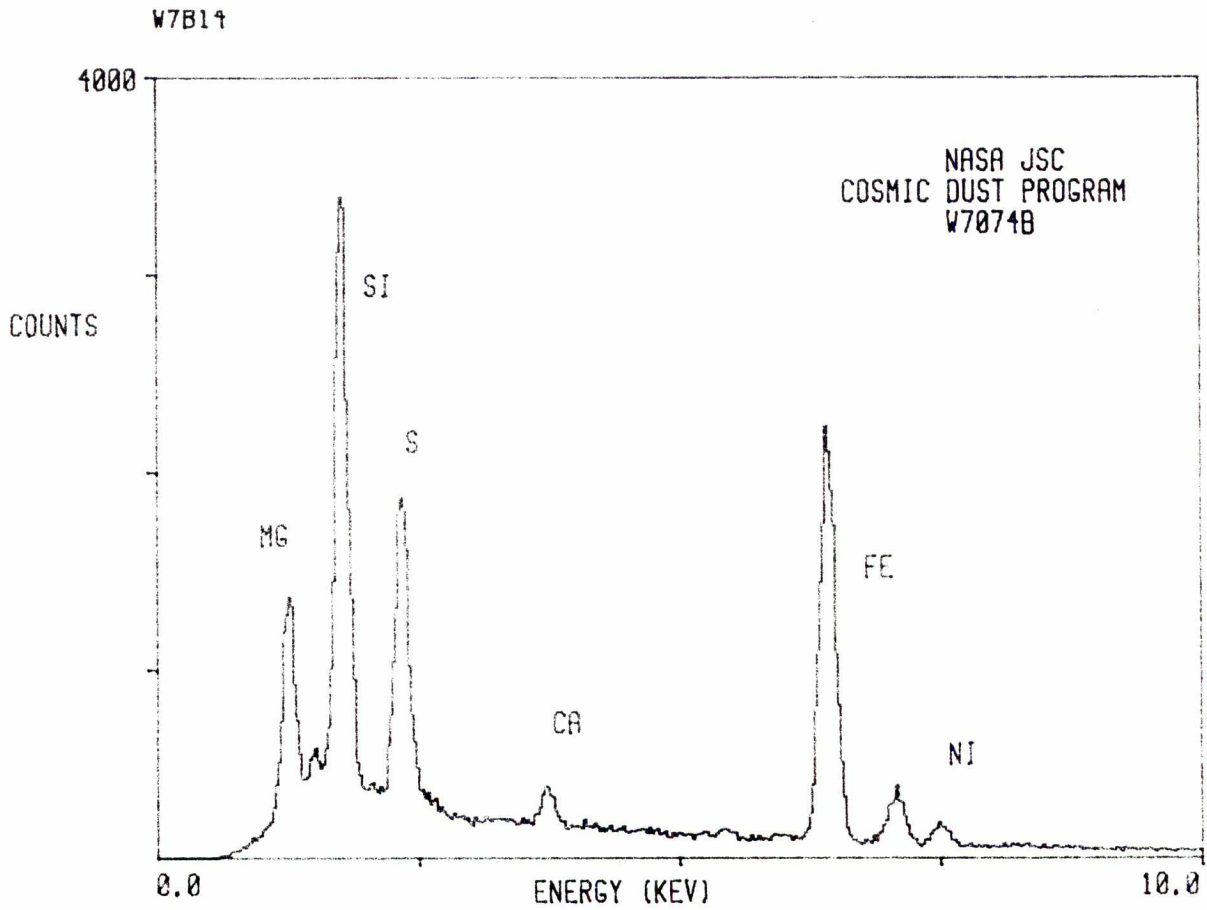


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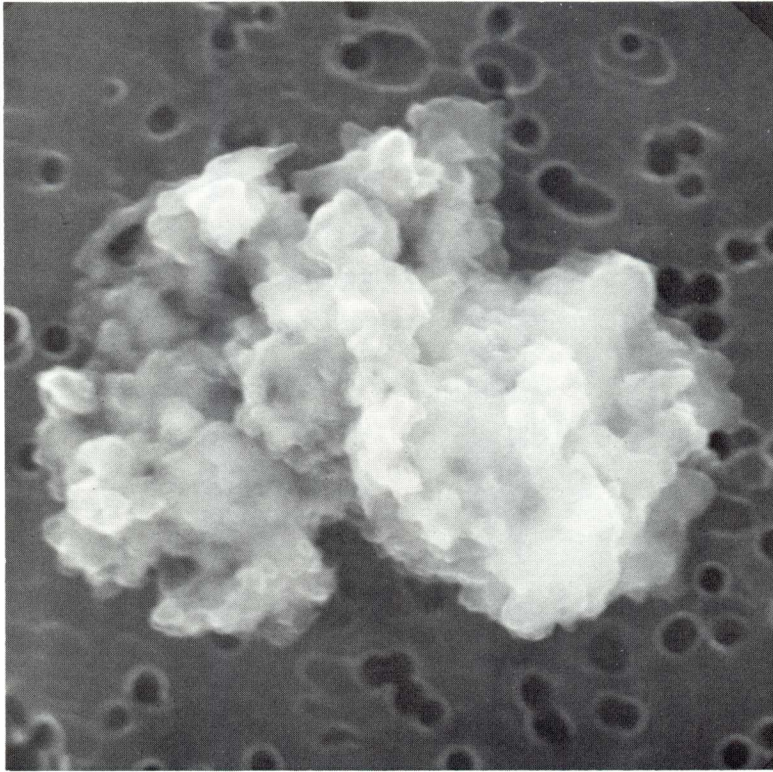


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S-88-53279



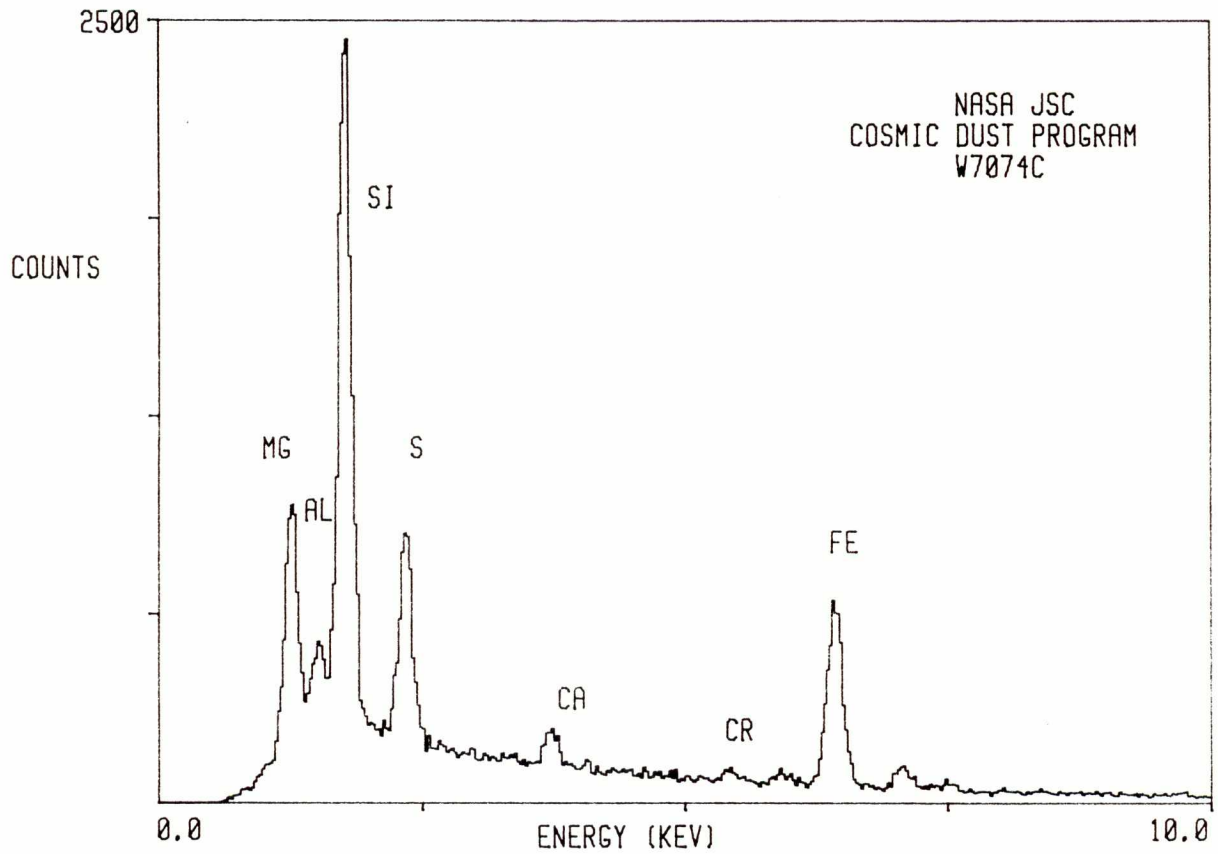
W7074 C 2



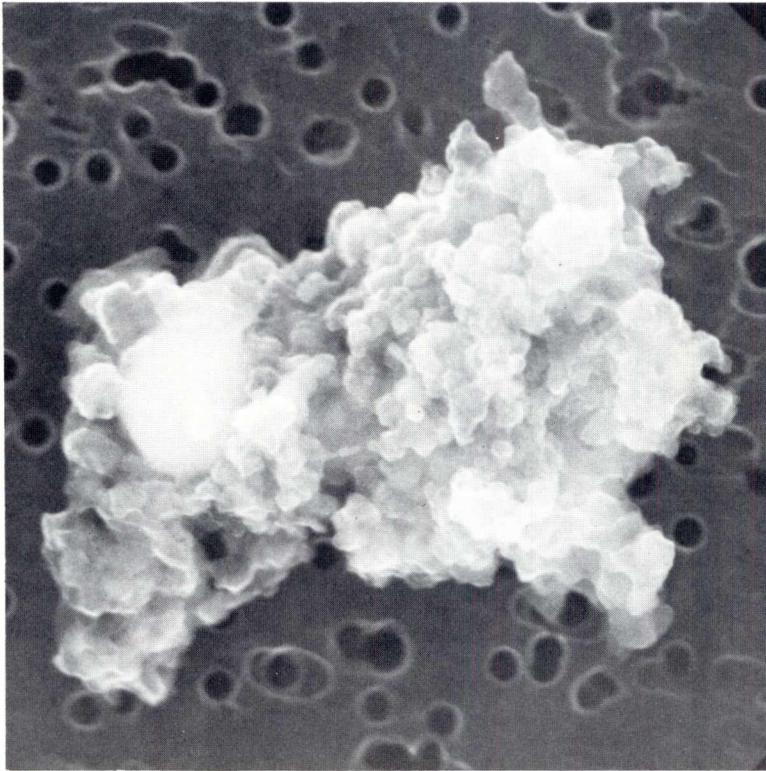
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S-88-53291

W7C2



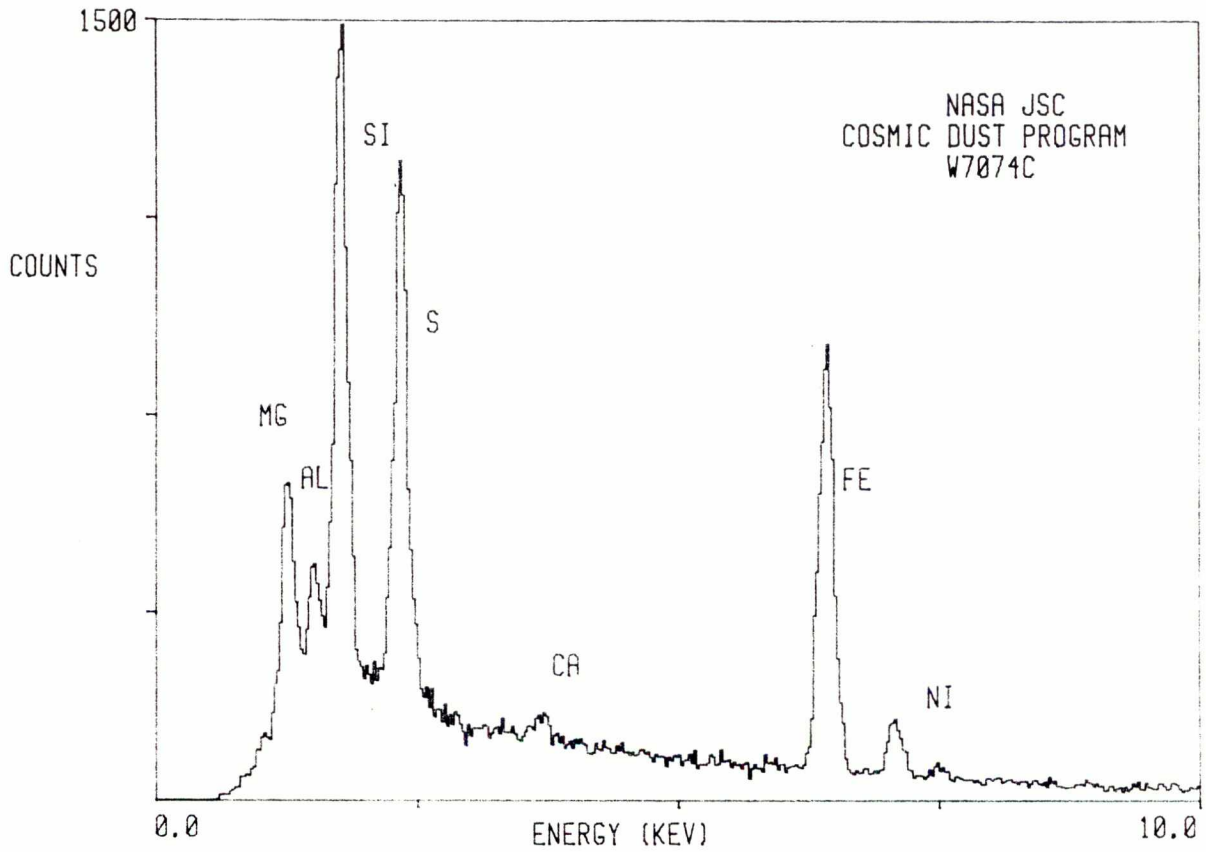
W7074 C 3



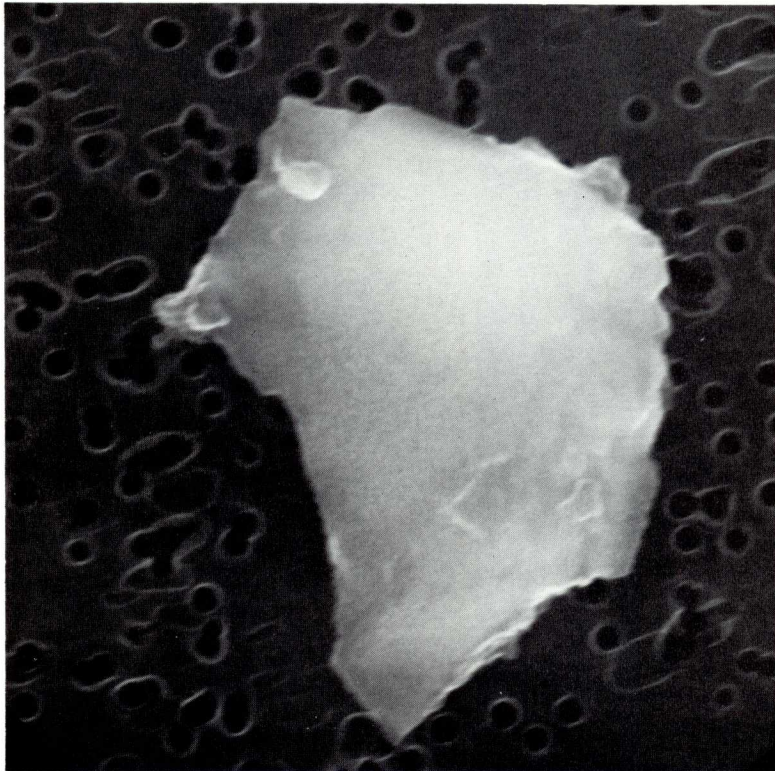
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W7C3

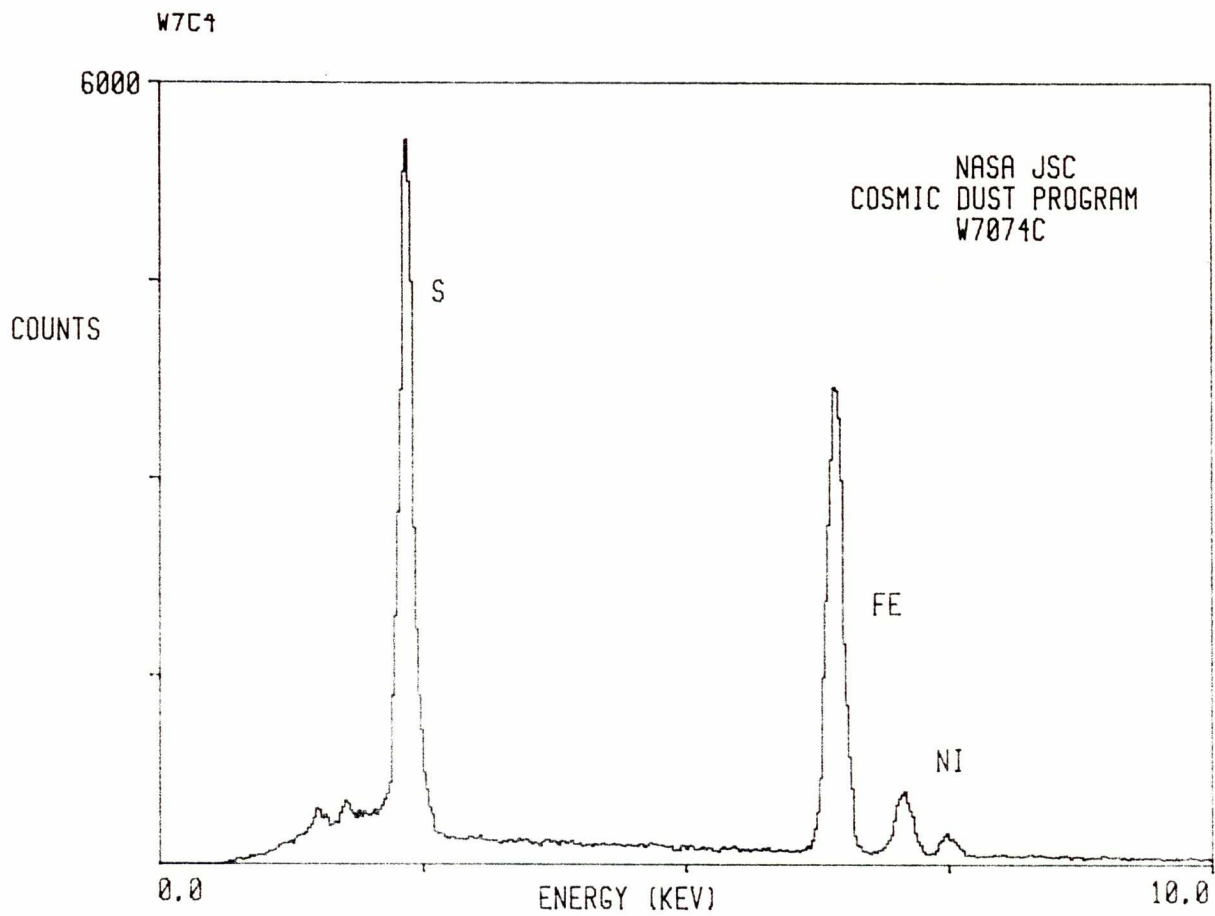


W7074 C 4

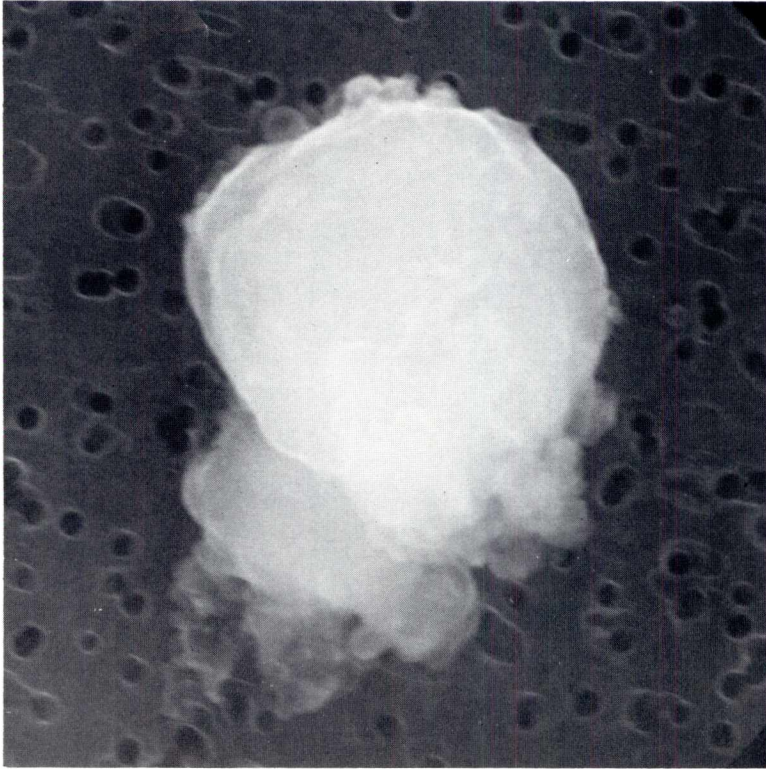


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COMMENTS:

S-88-53293



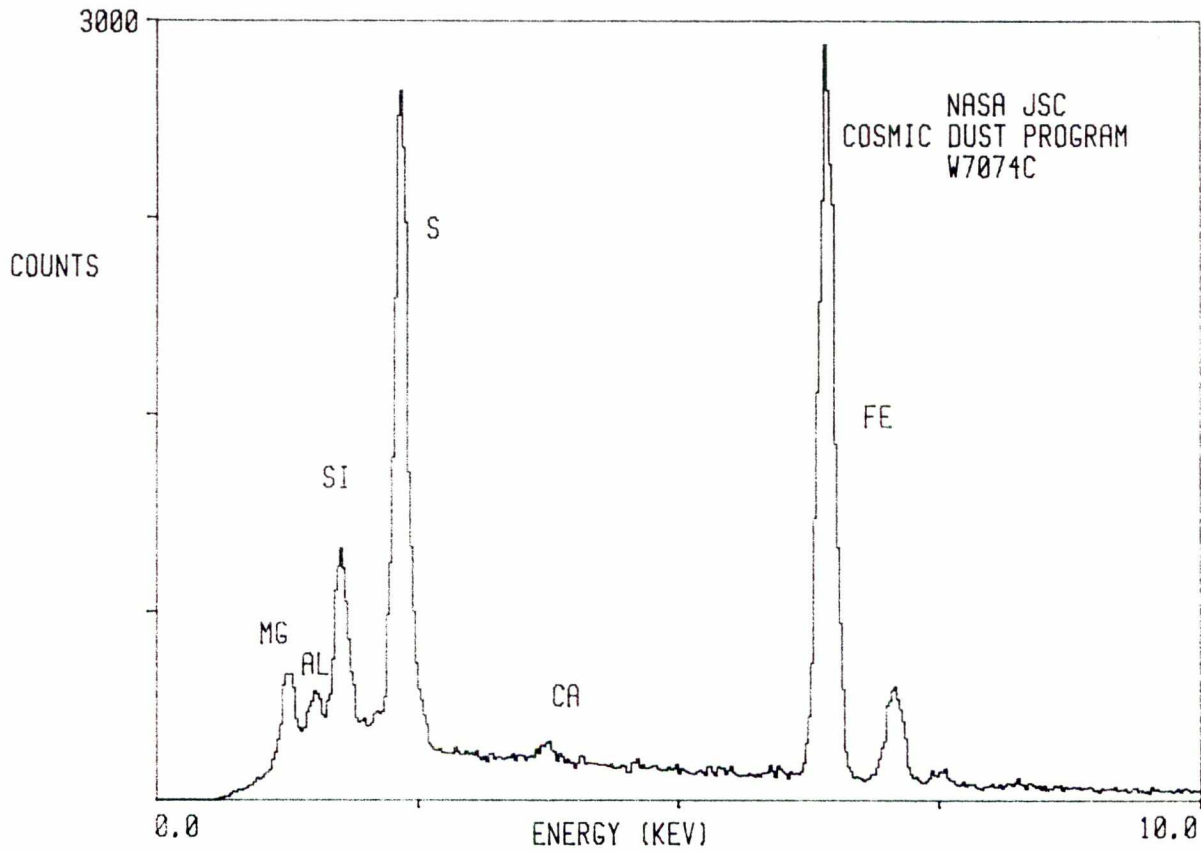
W7074 C 6



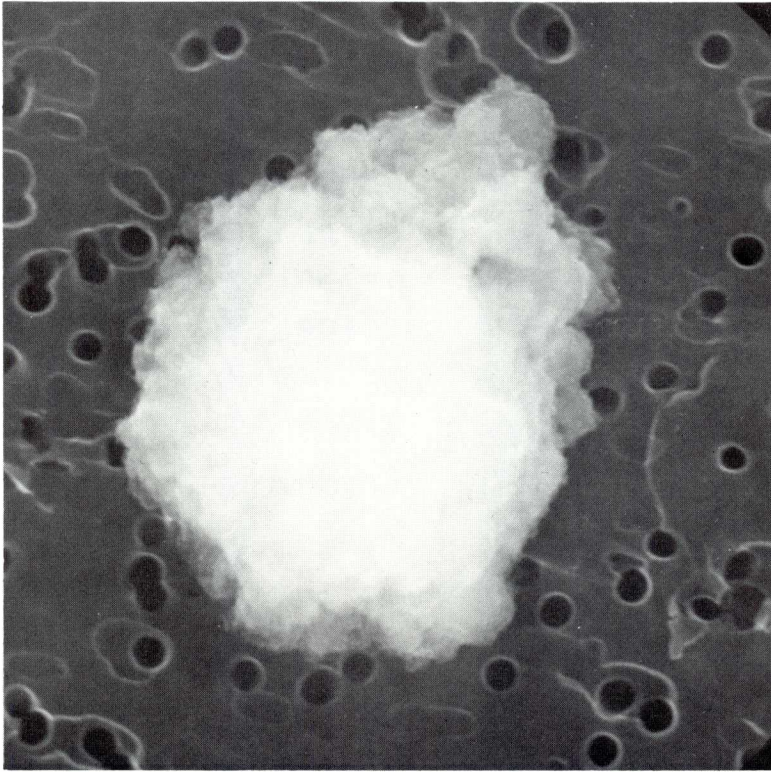
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S-88-53295

W7C6



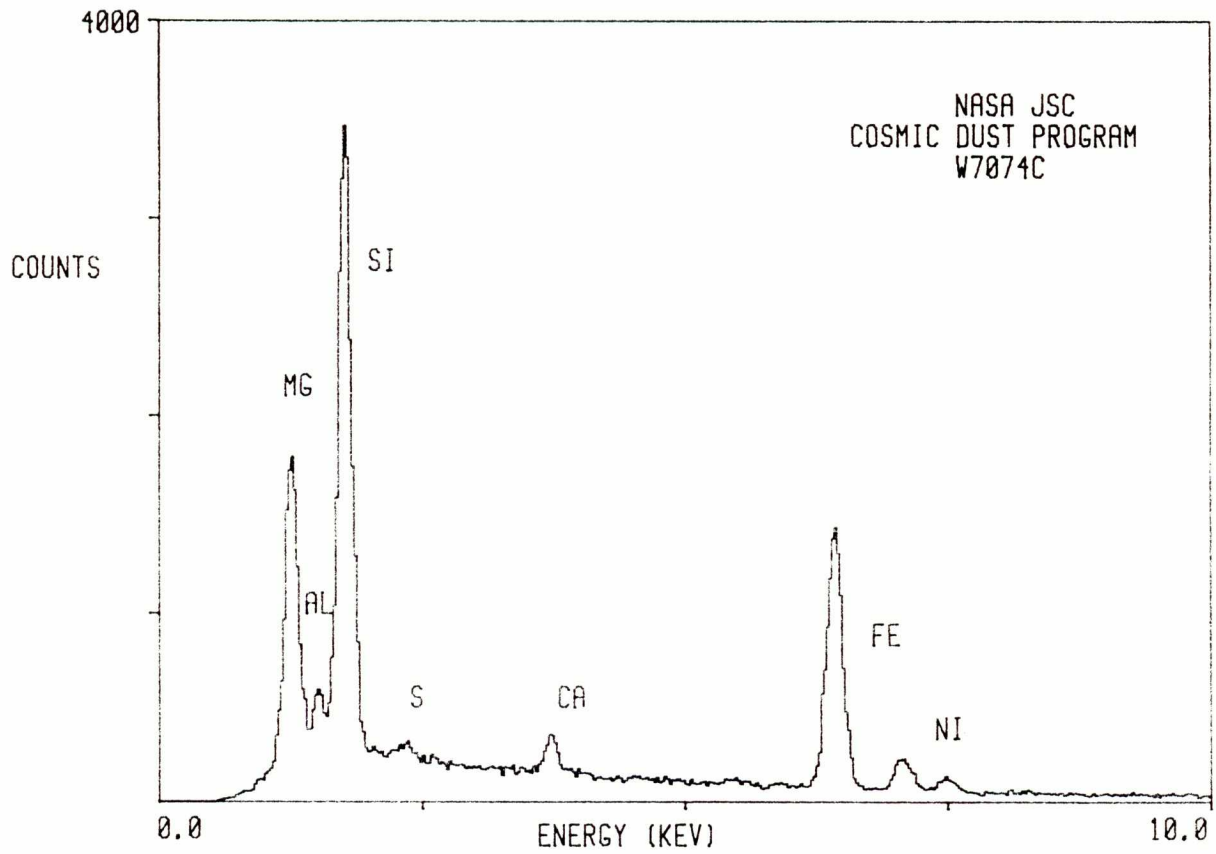
W7074 C 12



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S-88-53299

W7C12



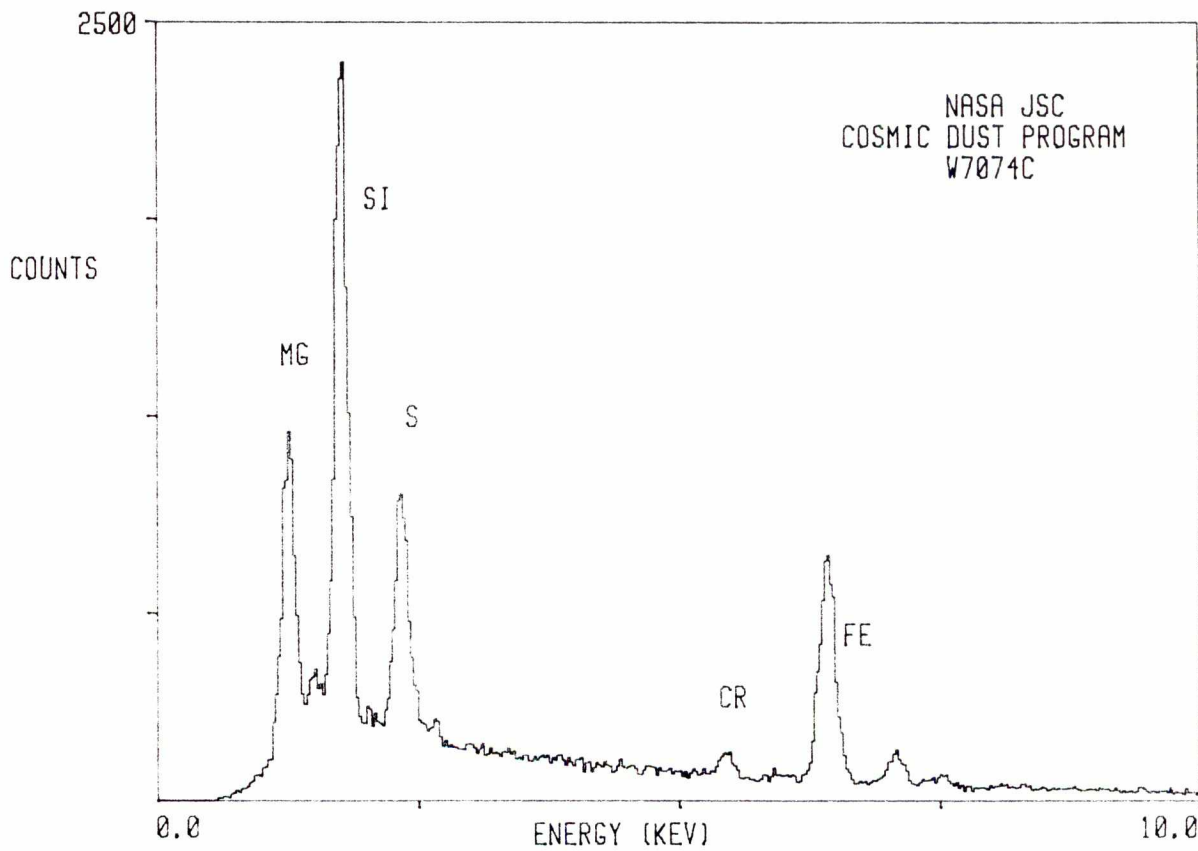
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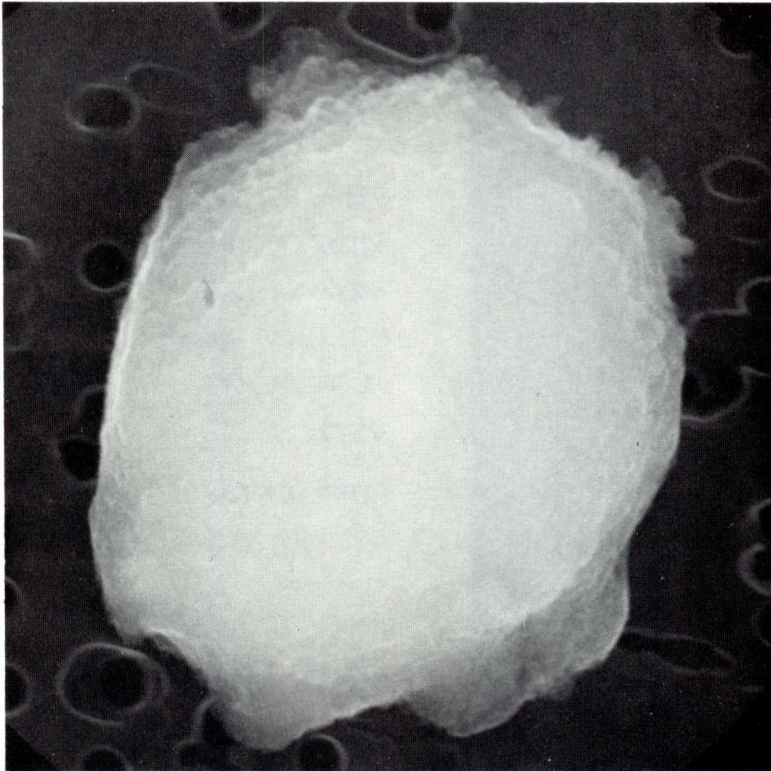
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S-88-53302

W7C15

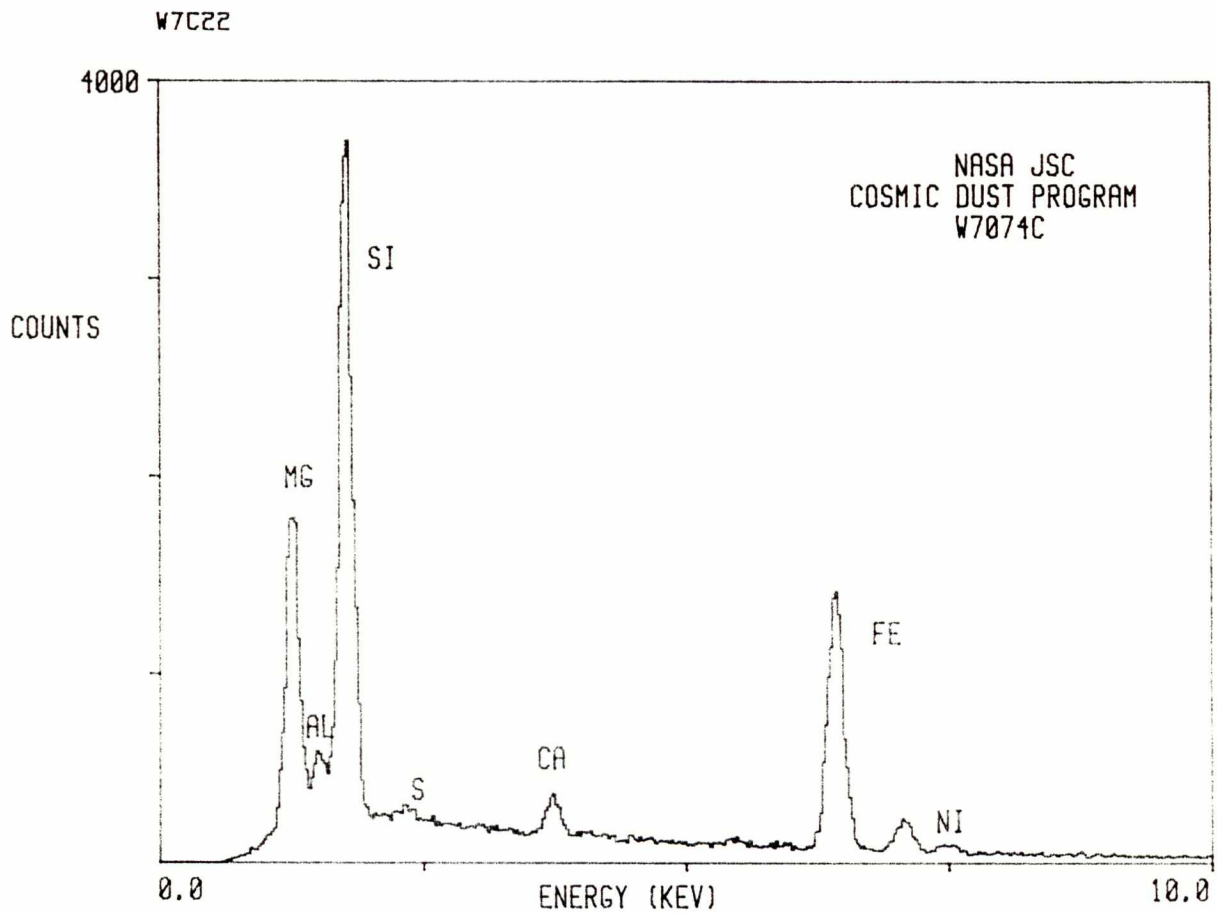


W7074 C 22

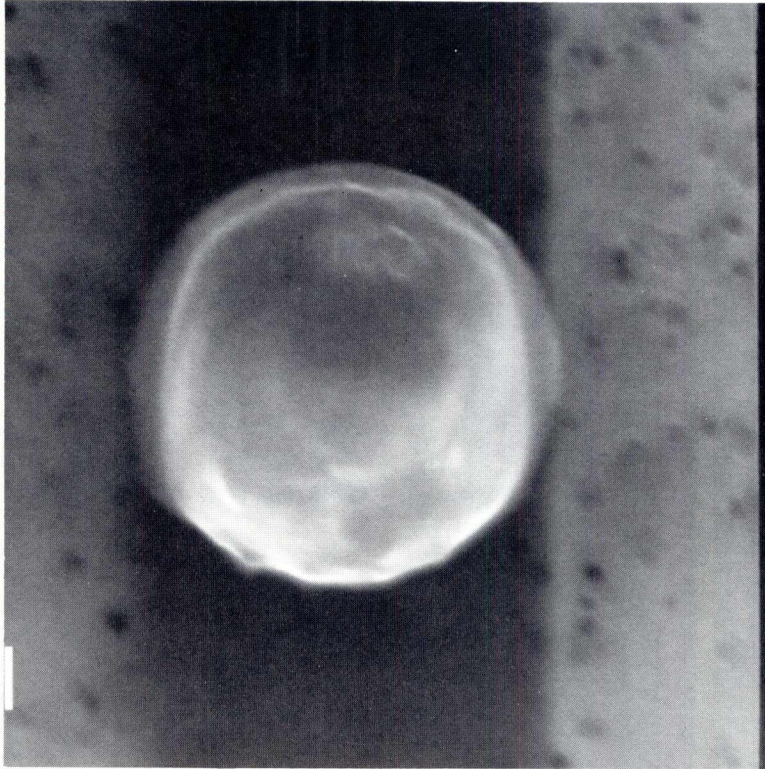


SIZE: 4
SHAPE: I
TRANS.: TL
COLOR: Black
LUSTER: V
TYPE: C
COMMENTS:

S-88-53309



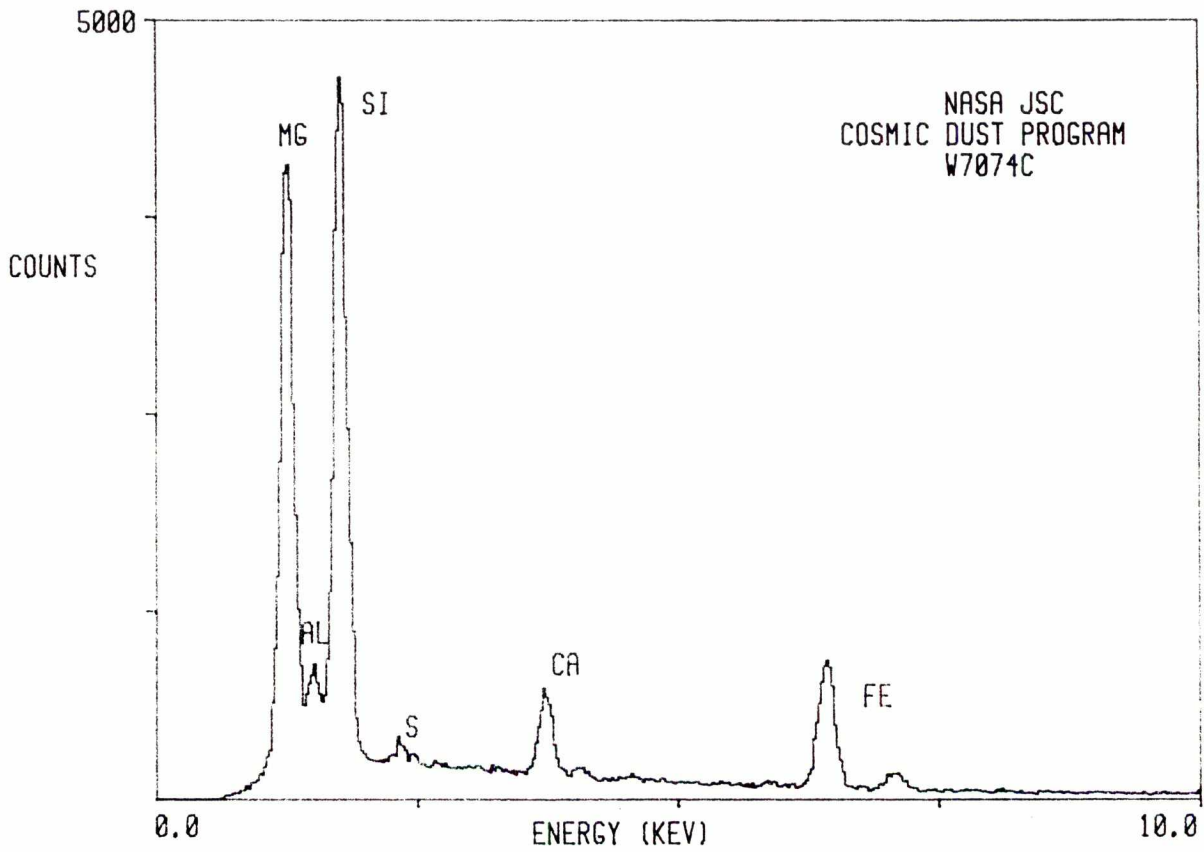
W7074 C 23



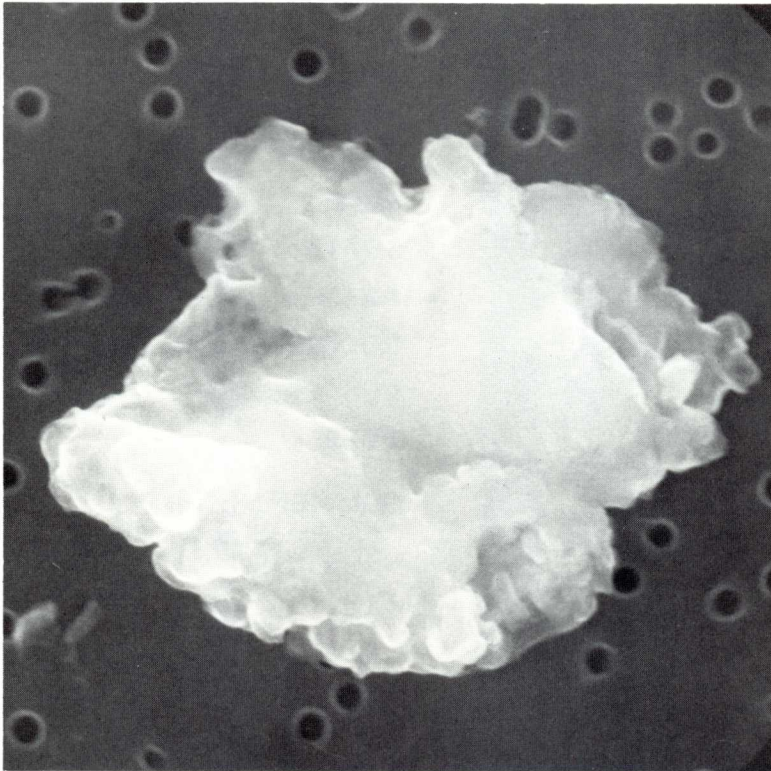
SIZE: 6
SHAPE: S
TRANS.: T
COLOR: Brown
LUSTER: V
TYPE: C
COMMENTS:

S-88-53310

W7C23



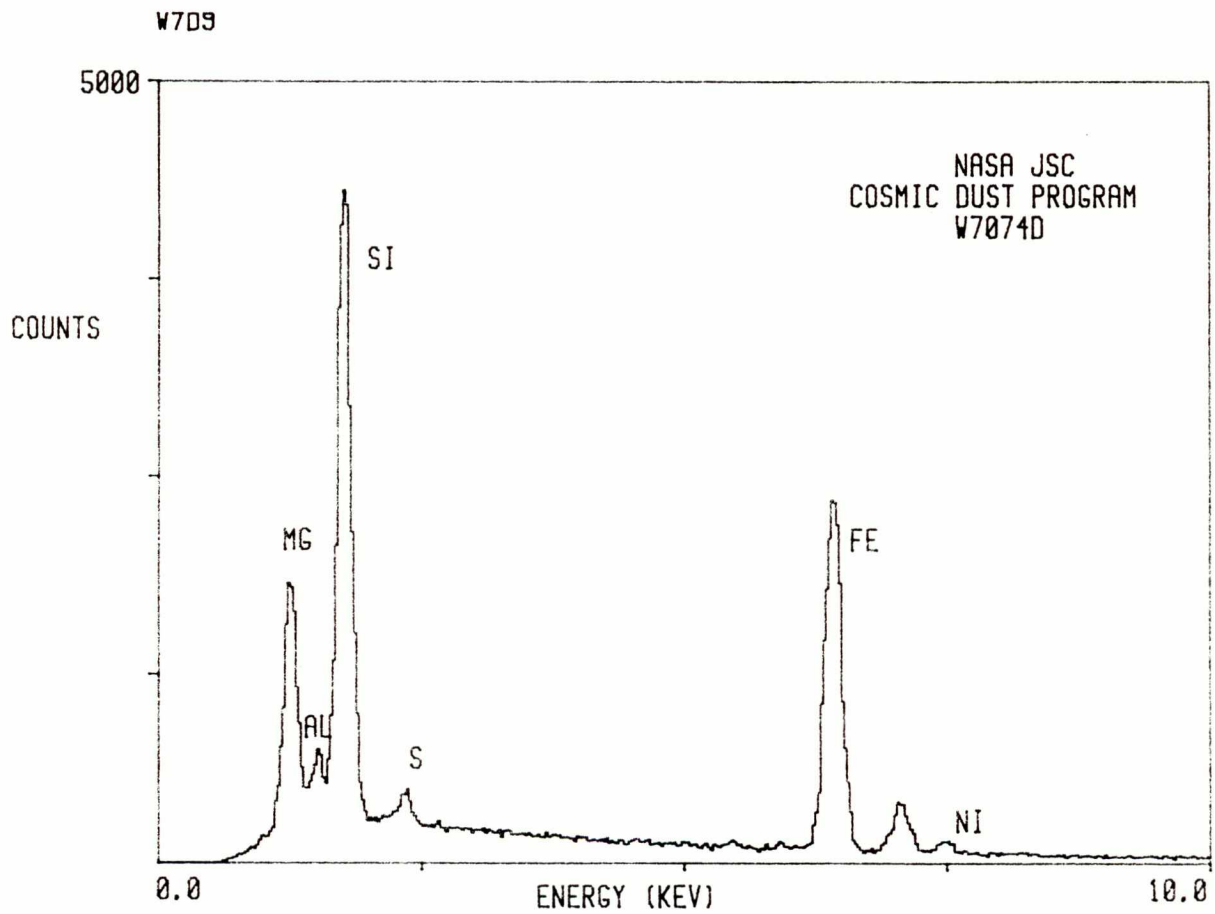
W7074 D 9



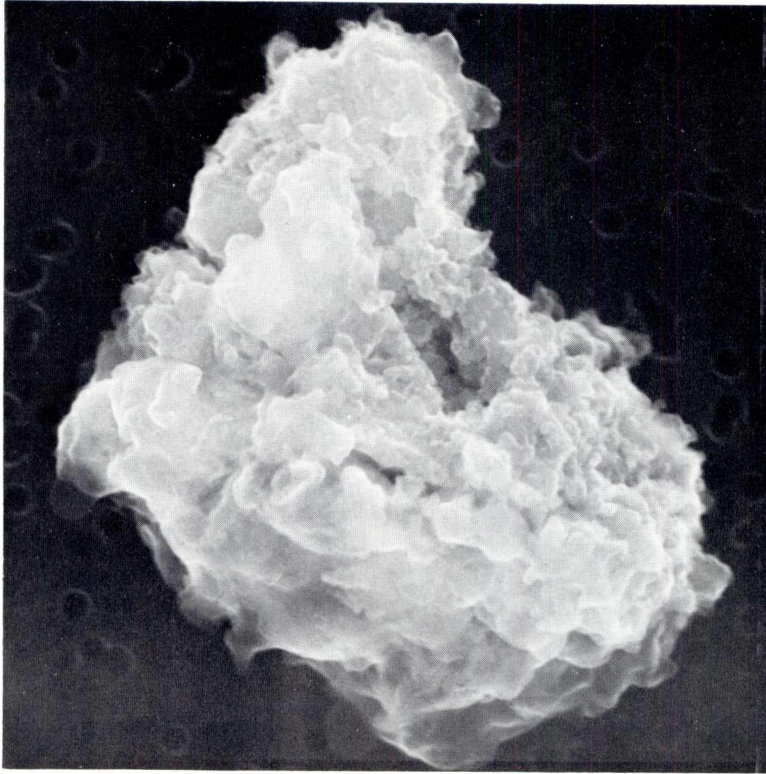
SIZE: 6
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/D
TYPE: C

COMMENTS:
Related to
W7074D10 and D11

S-88-53318



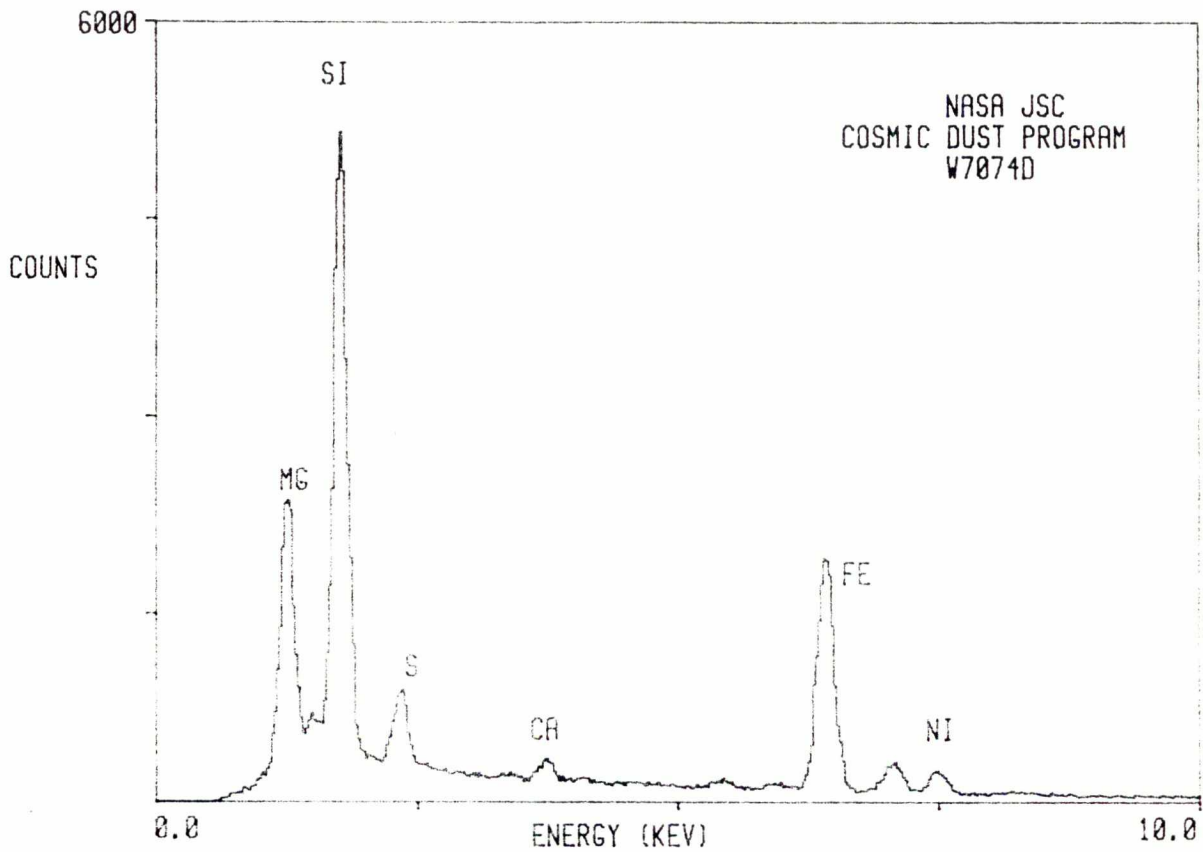
W7074 D 10



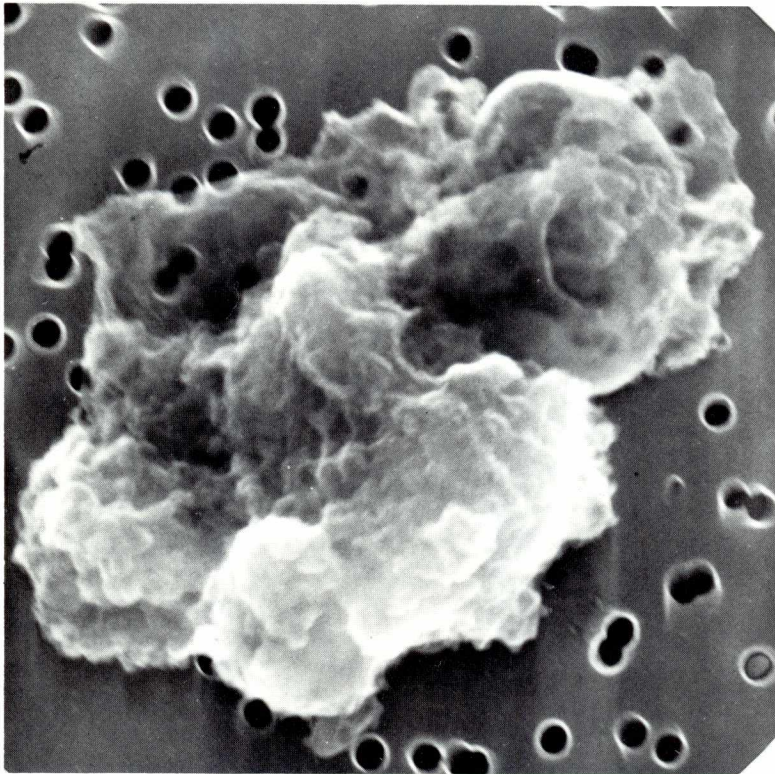
SIZE: 9x8
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/D
TYPE: C
COMMENTS:
Related to W7074D9
and D11

S-88-53319

W7010



W7074 D 11

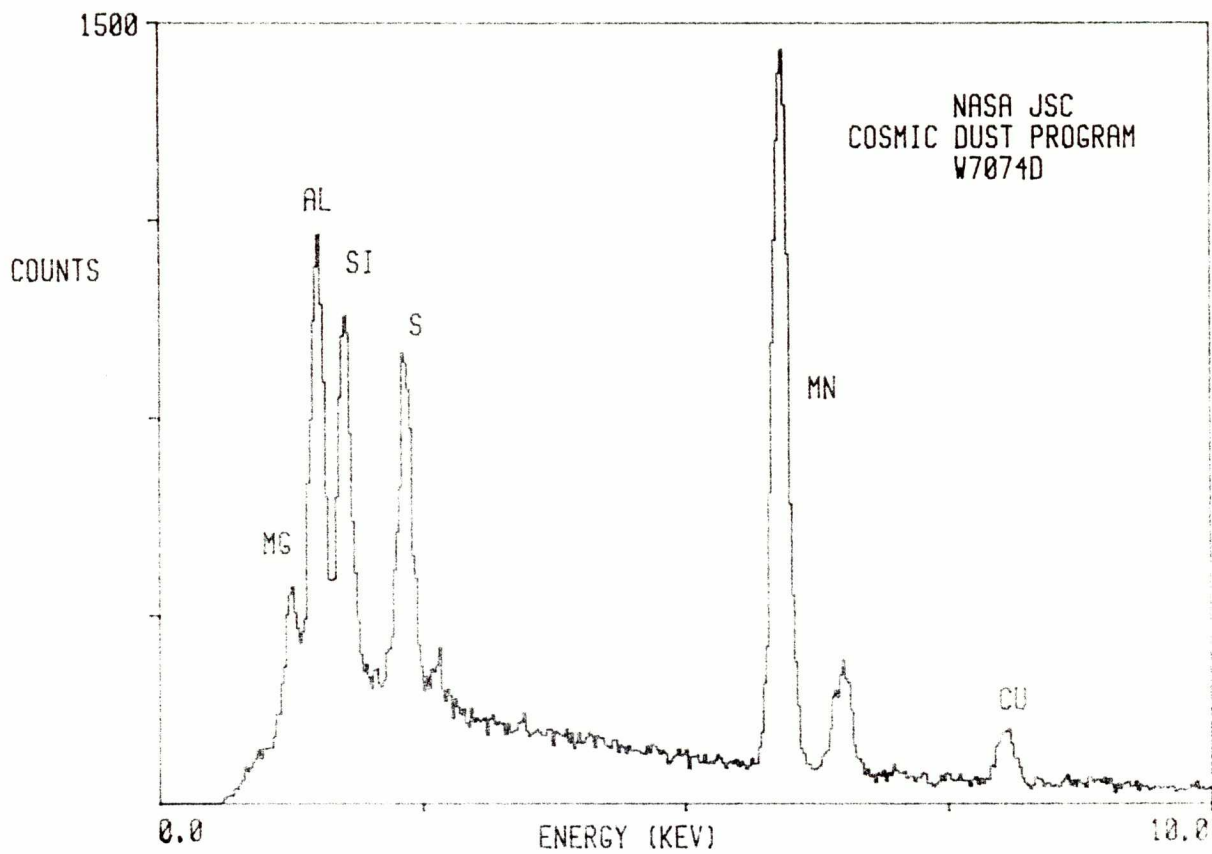


SIZE: 6
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/D
TYPE: C?

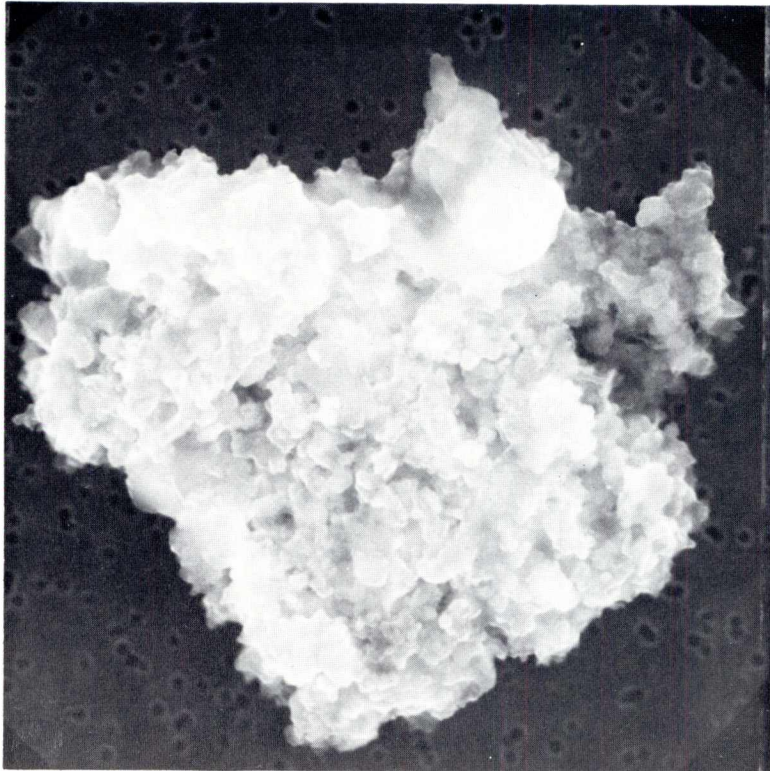
COMMENTS:
May be related to
W7074D9 and D10

S-88-55666

W7011



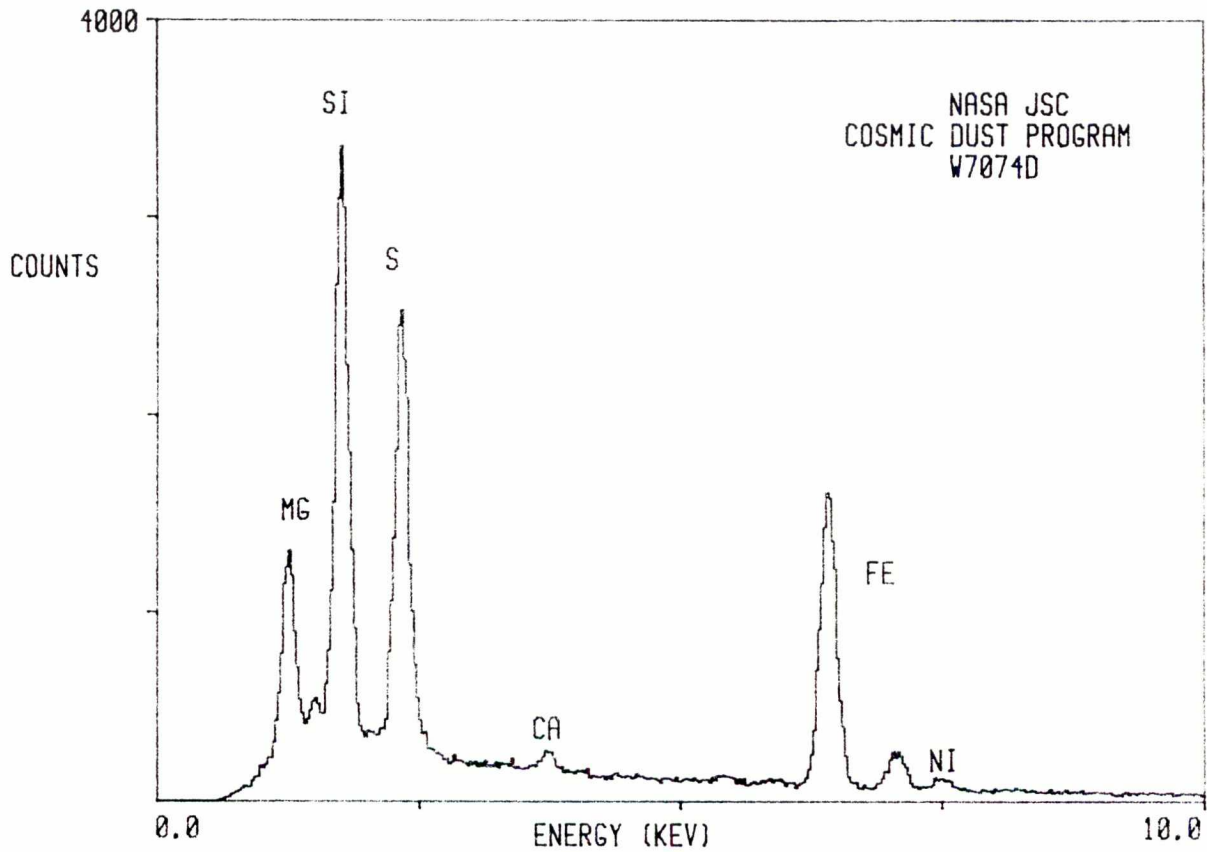
W7074 D 13



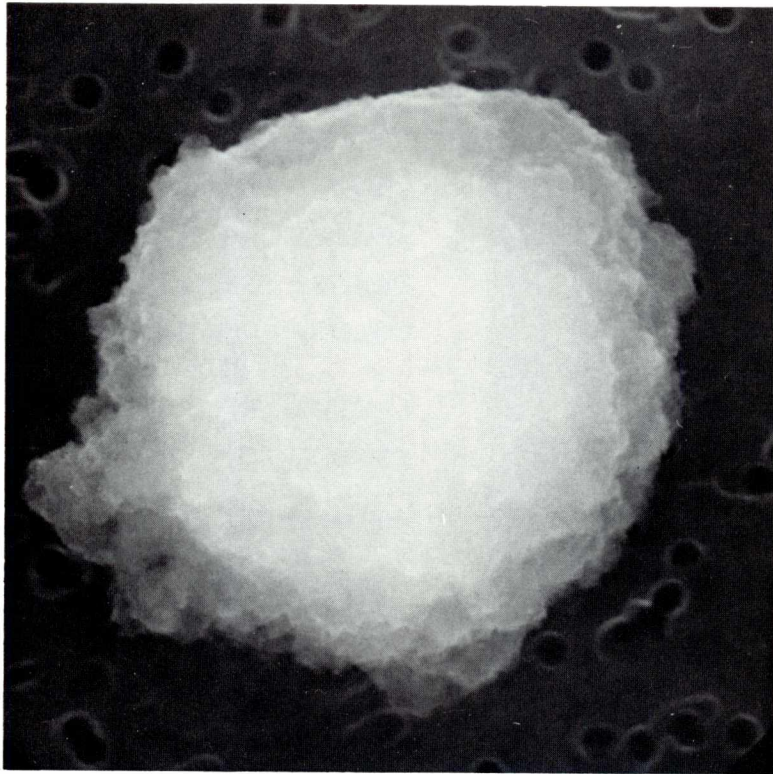
SIZE: 17x15
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SM/D
TYPE: C
COMMENTS:

S-88-53321

W7013



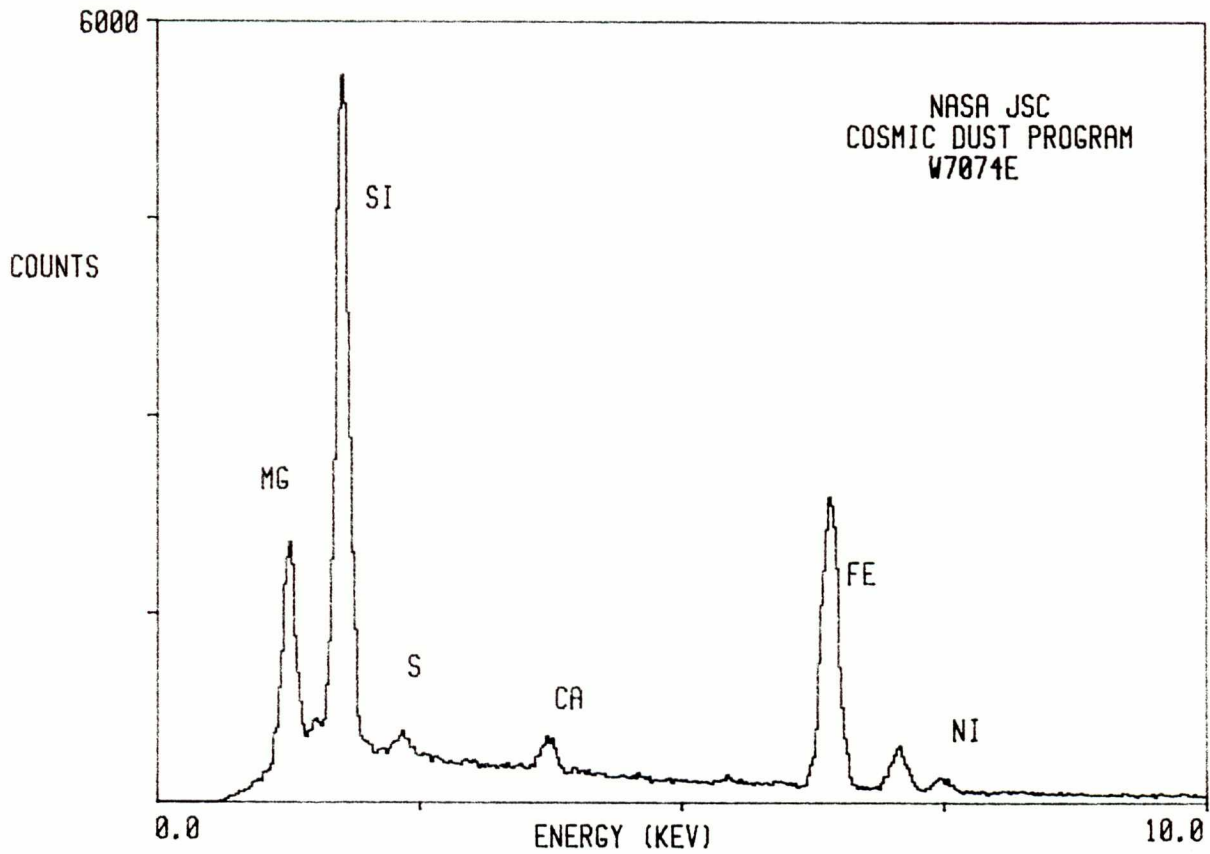
W7074 E 12



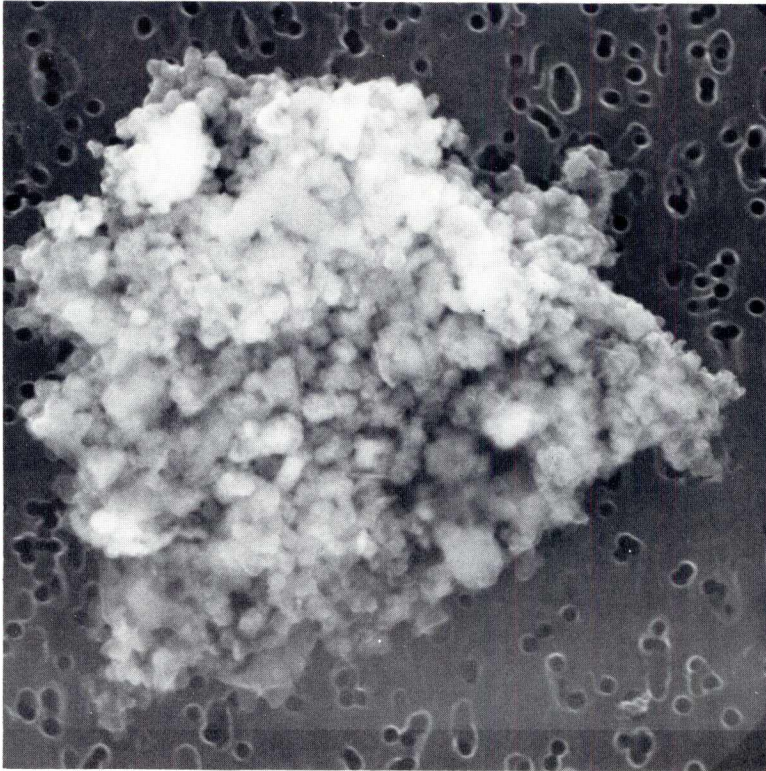
SIZE: 11
SHAPE: S
TRANS.: O
COLOR: Black
LUSTER: D
TYPE: C
COMMENTS:

S-88-53333

W7E12



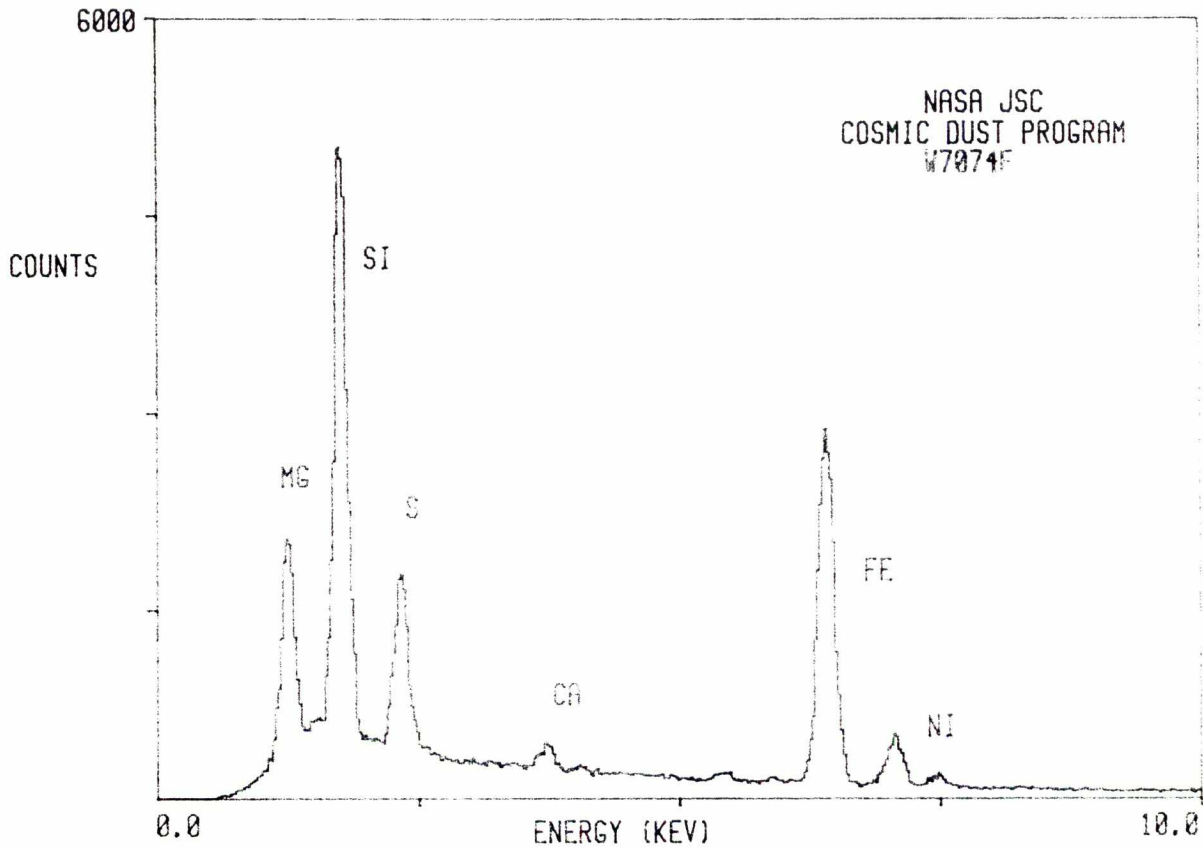
W7074 F 6



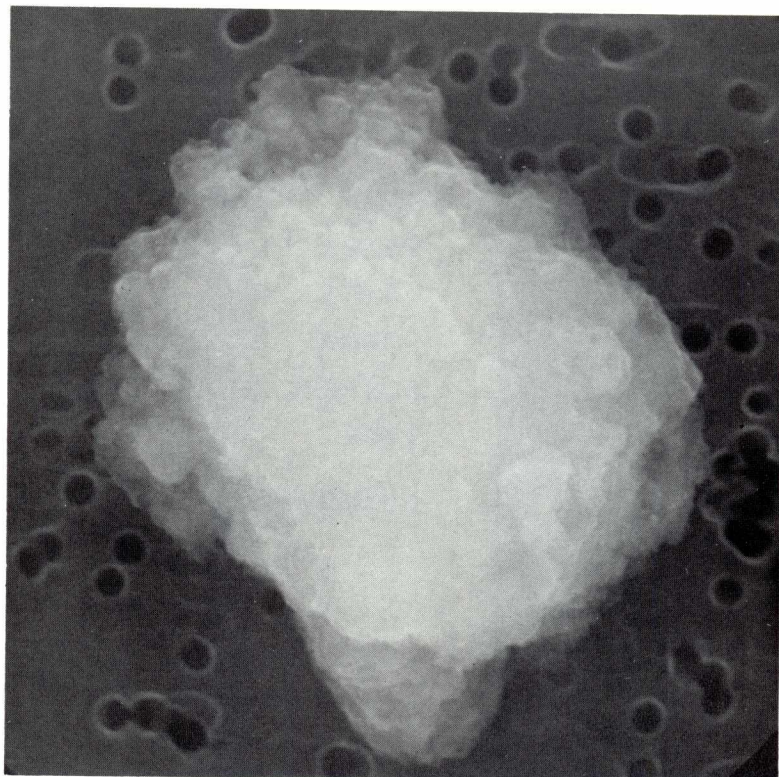
SIZE: 12
SHAPE: I
TRANS.: TL/O
COLOR: Colorless to black
LUSTER: R/D
TYPE: C

COMMENTS:
Largest particle
in a field of
particles

W7F6

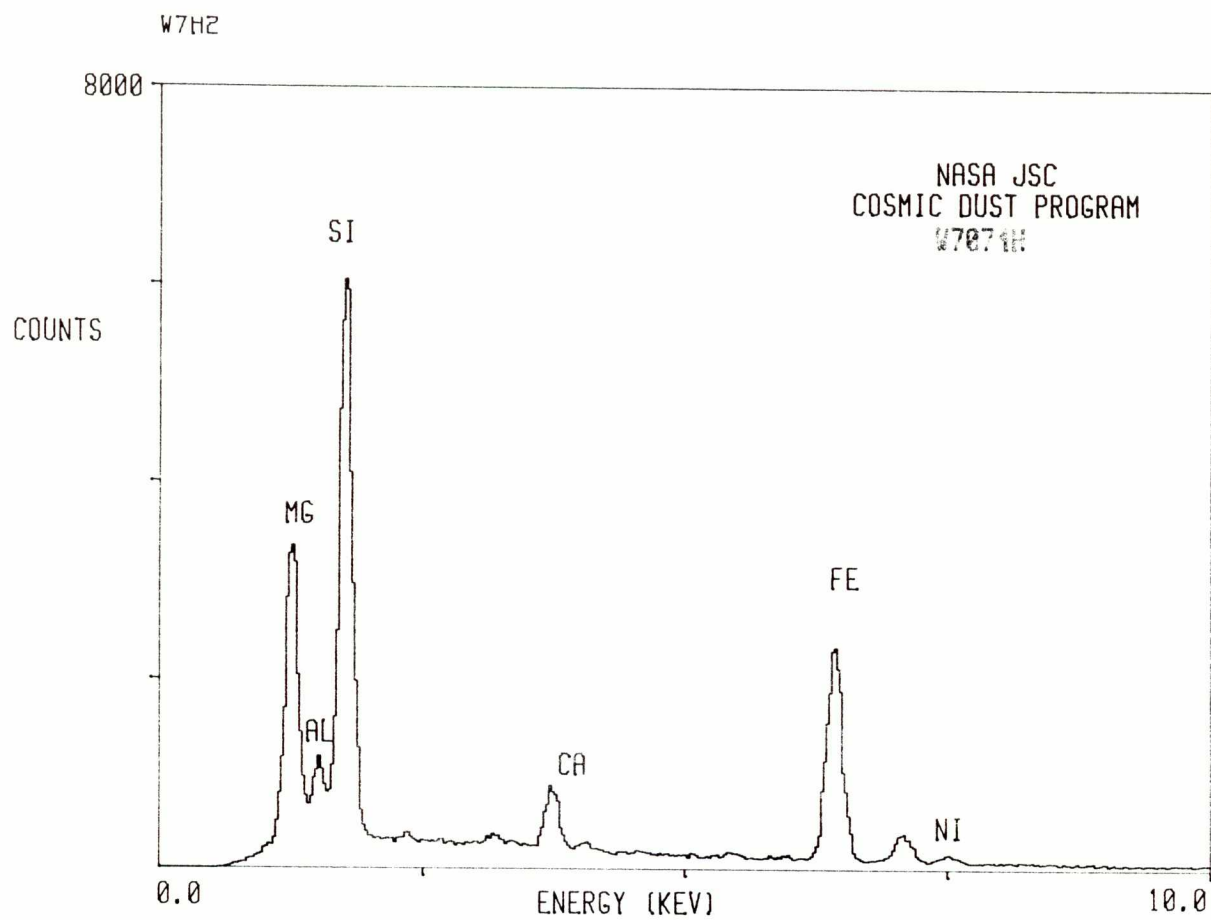


W7074 H 2



SIZE: 6
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM
TYPE: C?
COMMENTS:

S-88-53371



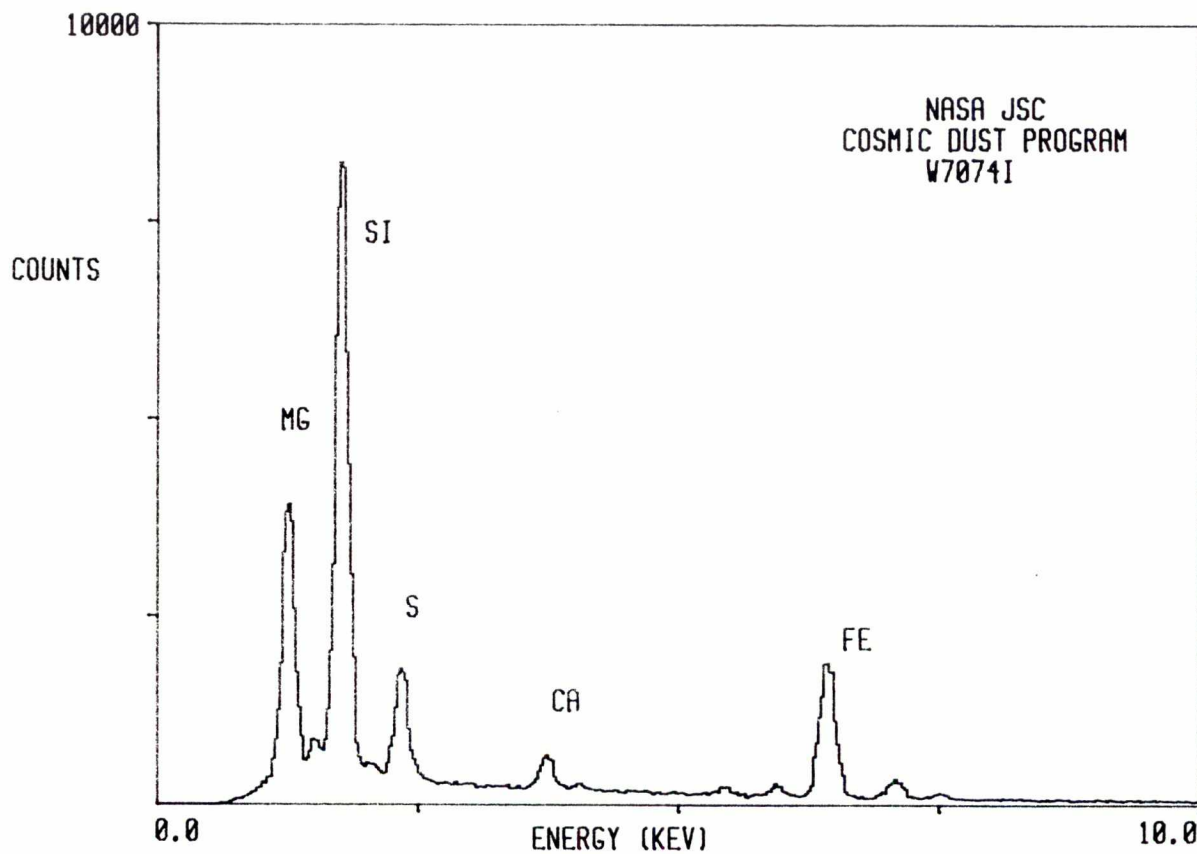
W7074 I 8



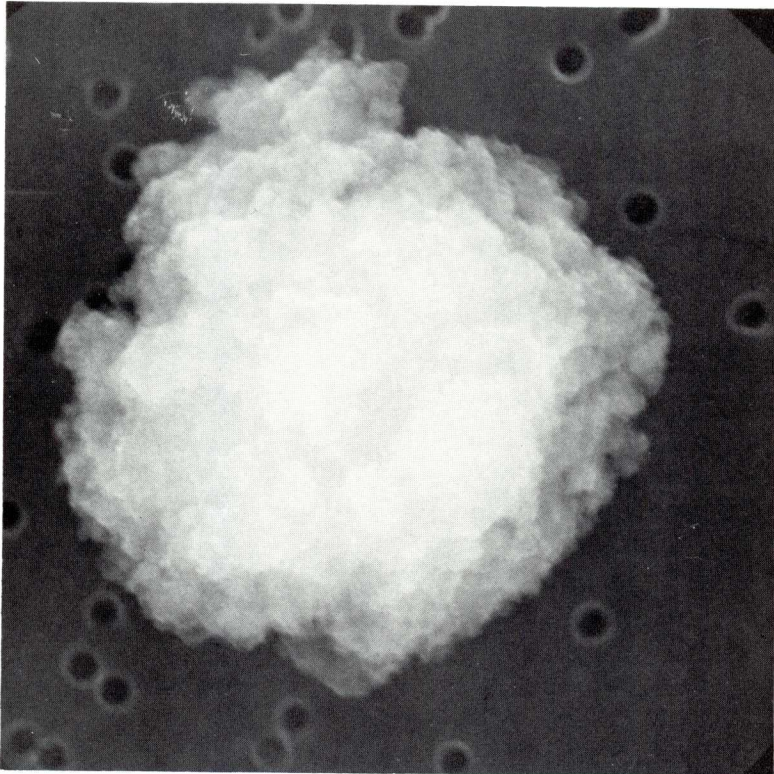
SIZE: 20x14
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/D
TYPE: C
COMMENTS:

S-88-53391

W718



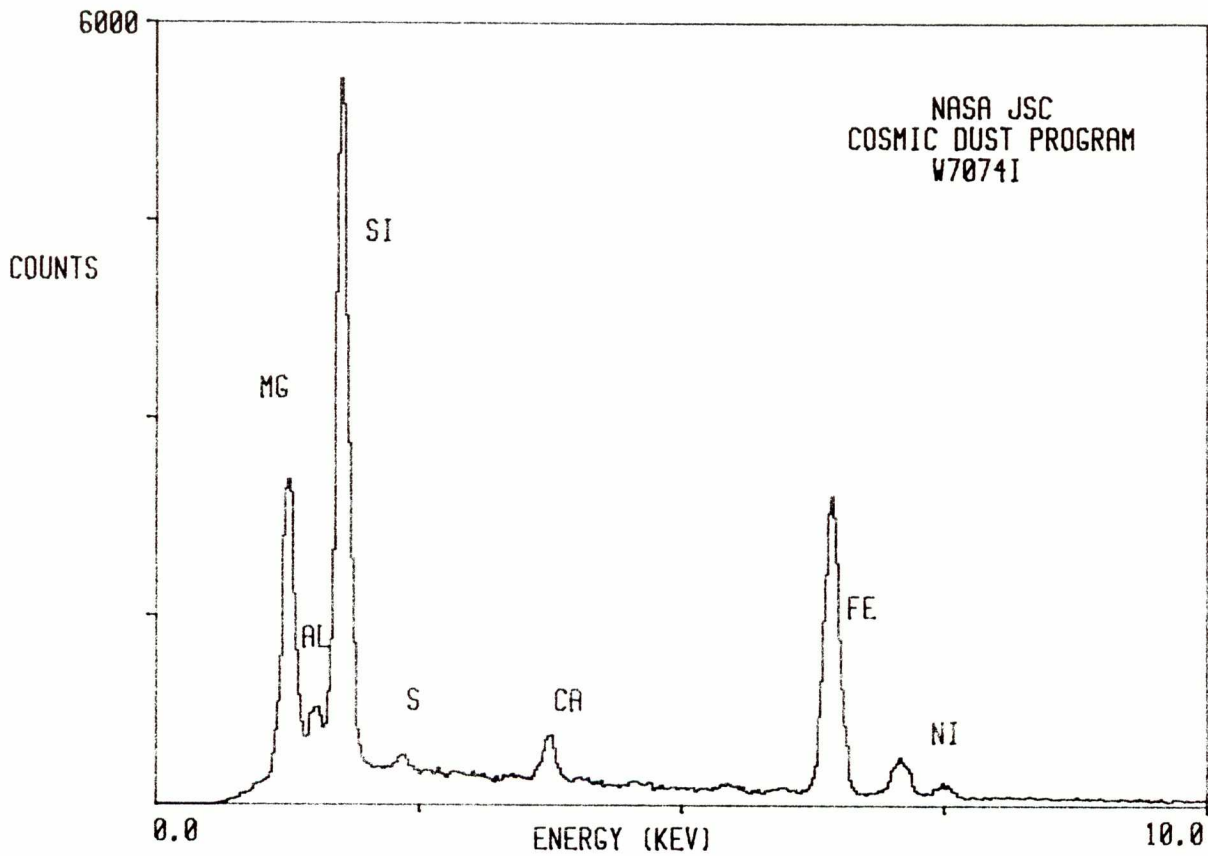
W7074 I 12



SIZE: 6
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SM/D
TYPE: C
COMMENTS:

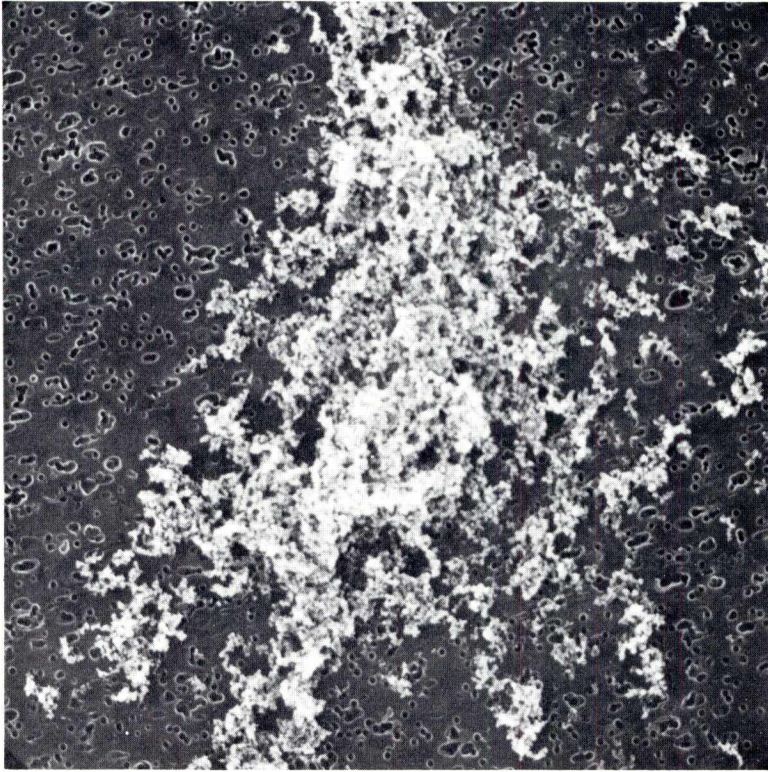
S-88-53394

W7112



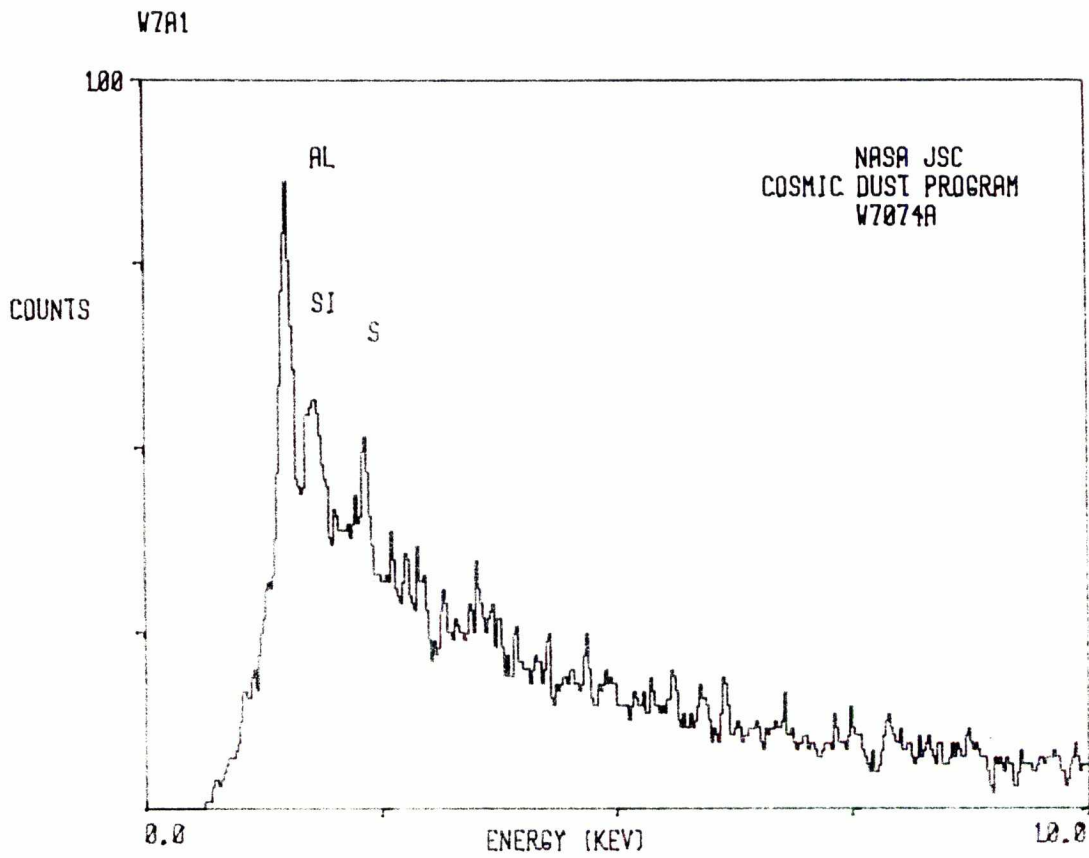
TERRESTRIAL CONTAMINATION (ARTIFICIAL)

W7074 A 1

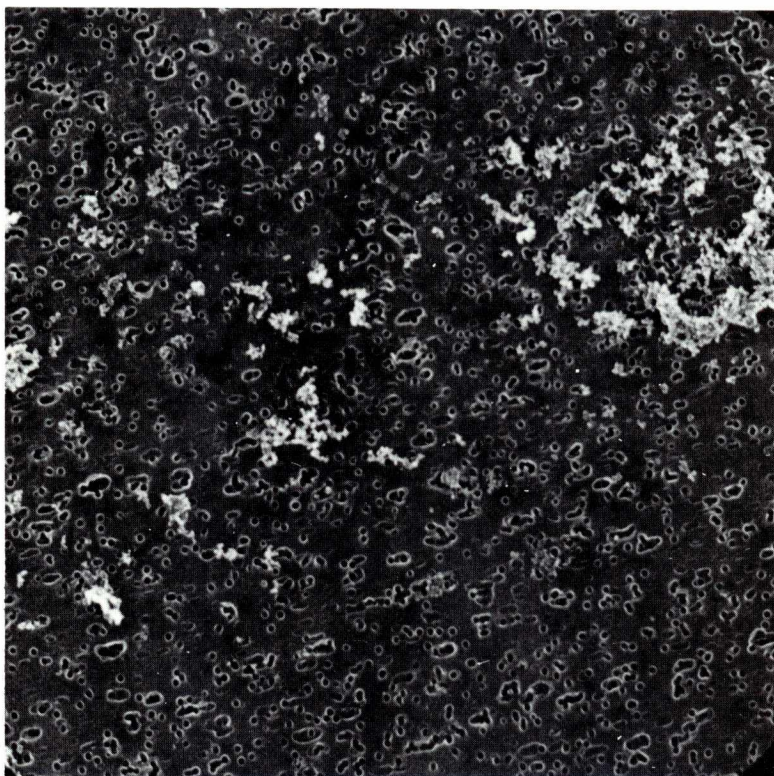


SIZE: 70x35
SHAPE: I
TRANS.: O
COLOR: Black
LUSTER: D
TYPE: TCA
COMMENTS:
Field of particles

S-88-53247



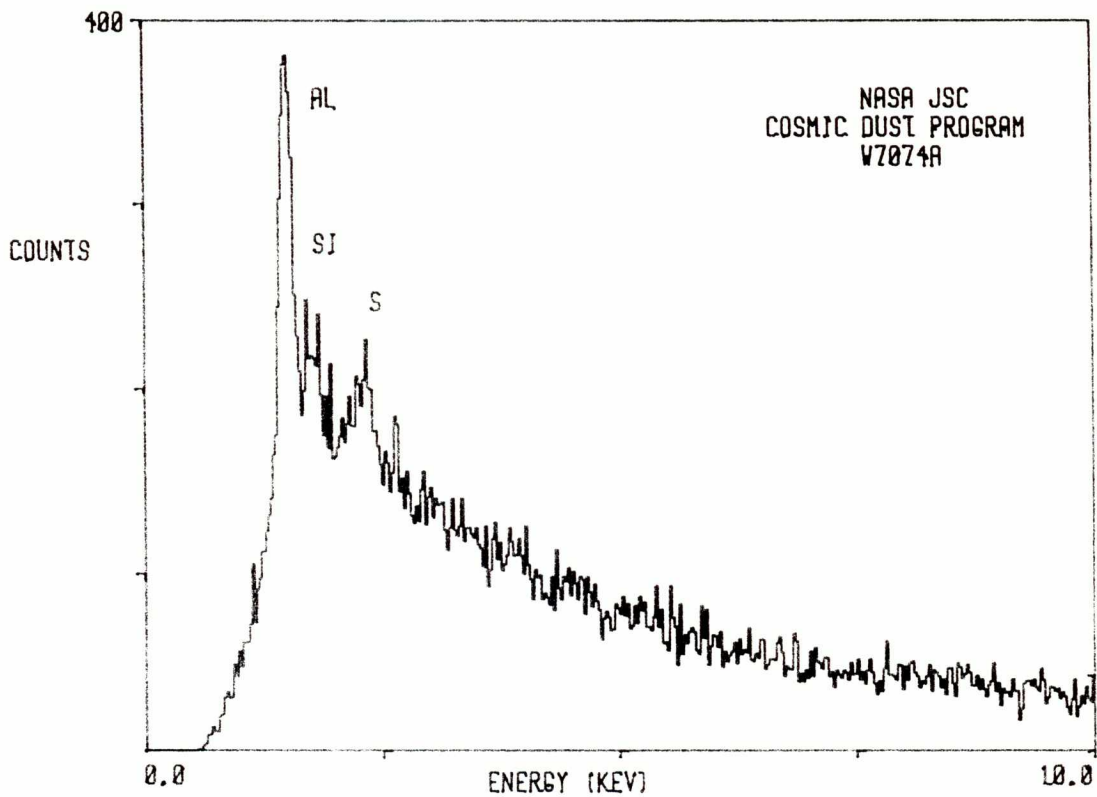
W7074 A 2



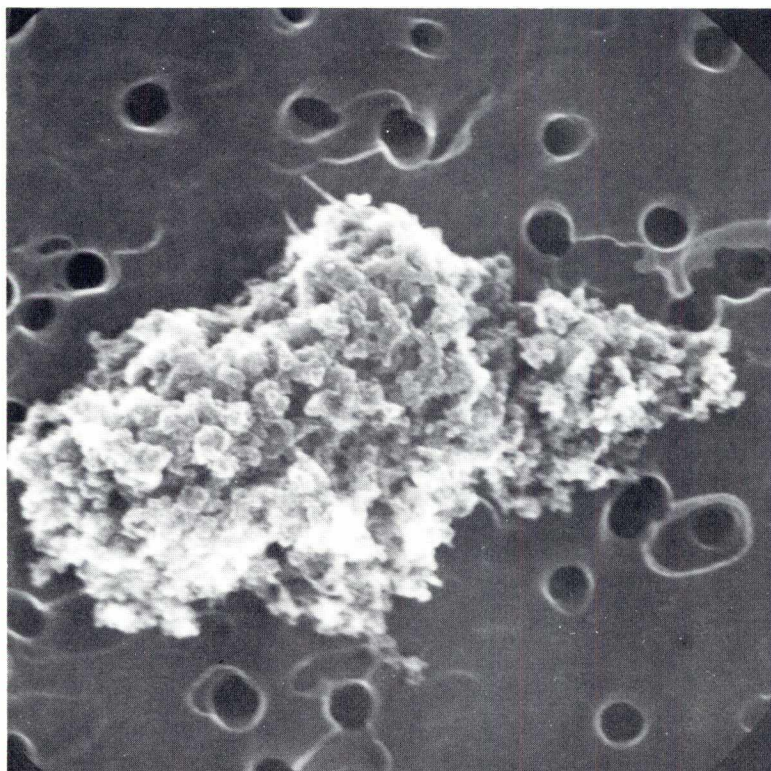
SIZE: 60x10
SHAPE: I
TRANS.: O
COLOR: Black
LUSTER: D
TYPE: TCA
COMMENTS:
Field of particles

S-88-53248

W7A2

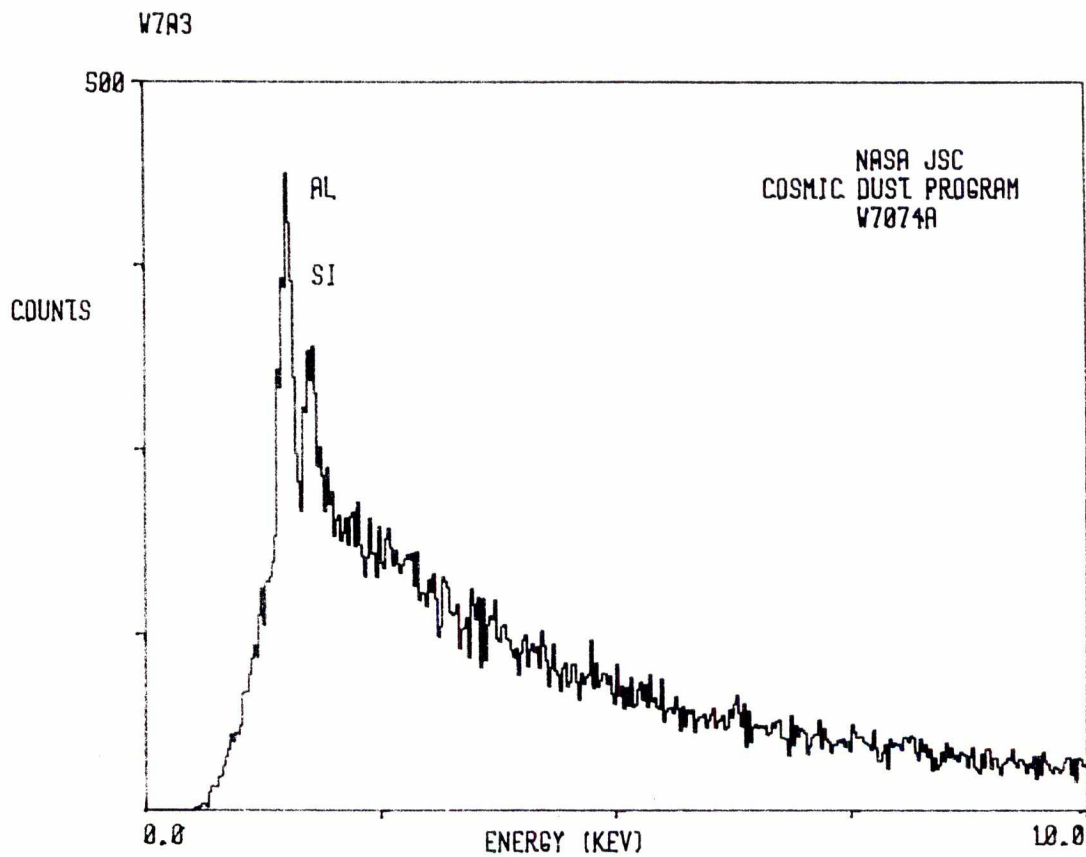


W7074 A 3

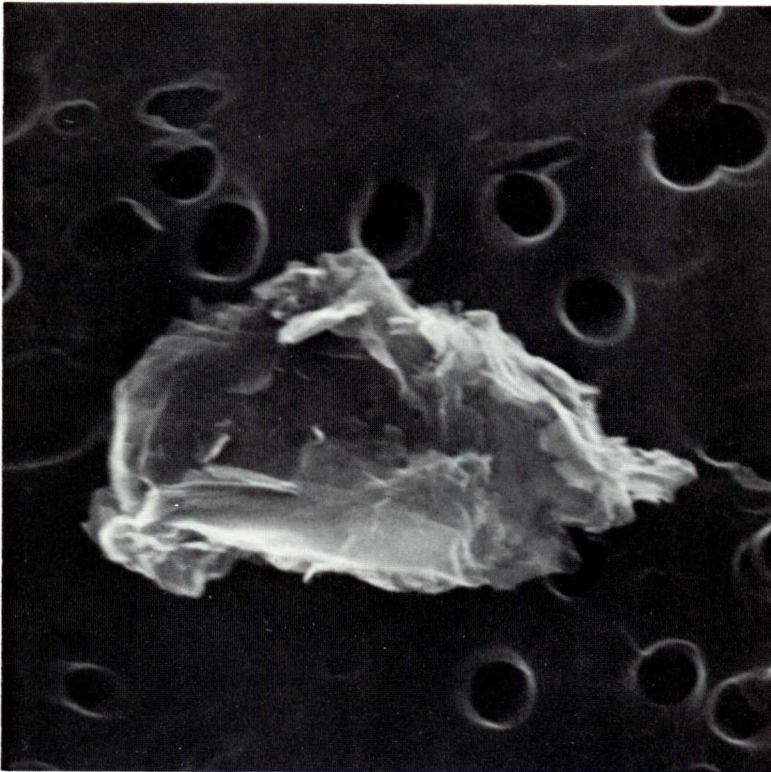


SIZE: 5x3
SHAPE: I
TRANS.: O
COLOR: Black
LUSTER: D
TYPE: TCA
COMMENTS:

S-88-53249

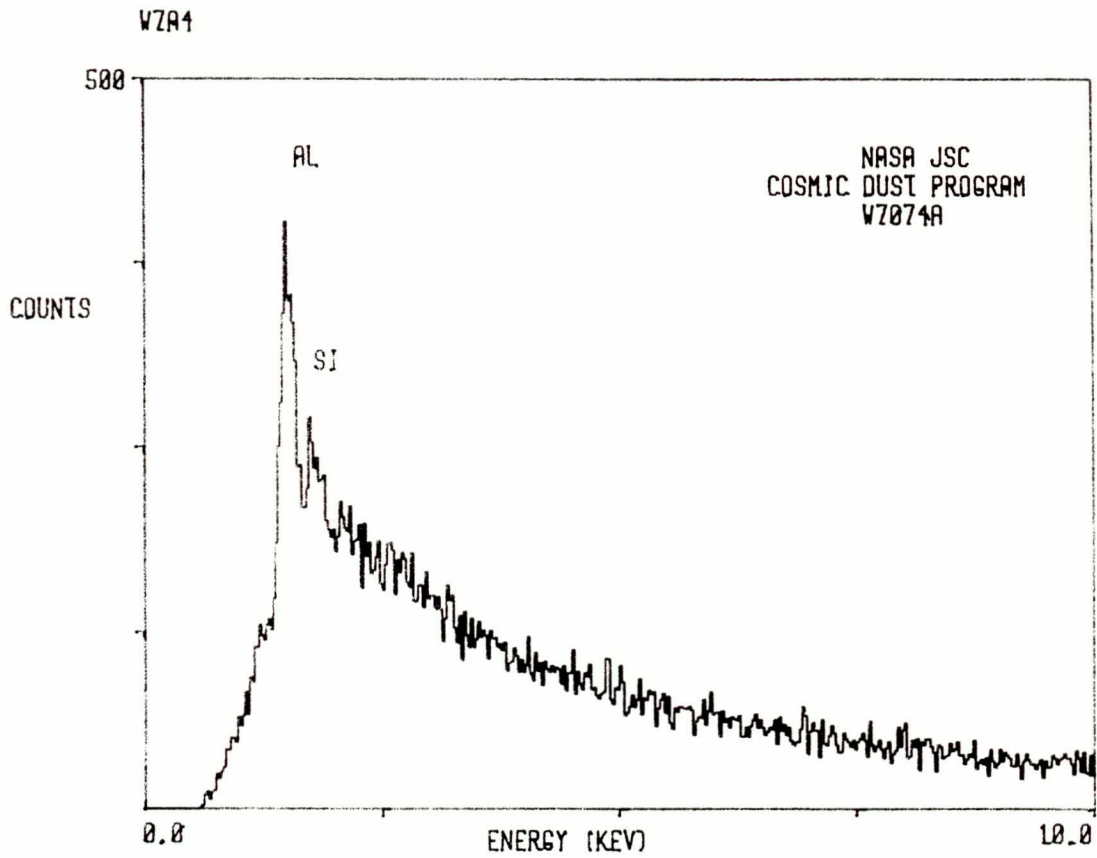


W7074 A 4

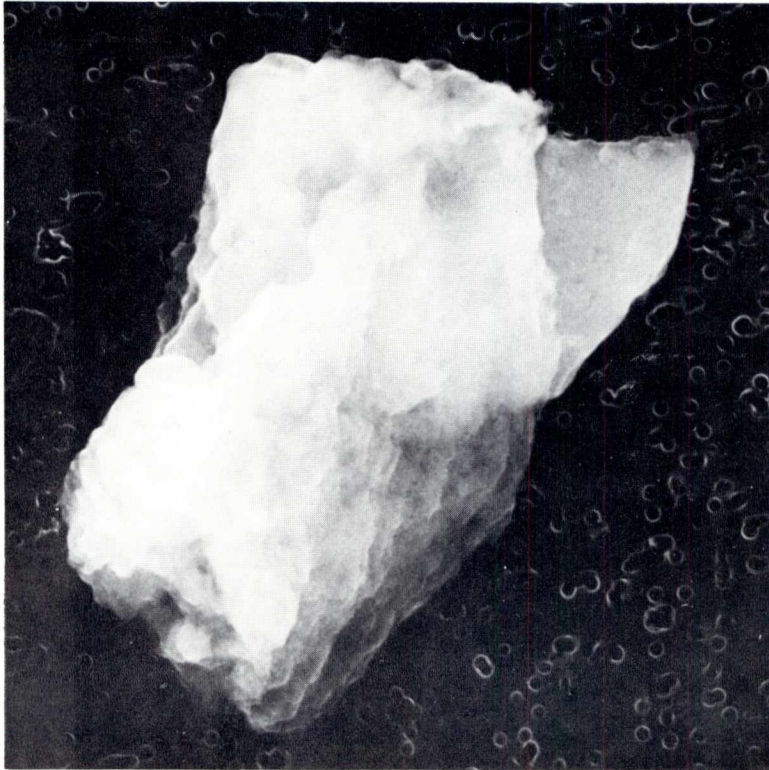


SIZE: 3
SHAPE: I
TRANS.: O
COLOR: Black
LUSTER: D
TYPE: TCA
COMMENTS:

S-88-53250

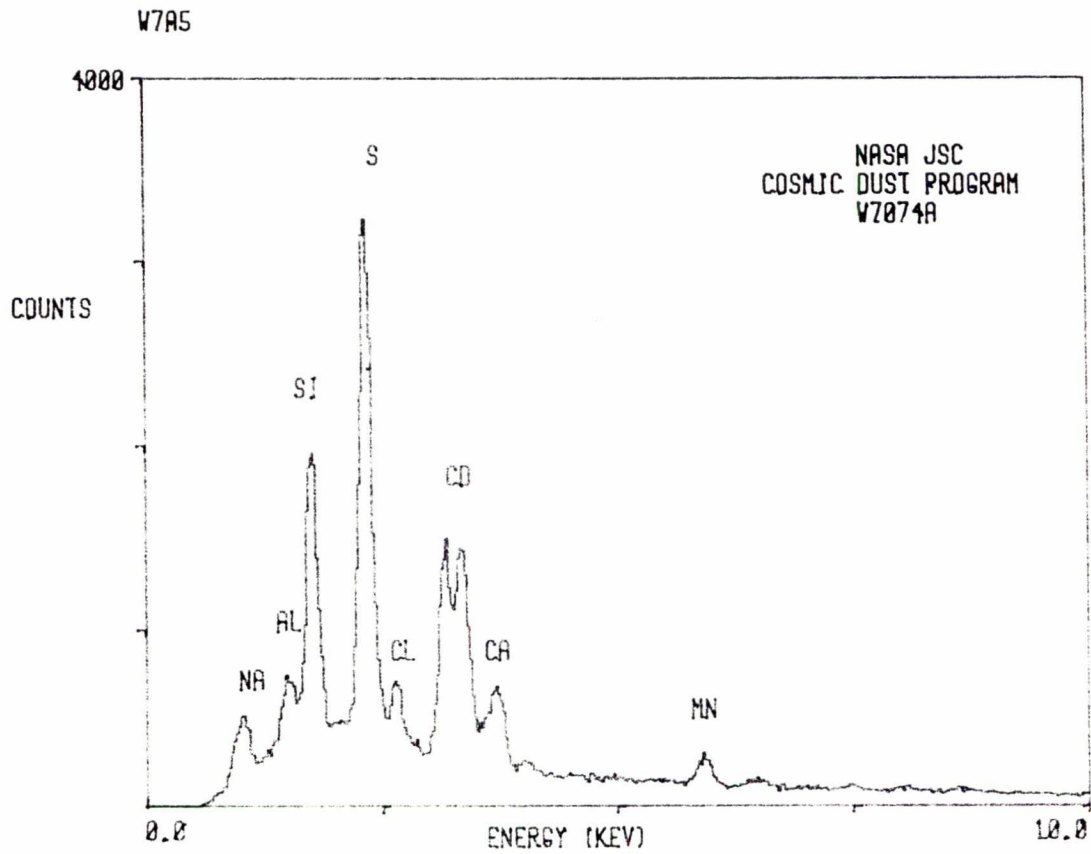


W7074 A 5

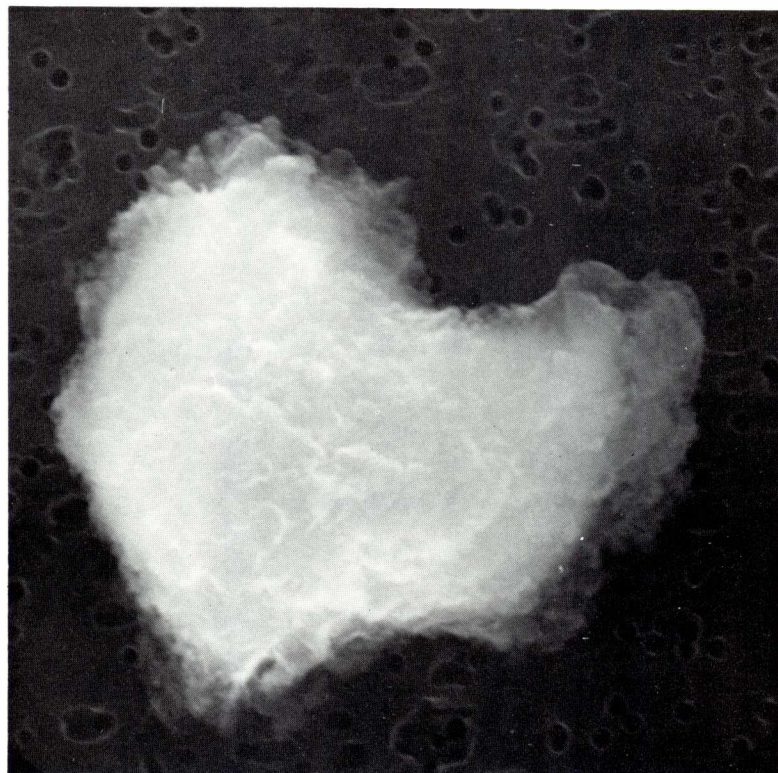


SIZE: 20x10
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: SV/R
TYPE: TCA
COMMENTS:

S-88-53251

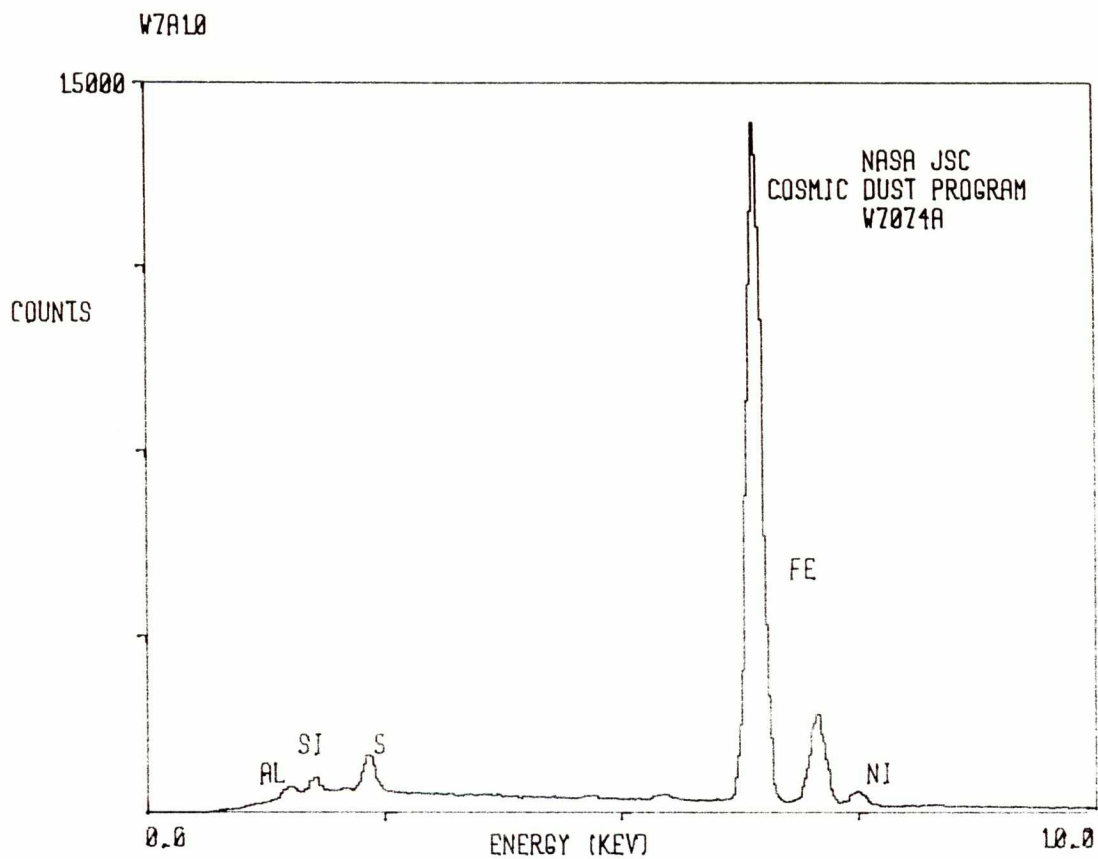


W7074 A 10

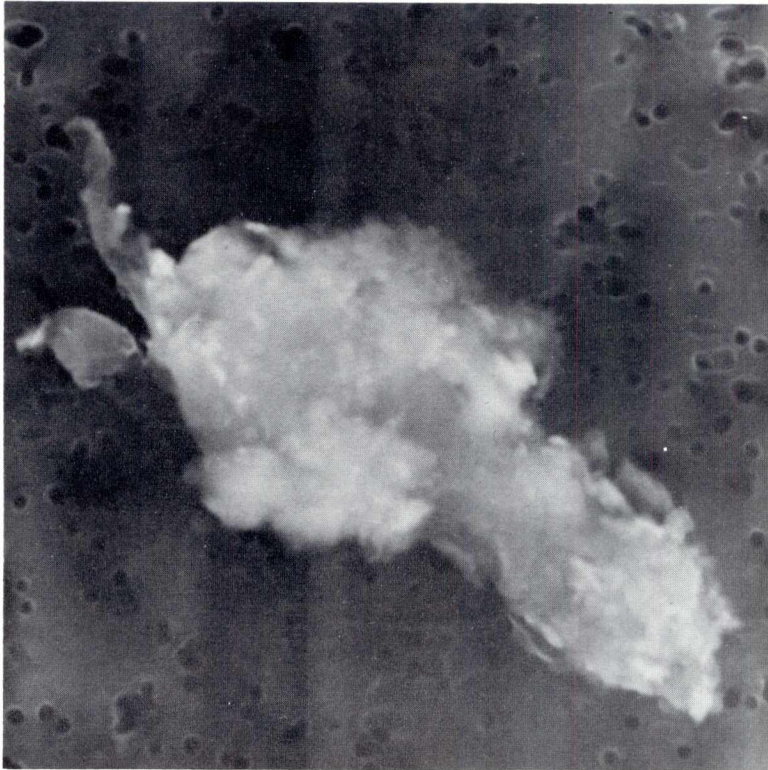


SIZE: 11x10
SHAPE: I
TRANS.: O
COLOR: Yellow to brown
LUSTER: SM
TYPE: TCA
COMMENTS:

S-88-53255

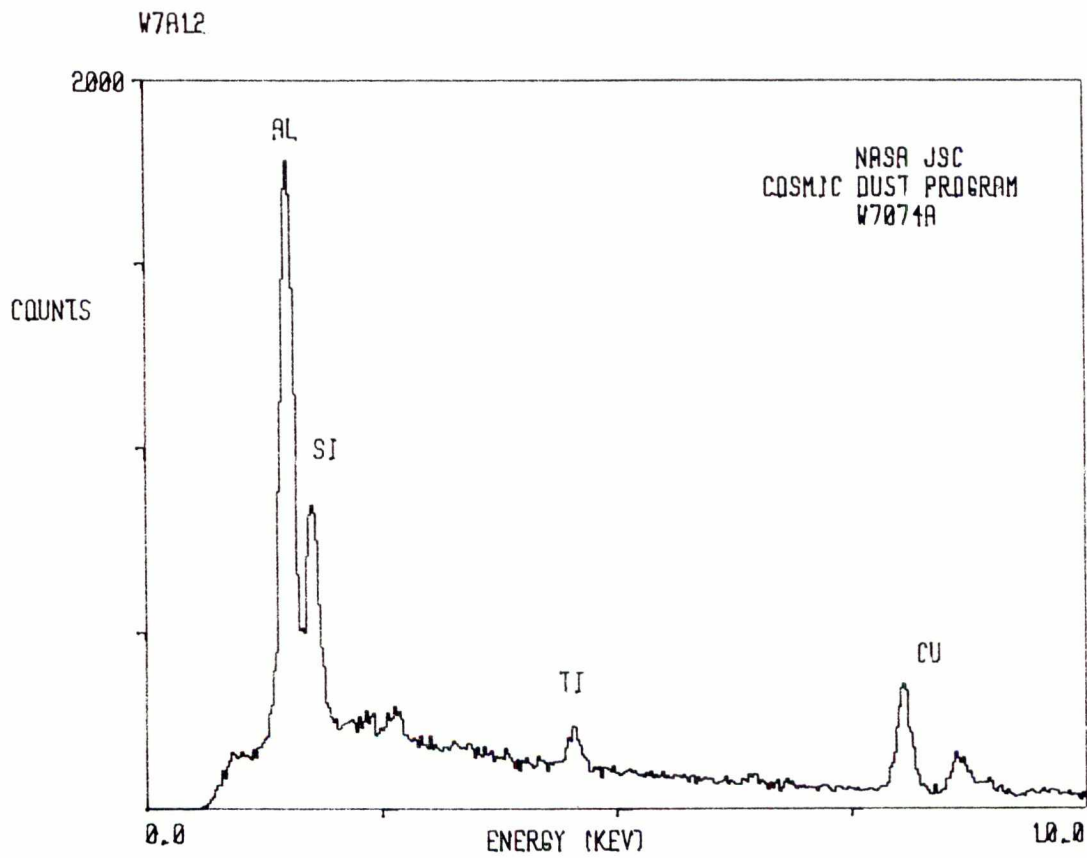


W7074 A 12



SIZE: 18x8
SHAPE: I
TRANS.: TL/O
COLOR: Yellow to brown
LUSTER: D/SM
TYPE: TCA
COMMENTS:

S-88-53257



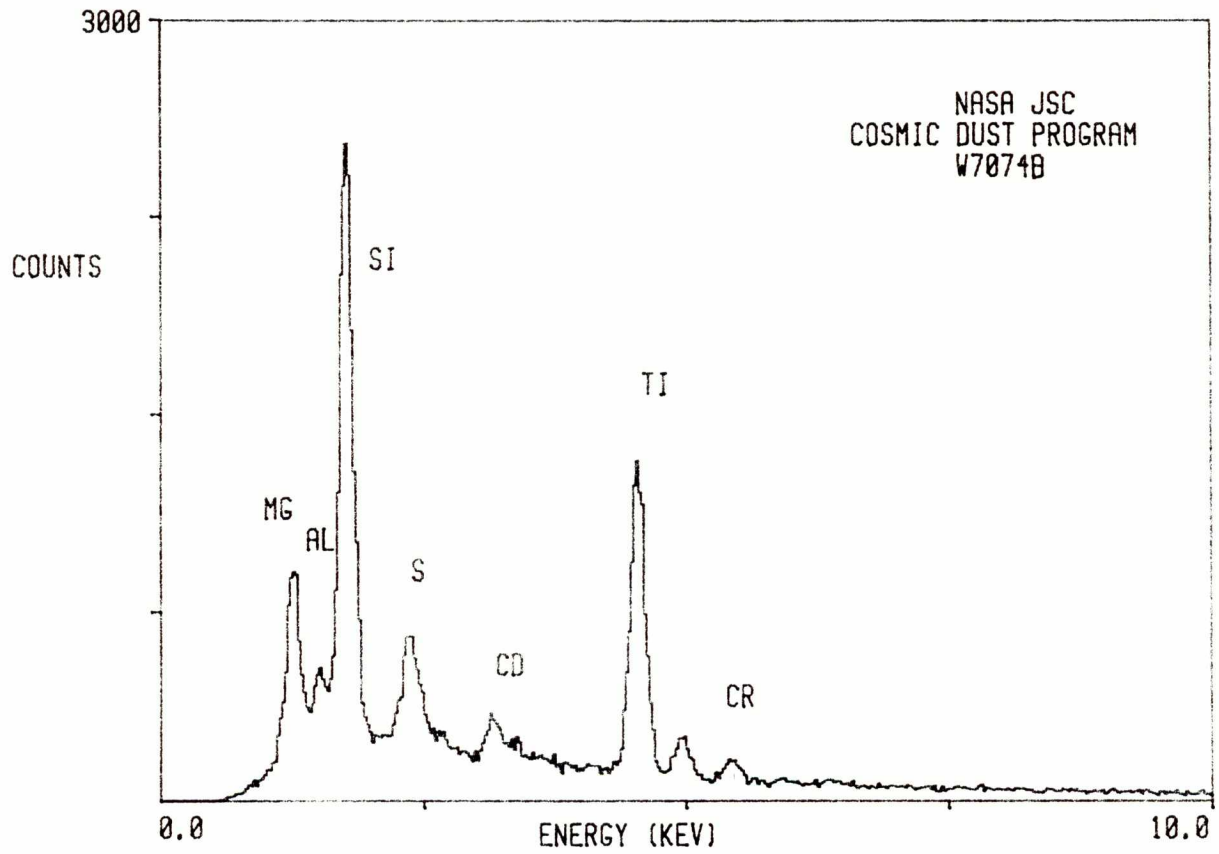
W7074 B 8



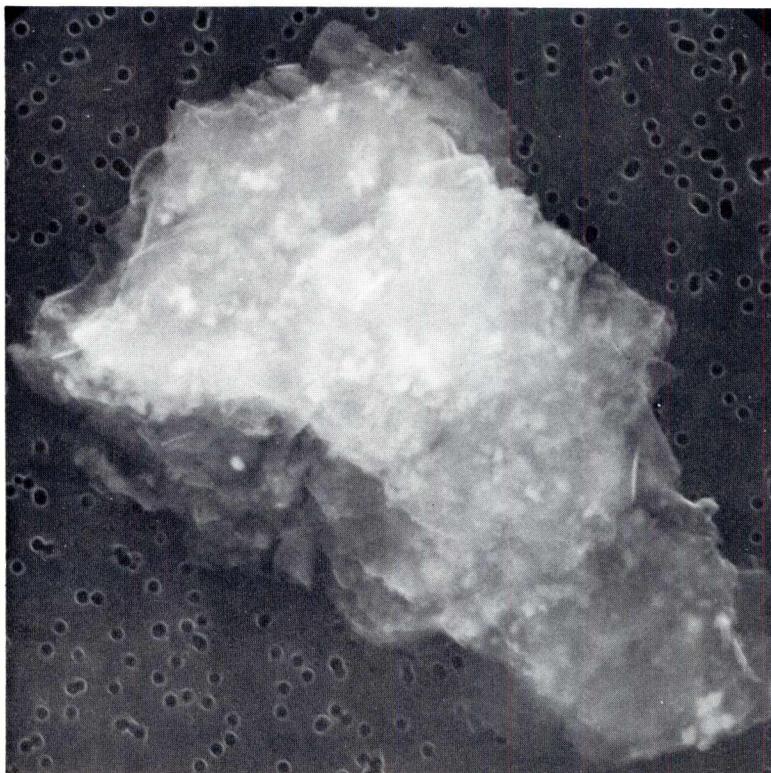
SIZE: 14x13
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53275

W7B8



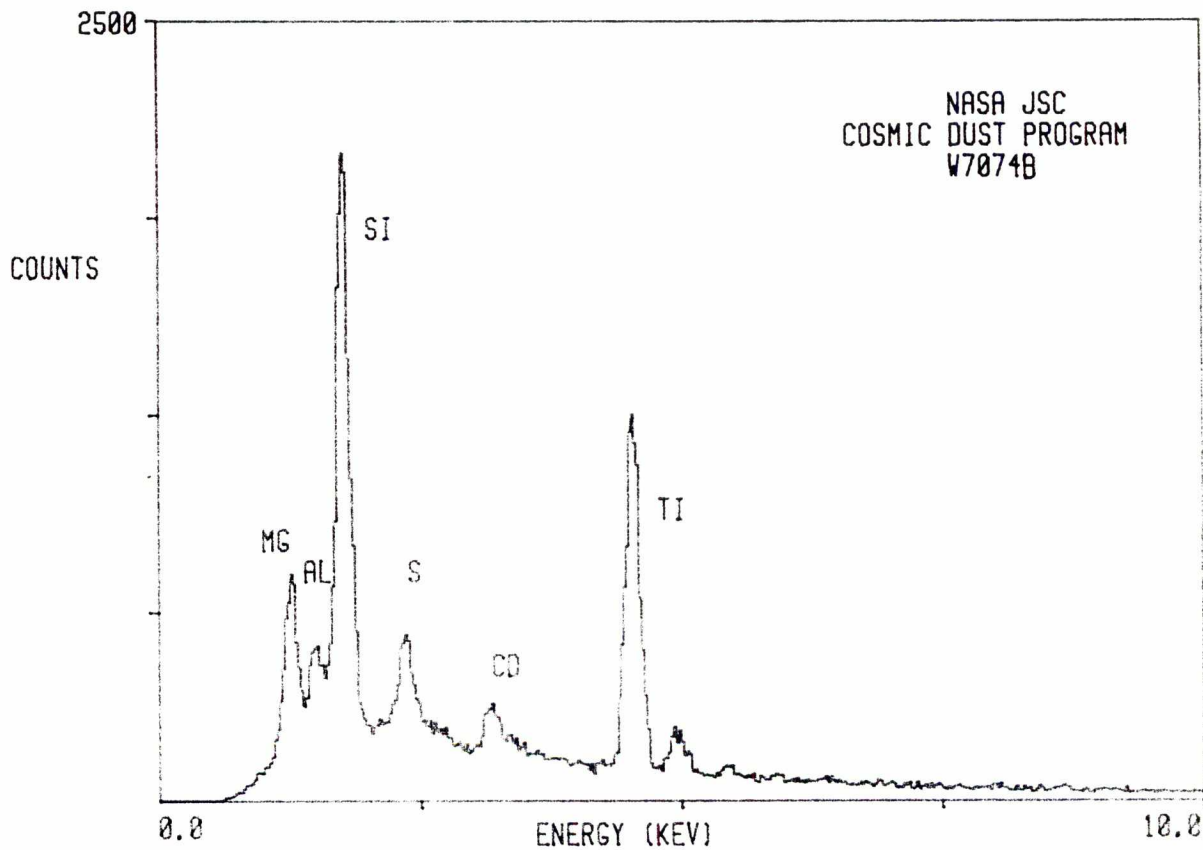
W7074 B 9



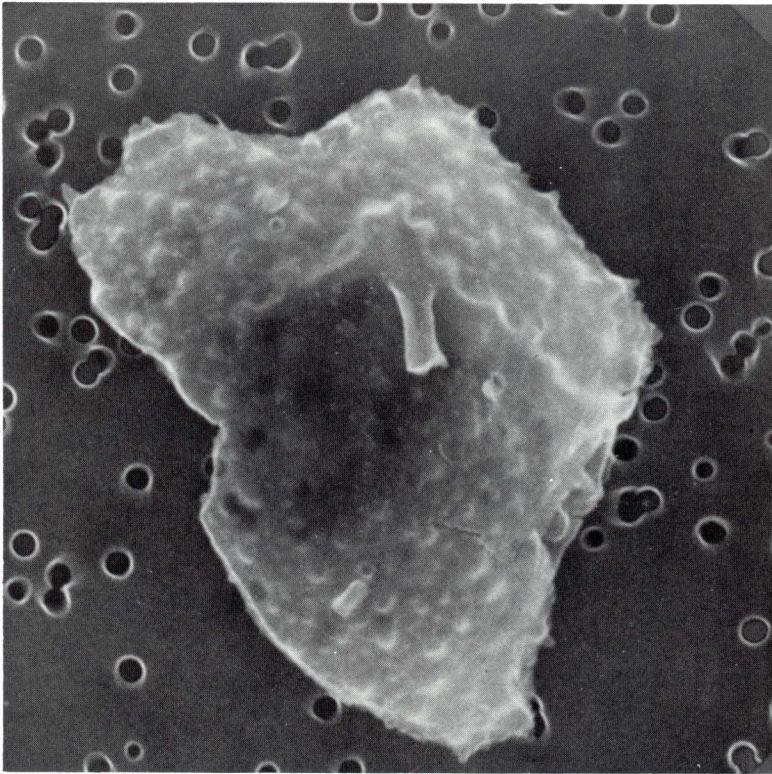
SIZE: 20x12
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53276

W7B9



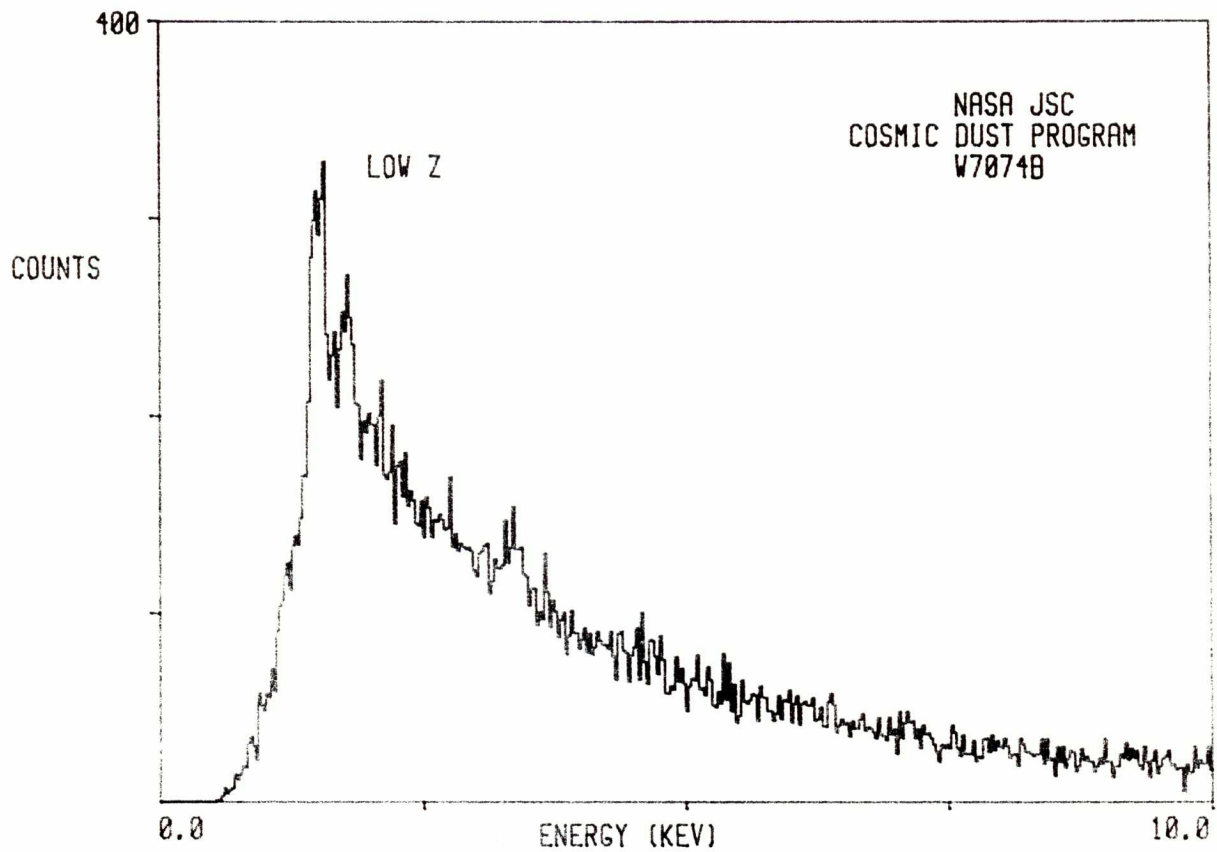
W7074 B 17



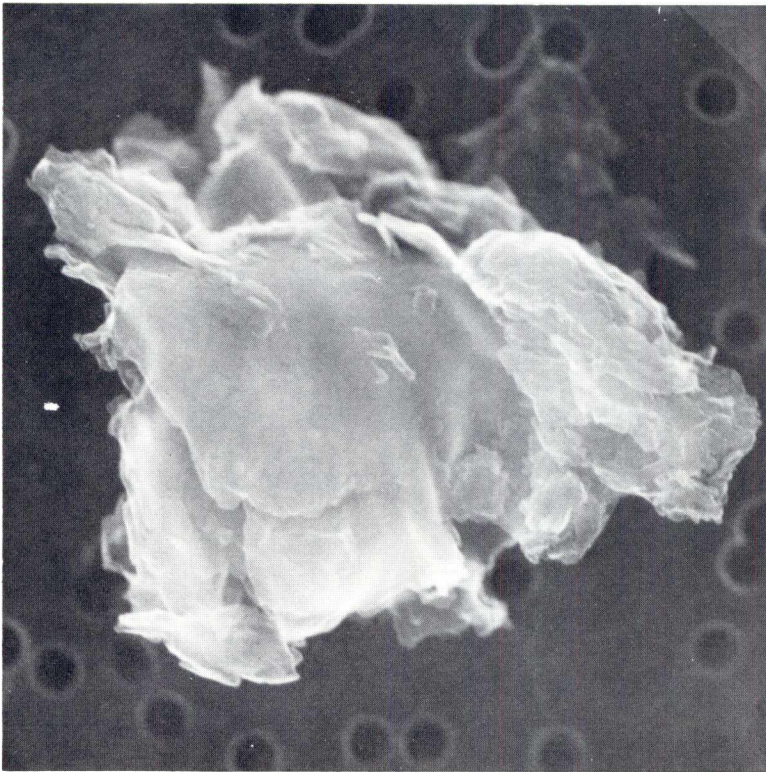
SIZE: 11x7
SHAPE: I
TRANS.: O
COLOR: Brown
LUSTER: D
TYPE: TCA
COMMENTS:

S-88-53282

W7B17



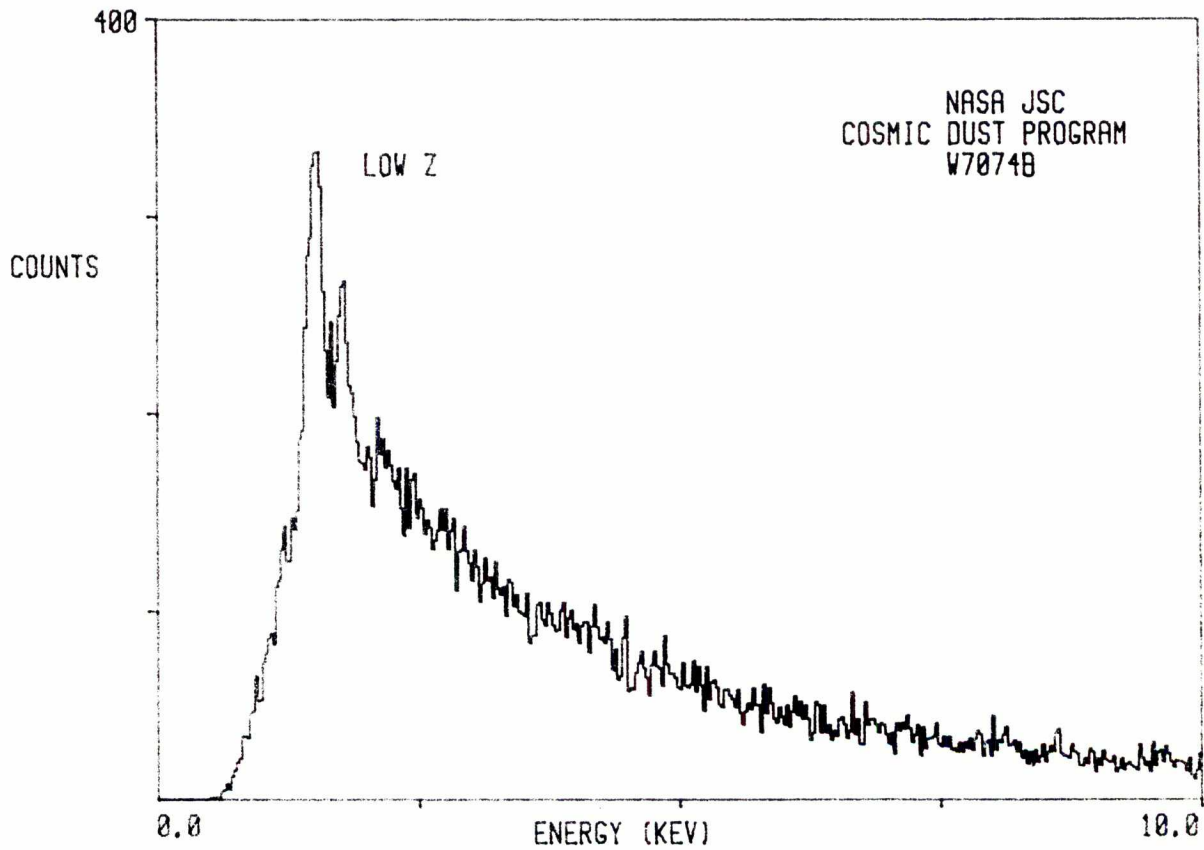
W7074 B 18



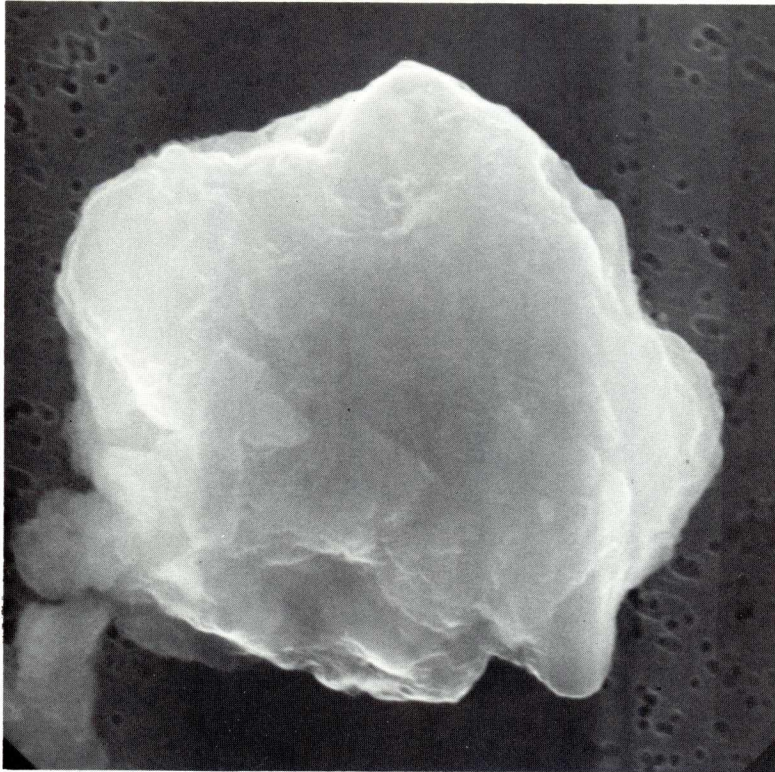
SIZE: 5
SHAPE: I
TRANS.: O
COLOR: Brown
LUSTER: SM/D
TYPE: TCA
COMMENTS:

S-88-53283

W7B18



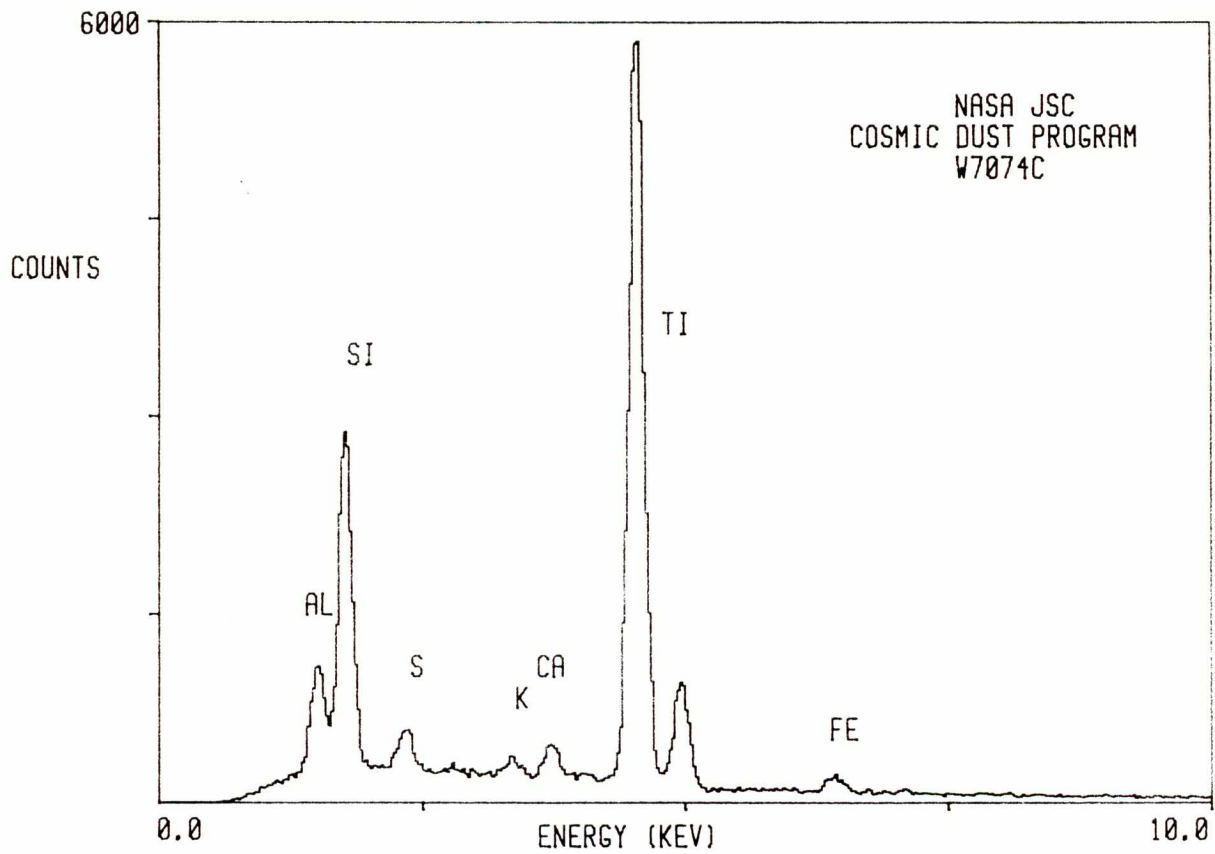
W7074 C 10



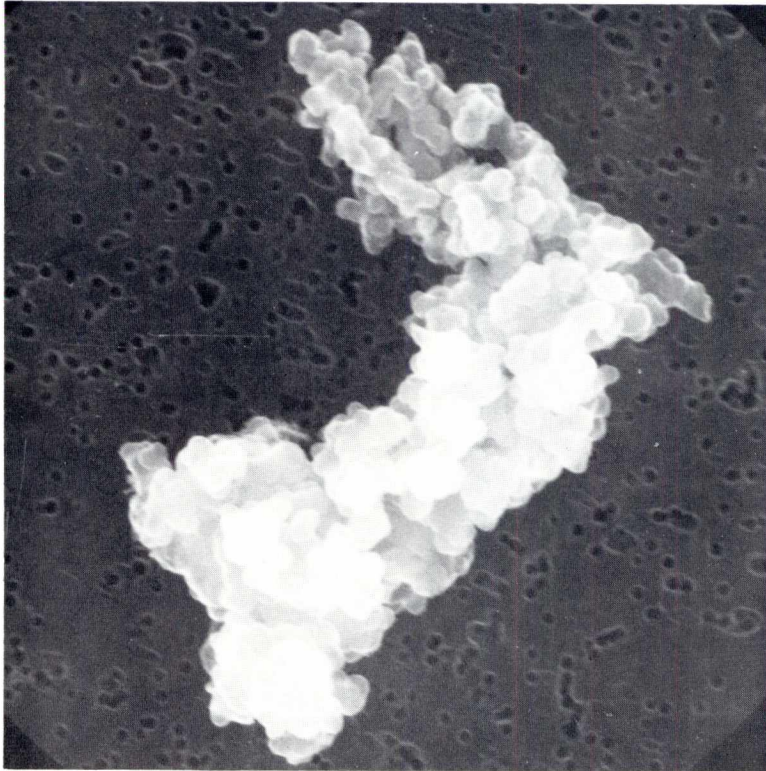
SIZE: 14
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R/SV
TYPE: TCA
COMMENTS:

S-88-53297

W7C10



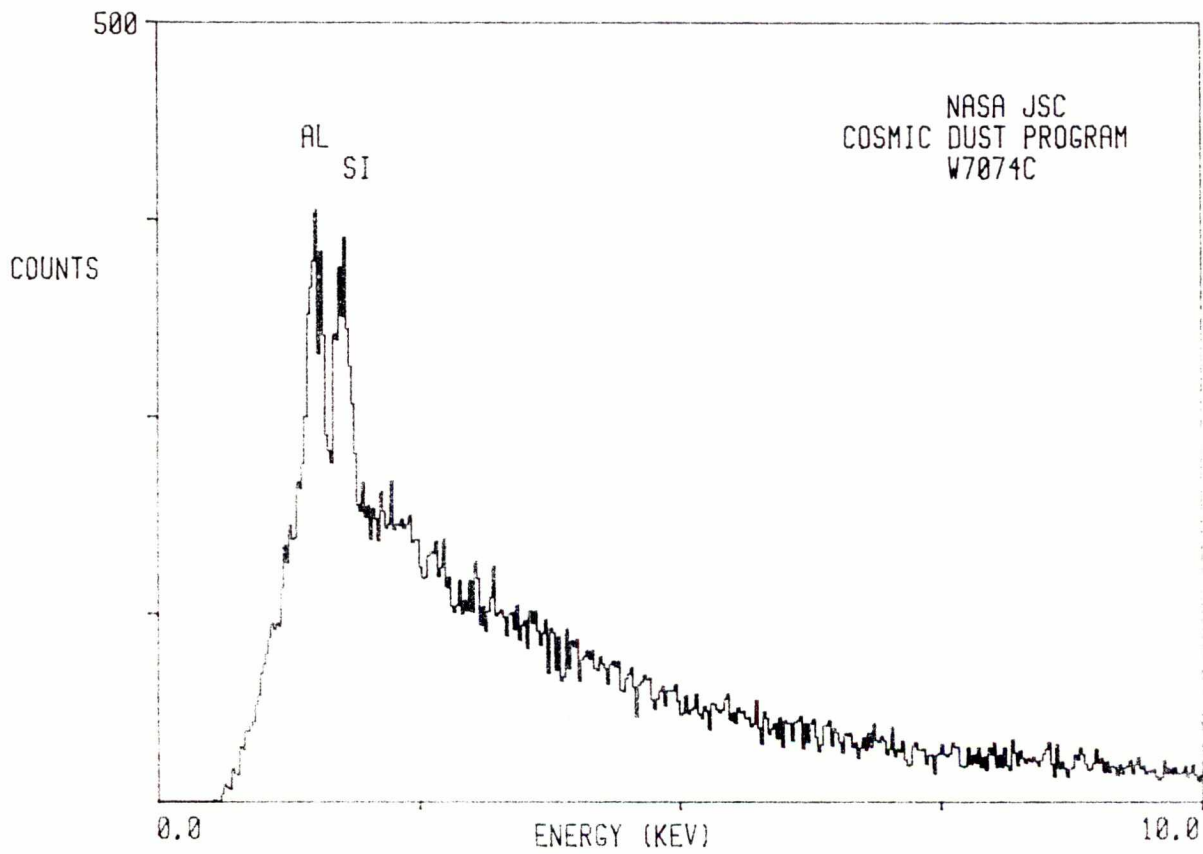
W7074 C 13



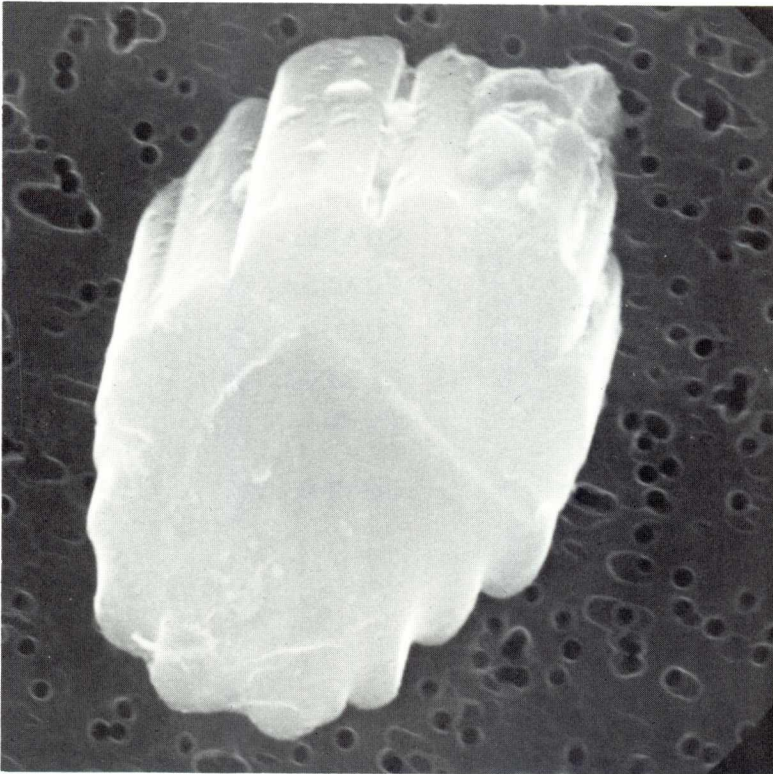
SIZE: 18X12
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCA
COMMENTS:

S-88-53300

W7C13



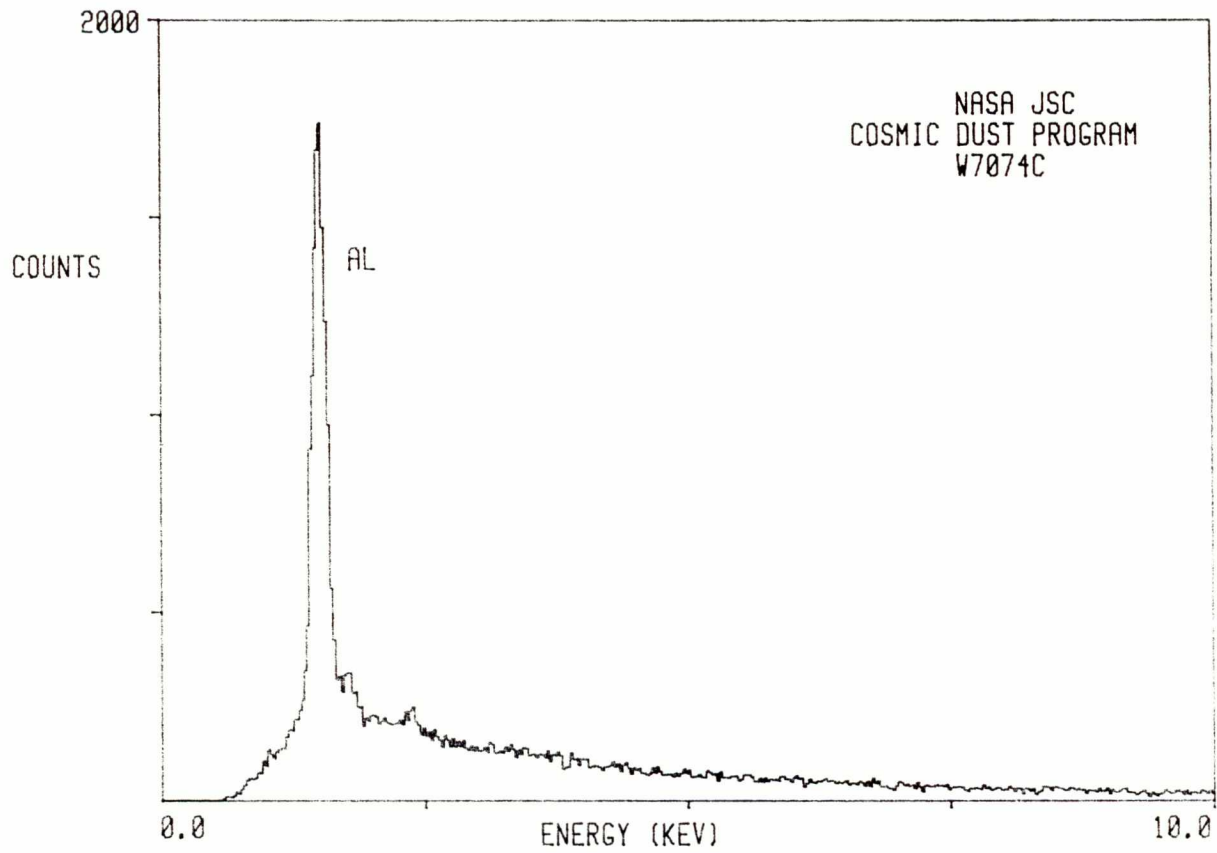
W7074 C 14



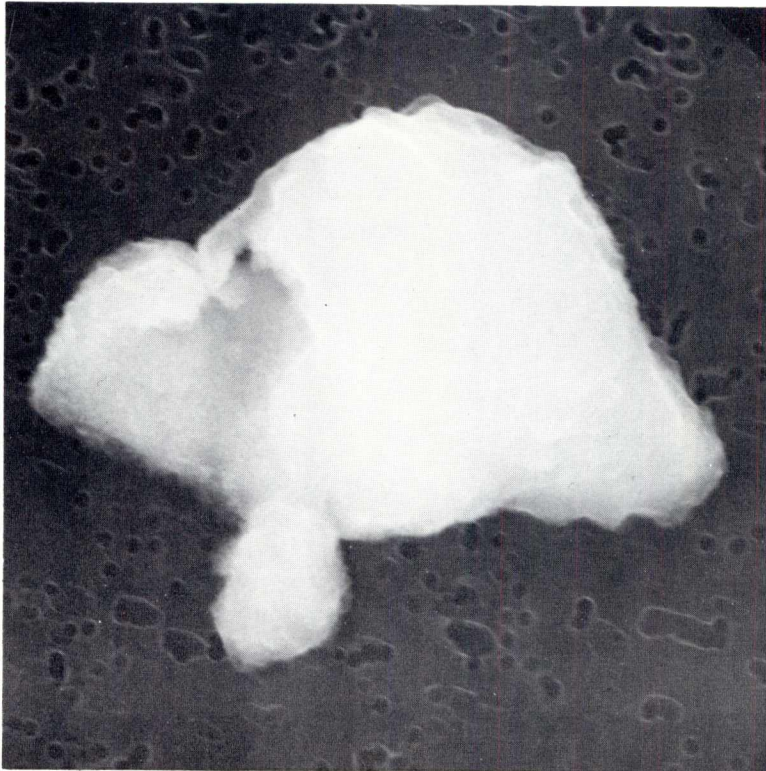
SIZE: 11x10
SHAPE: I
TRANS.: O
COLOR: Yellow to brown
LUSTER: SM/D
TYPE: TCA
COMMENTS:

S-88-53301

W7C14



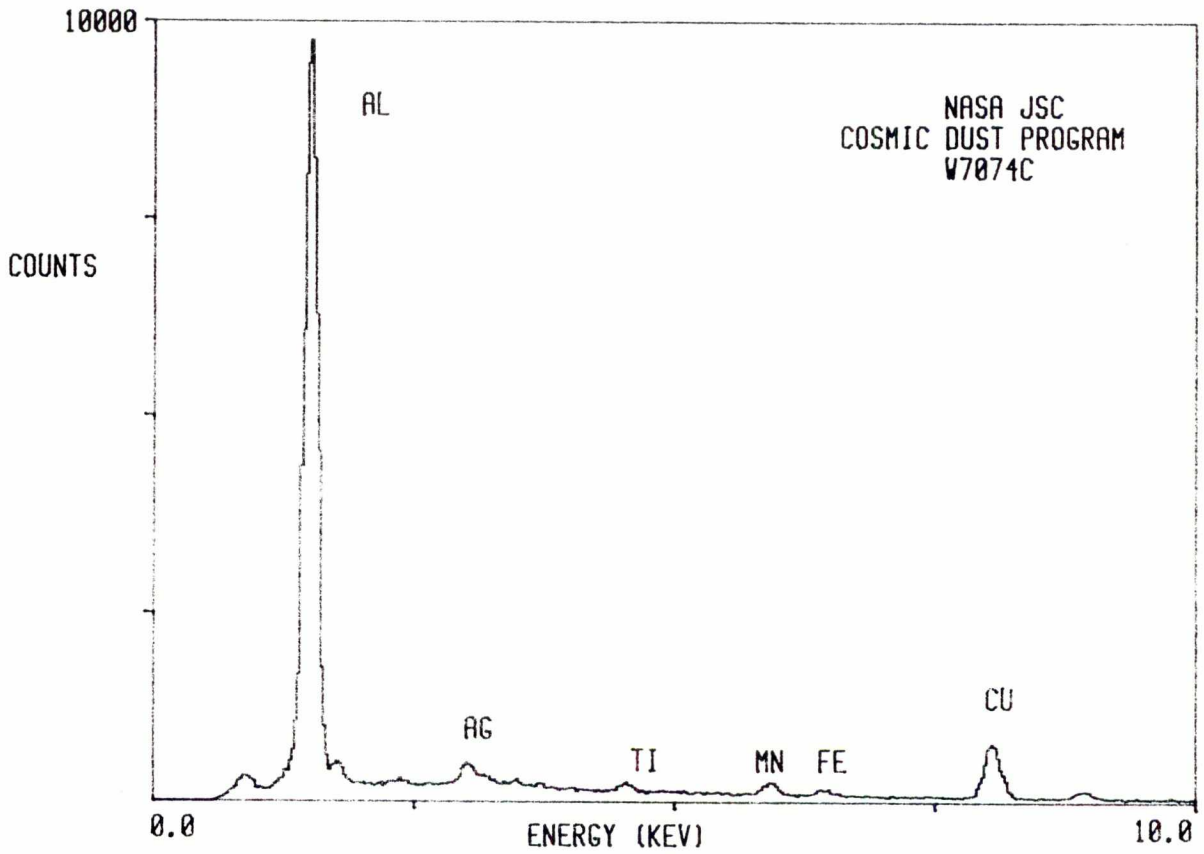
W7074 C 17



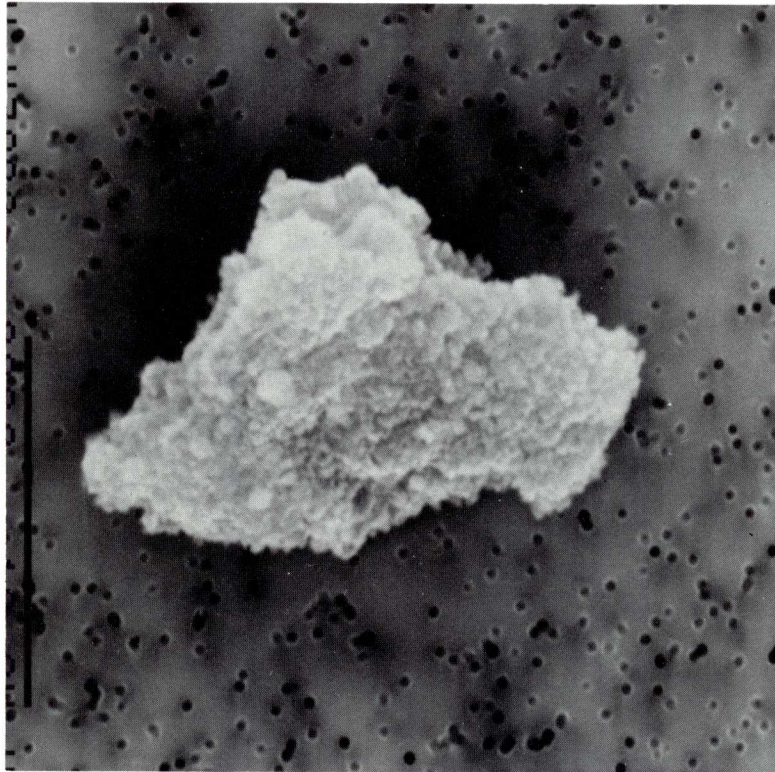
SIZE: 14x13
SHAPE: I
TRANS.: O
COLOR: Yellow to brown
LUSTER: SM/SV
TYPE: TCA
COMMENTS:

S-88-53304

W7C17

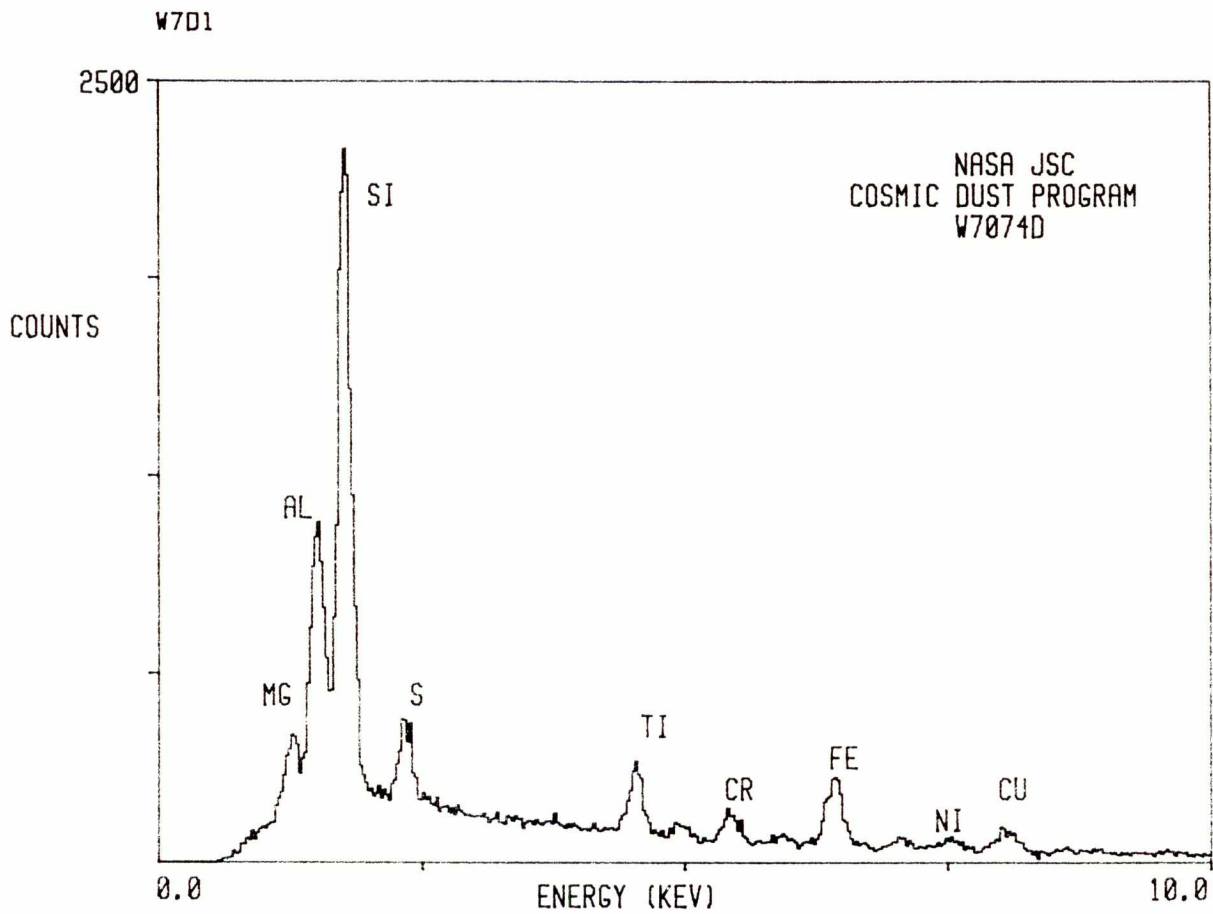


W7074 D 1

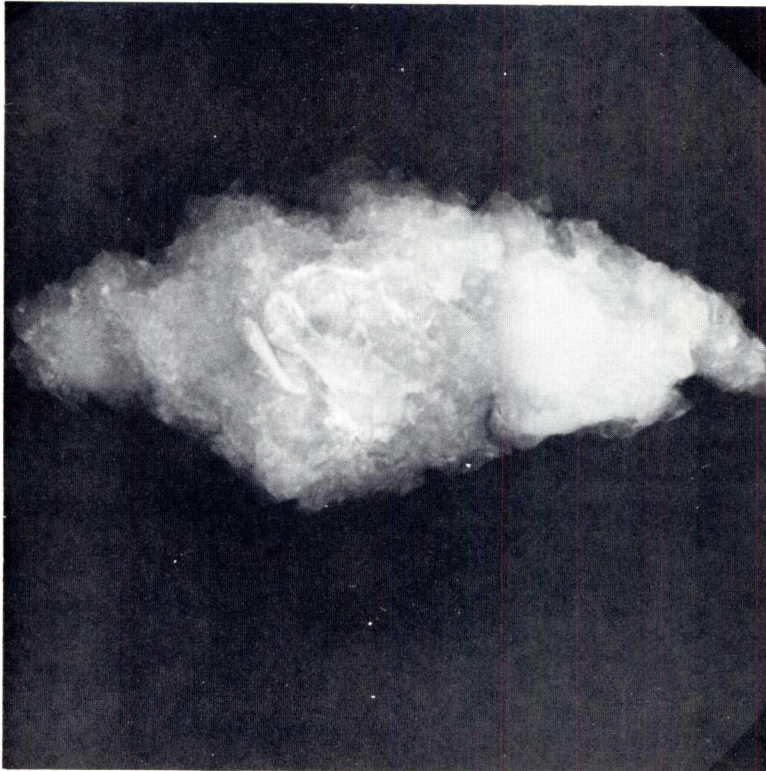


SIZE: 15x12
SHAPE: I
TRANS.: O
COLOR: Black
LUSTER: D
TYPE: TCA
COMMENTS:

S-88-53311



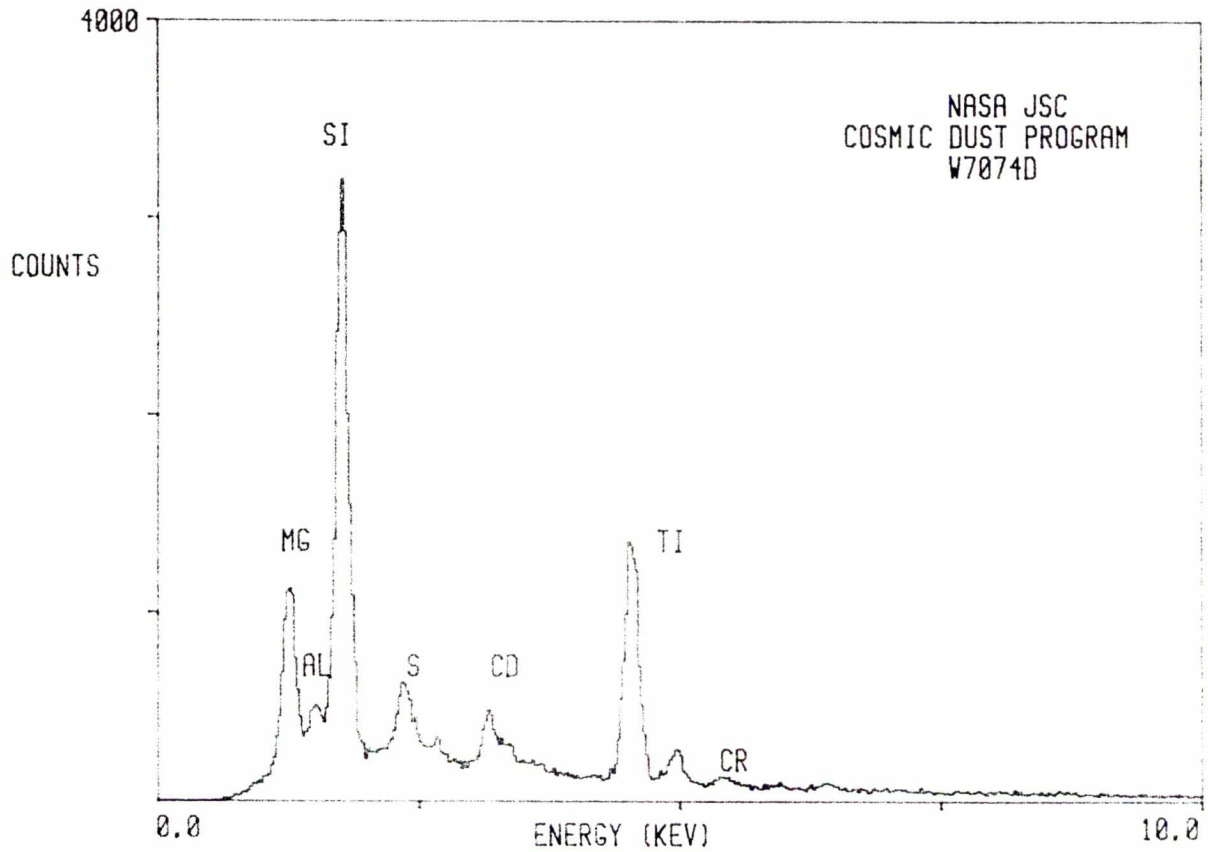
W7074 D 3



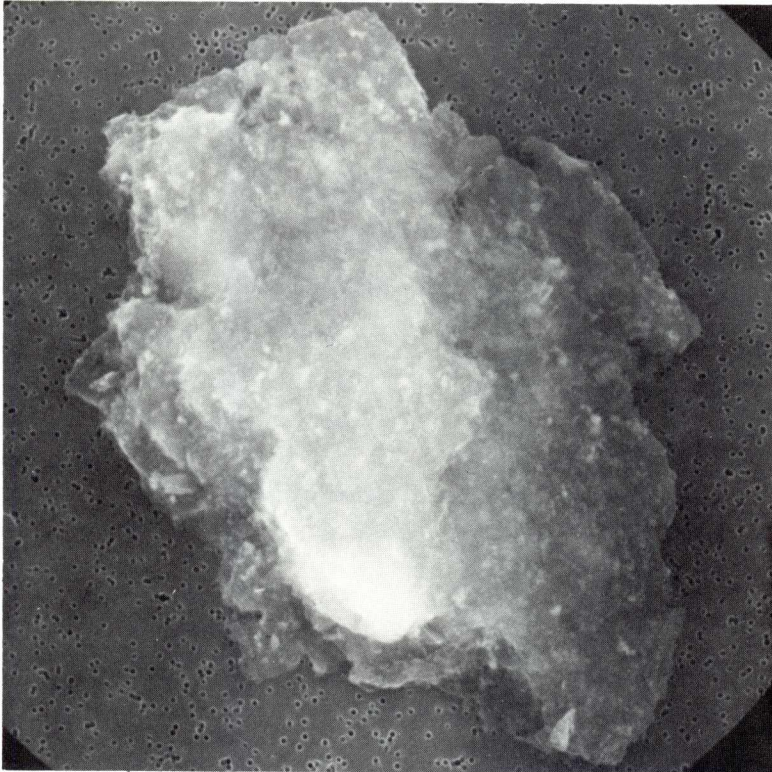
SIZE: 80x25
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53313

W703

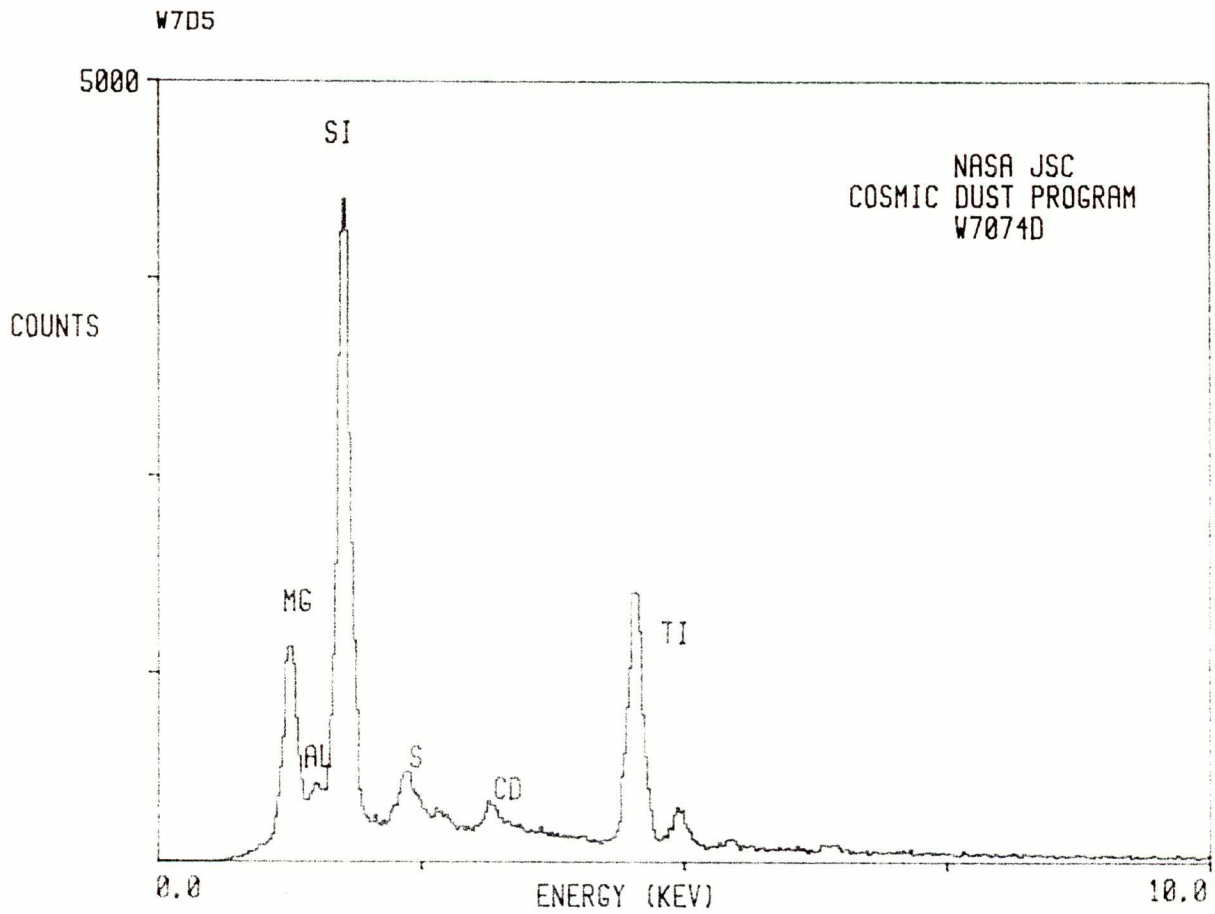


W7074 D 5

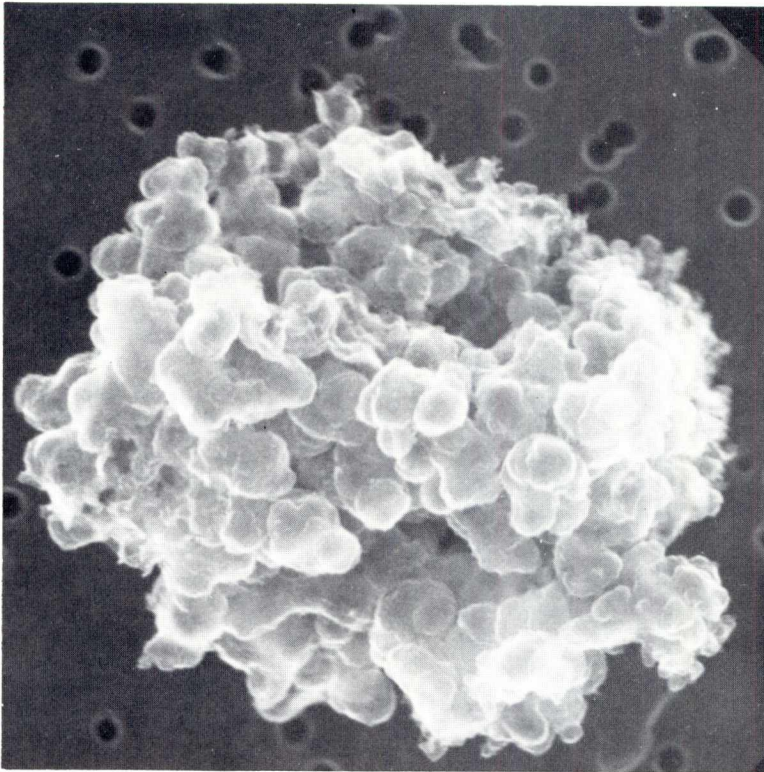


SIZE: 50x30
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53314



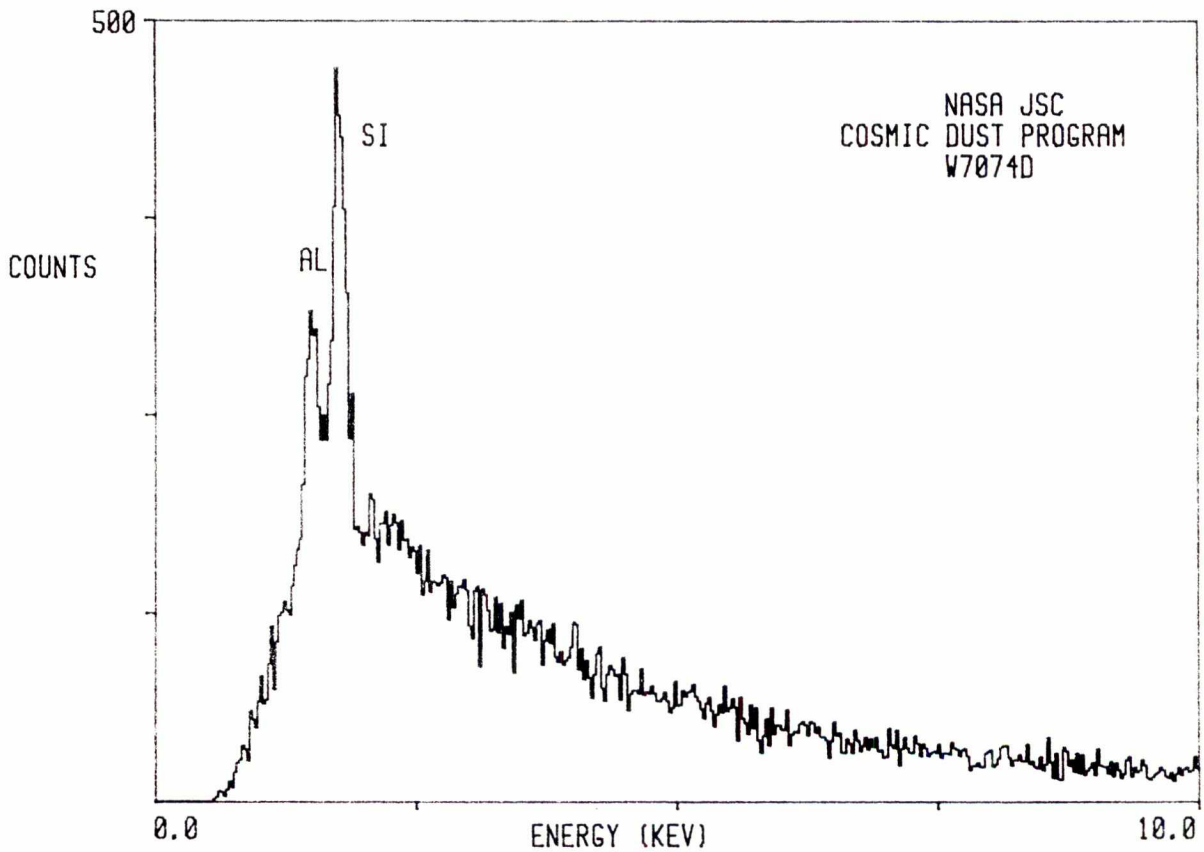
W7074 D 8



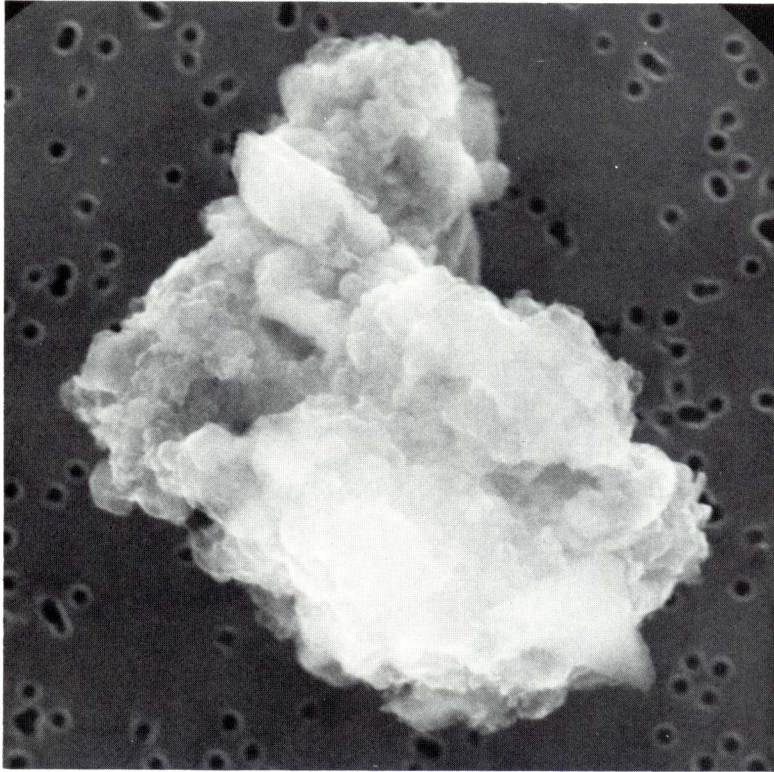
SIZE: 6
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCA
COMMENTS:

S-88-53317

W708



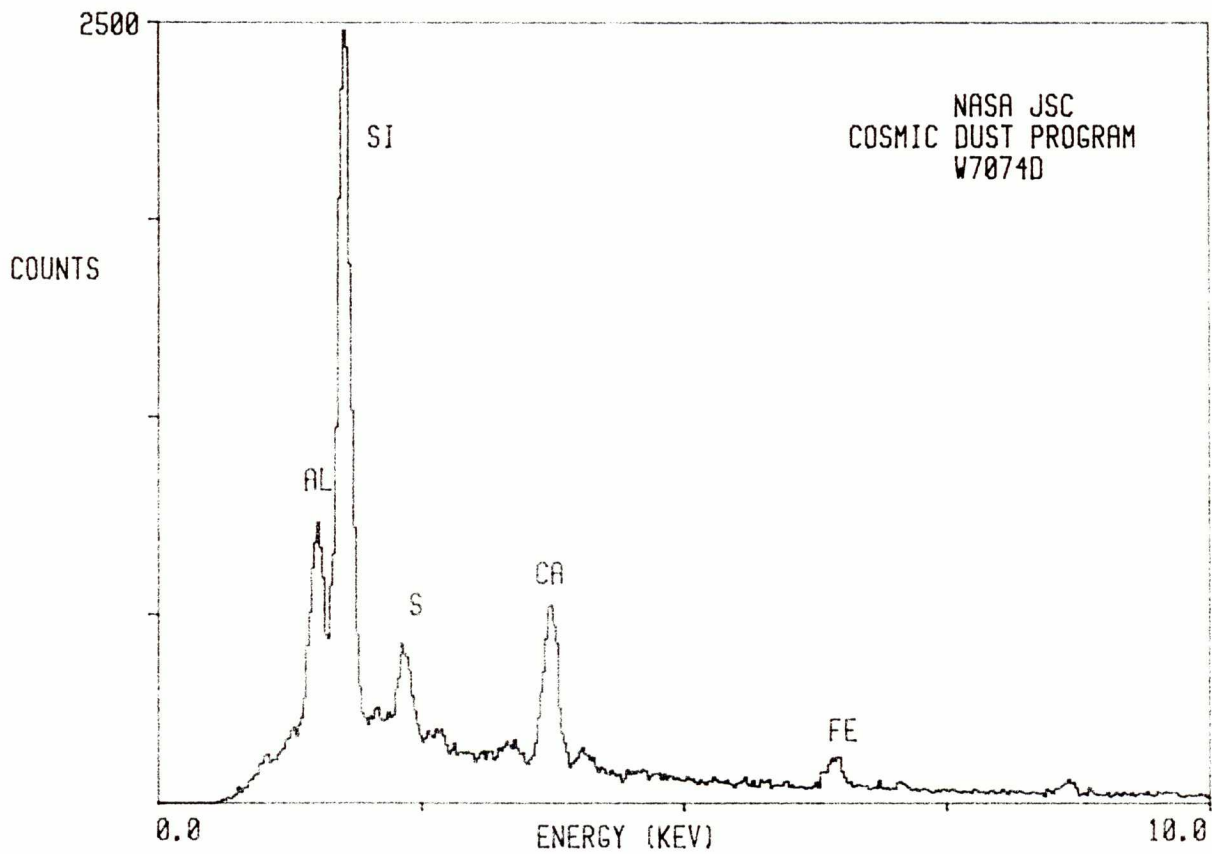
W7074 D 12



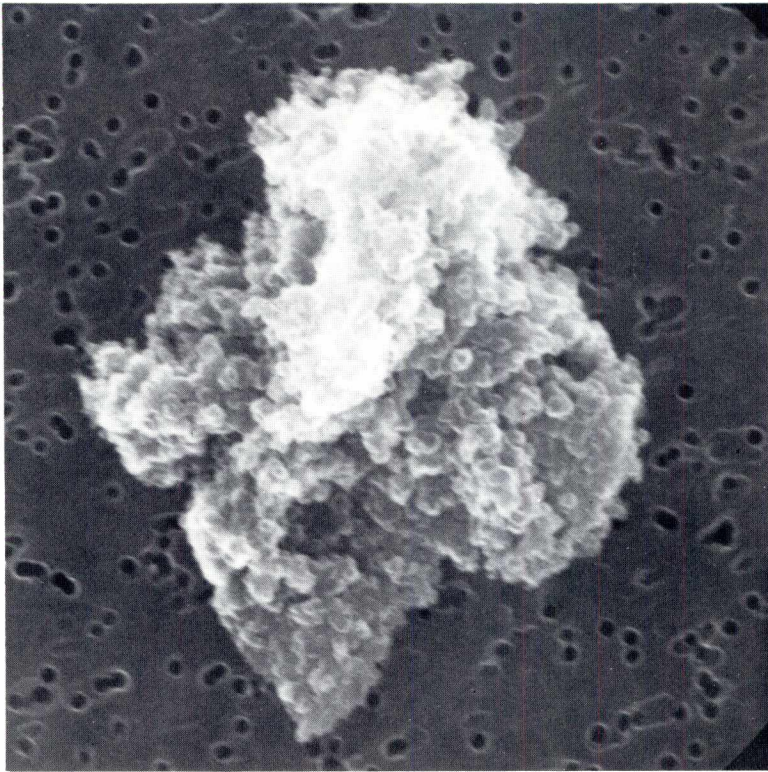
SIZE: 12x10
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCA
COMMENTS:

S-88-53320

W7012

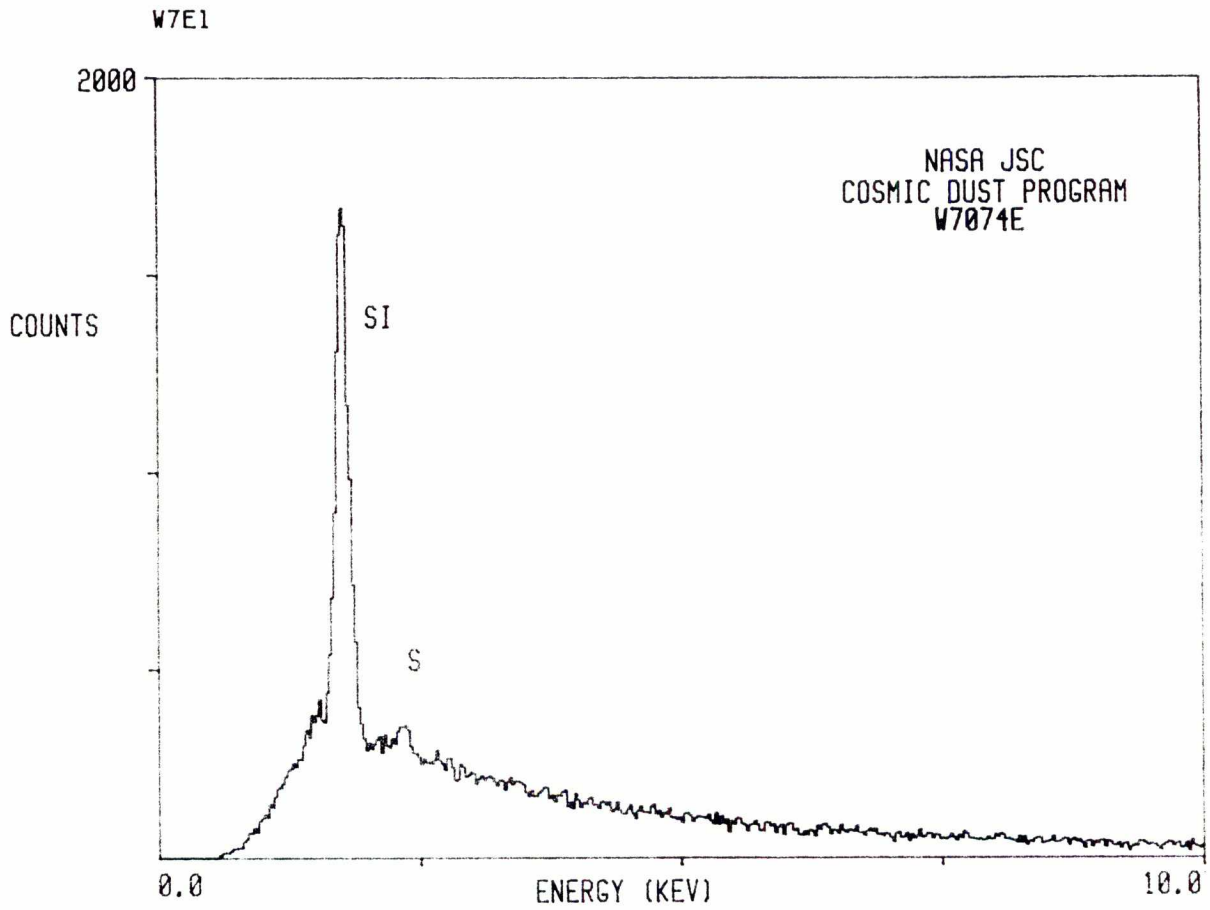


W7074 E 1

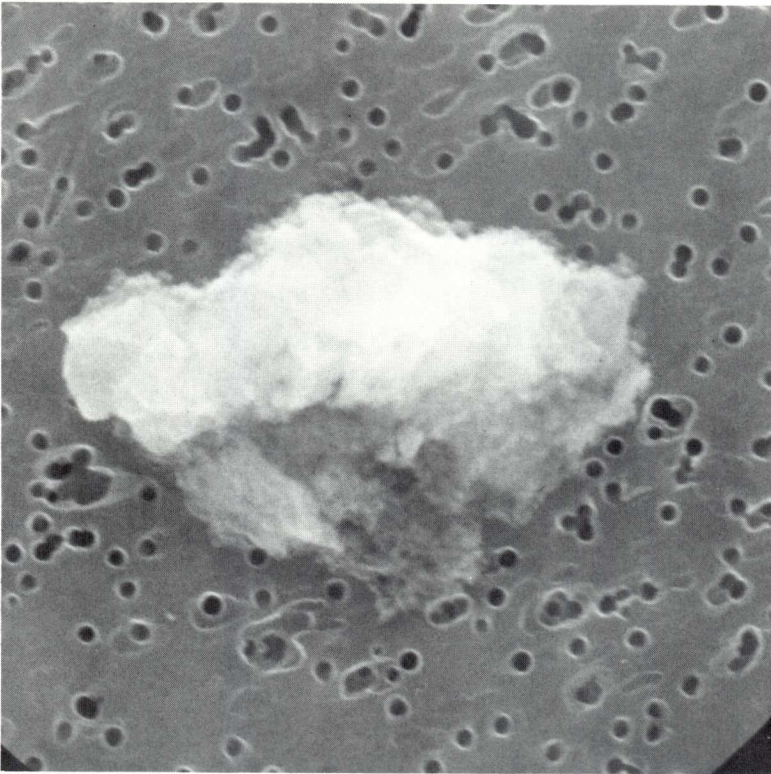


SIZE: 13
SHAPE: I
TRANS.: TL/O
COLOR: Orange
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53326

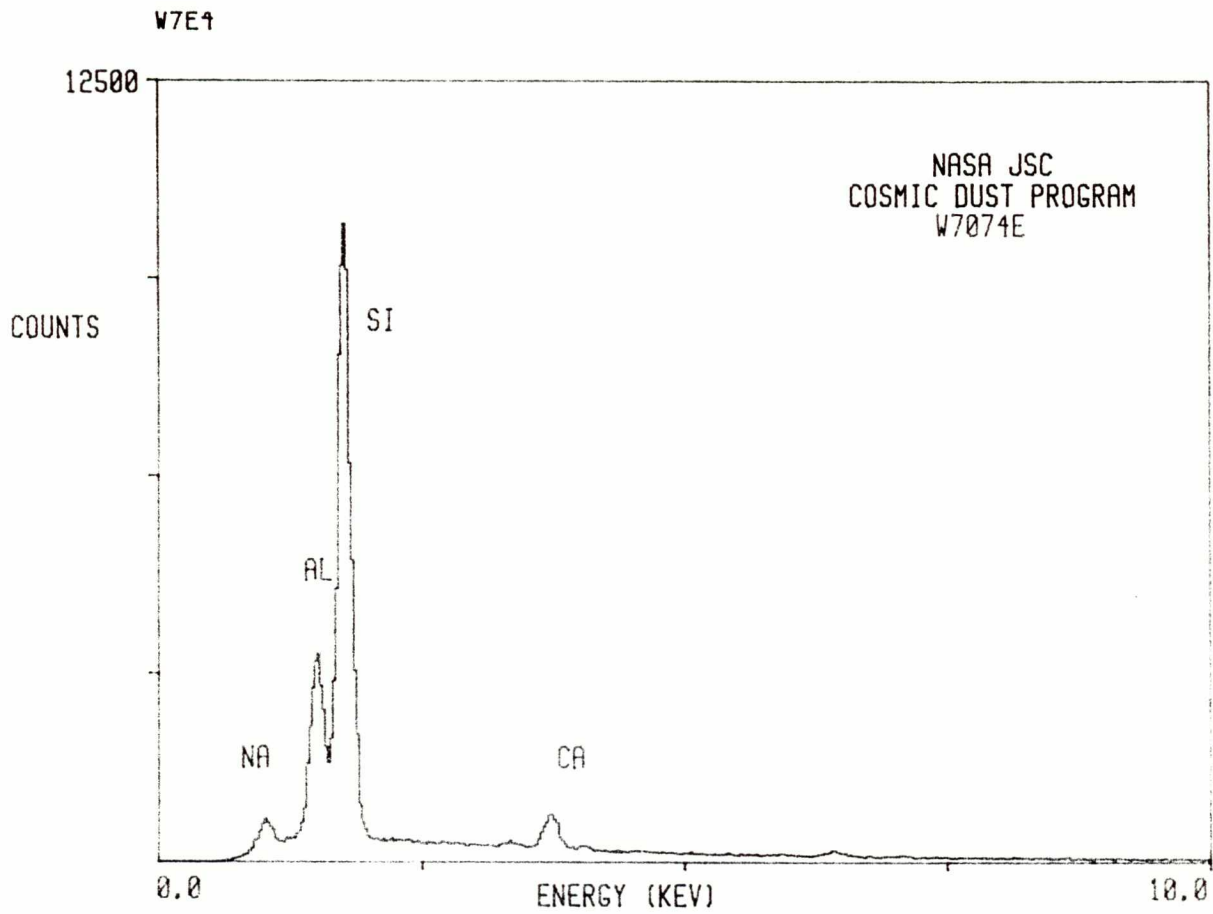


W7074 E 4

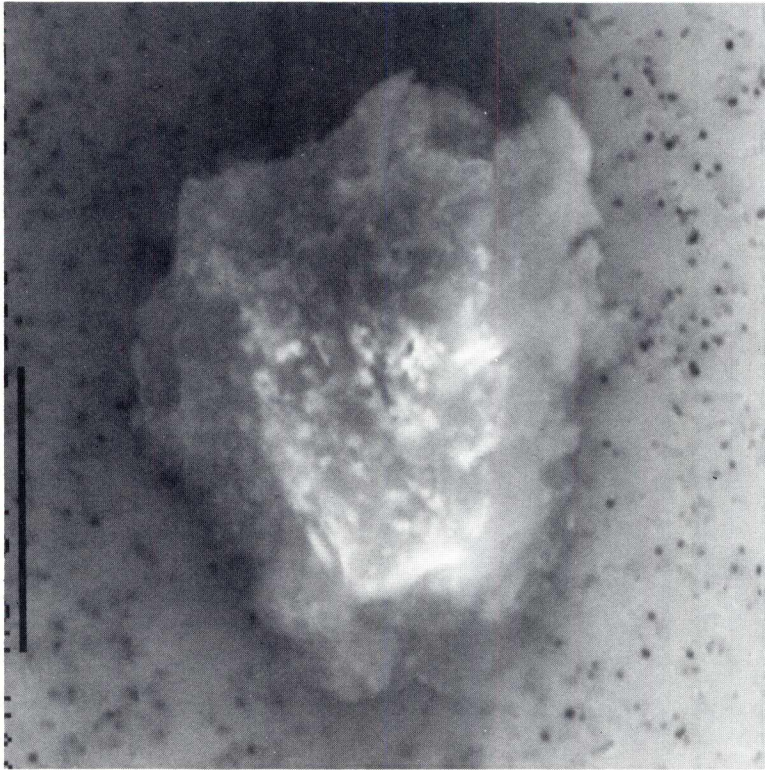


SIZE: 32
SHAPE: I
TRANS.: T
COLOR: Yellow to orange
LUSTER: V/R
TYPE: TCA
COMMENTS:

S-88-53328

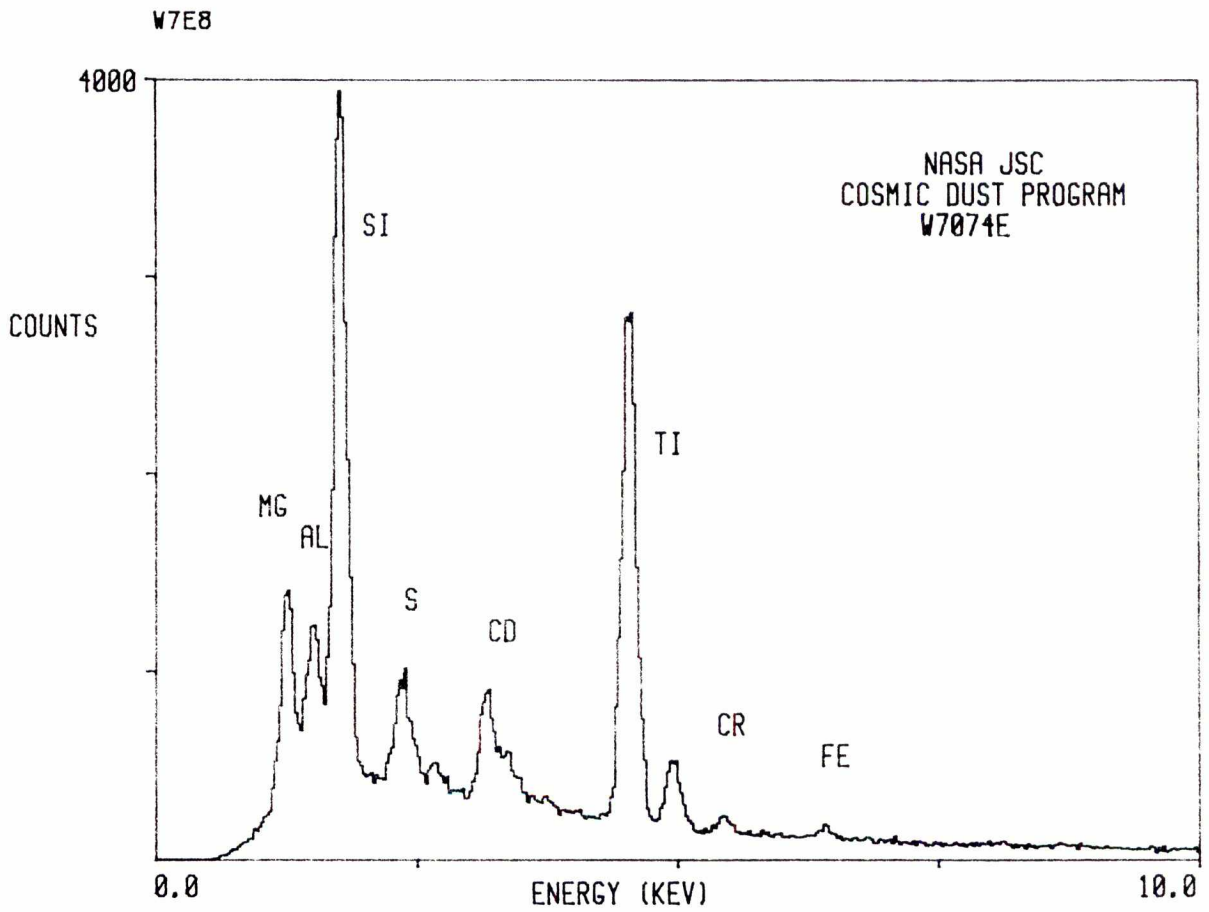


W7074 E 8

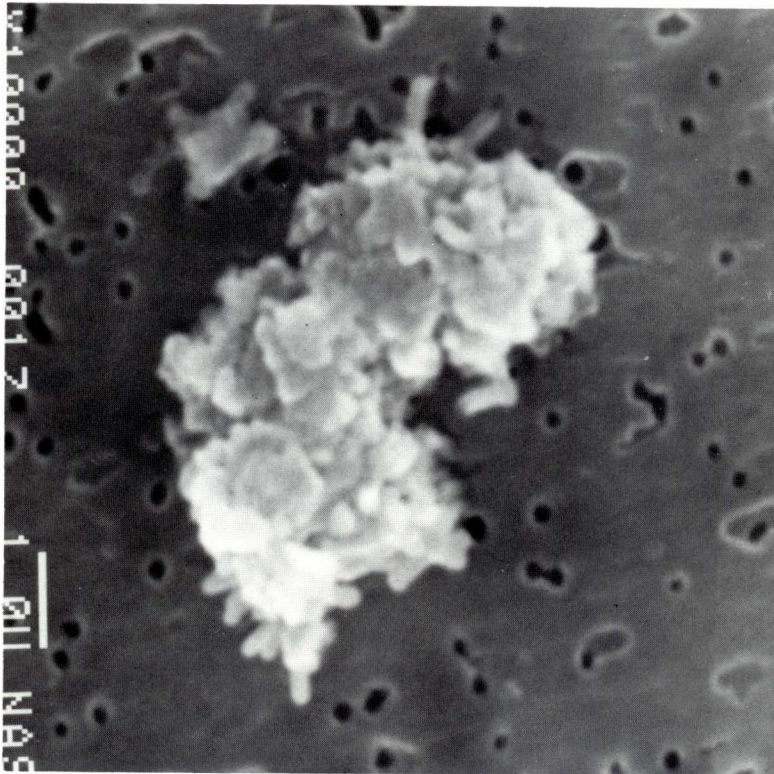


SIZE: 22
SHAPE: I
TRANS.: TL/O
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53329

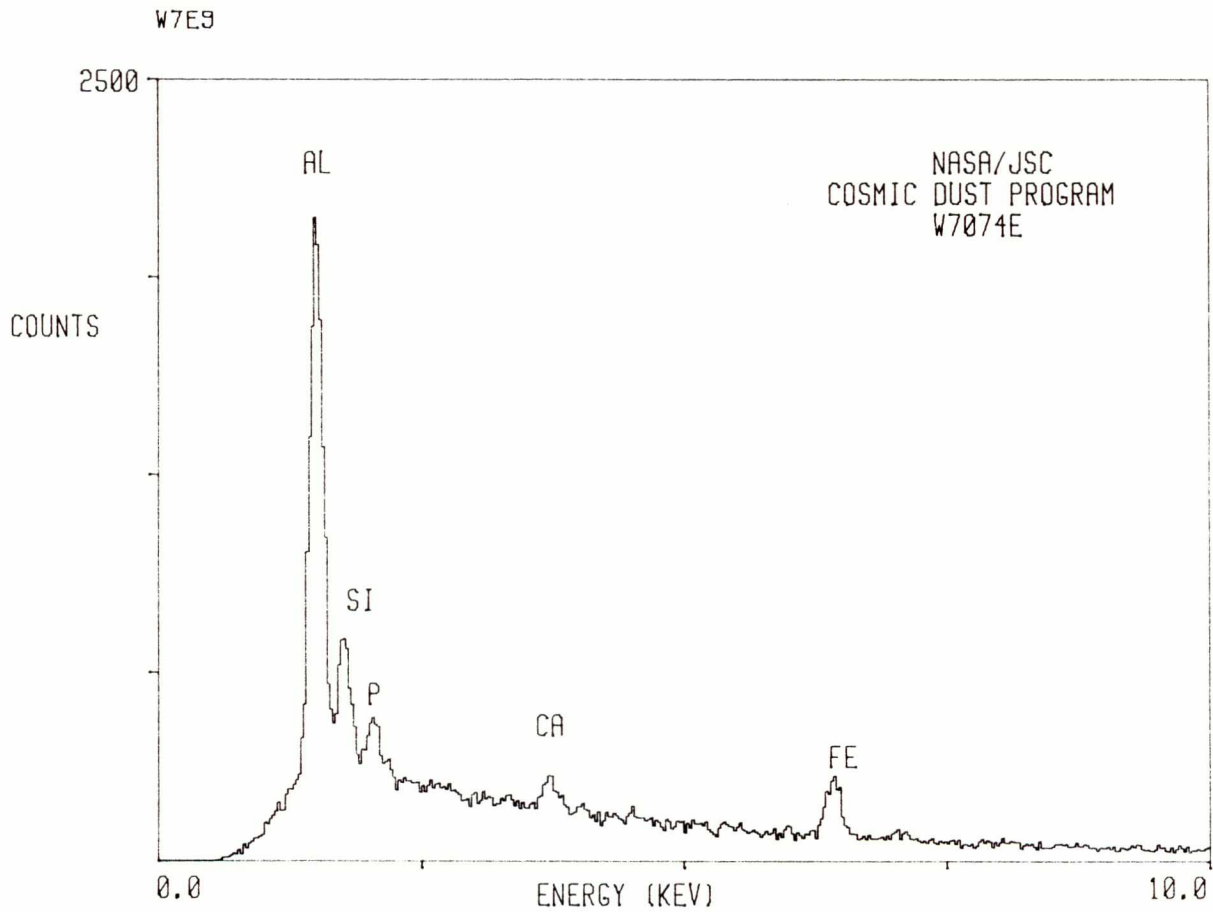


W7074 E 9

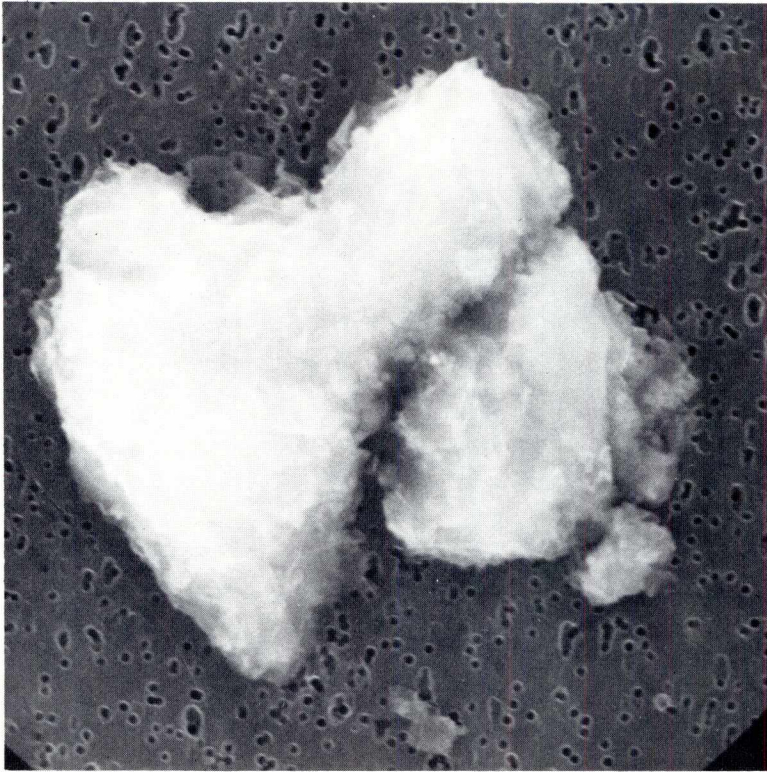


SIZE: 35x20
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53330



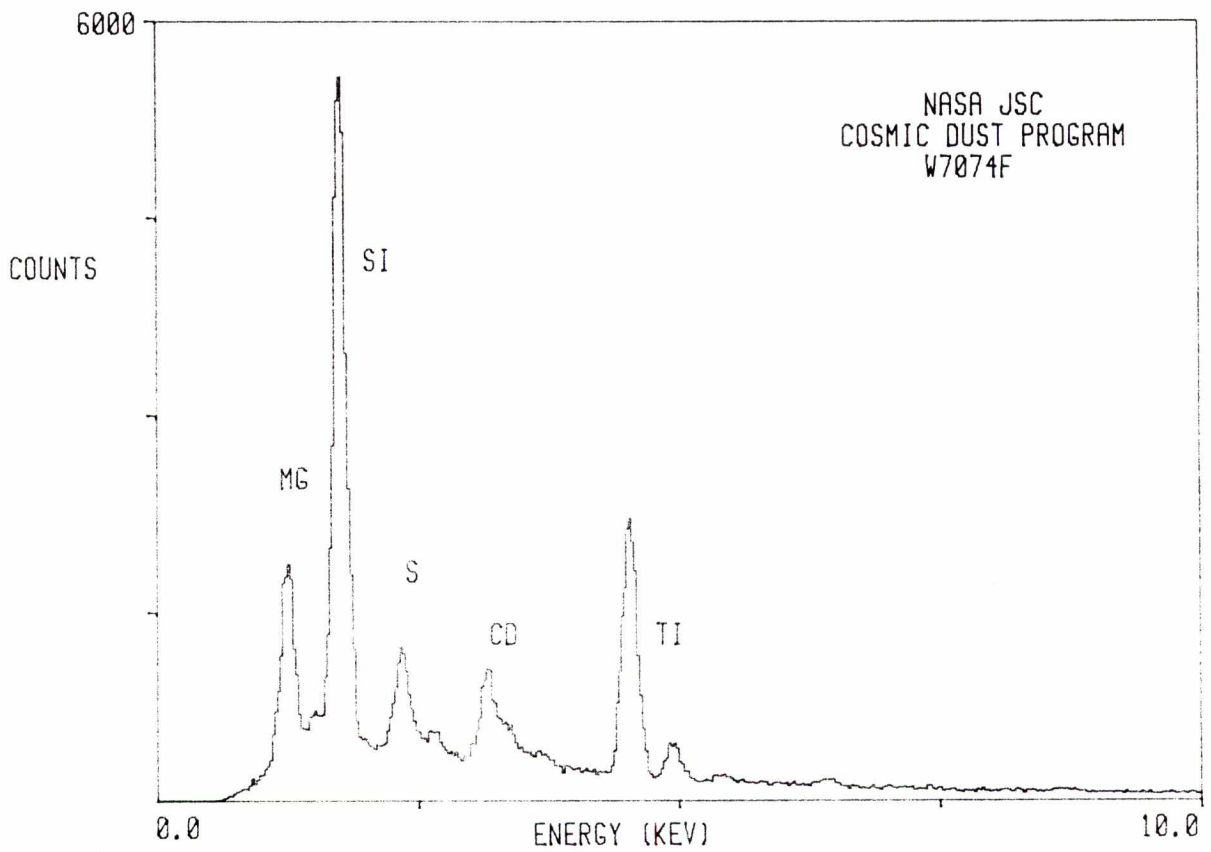
W7074 F 5



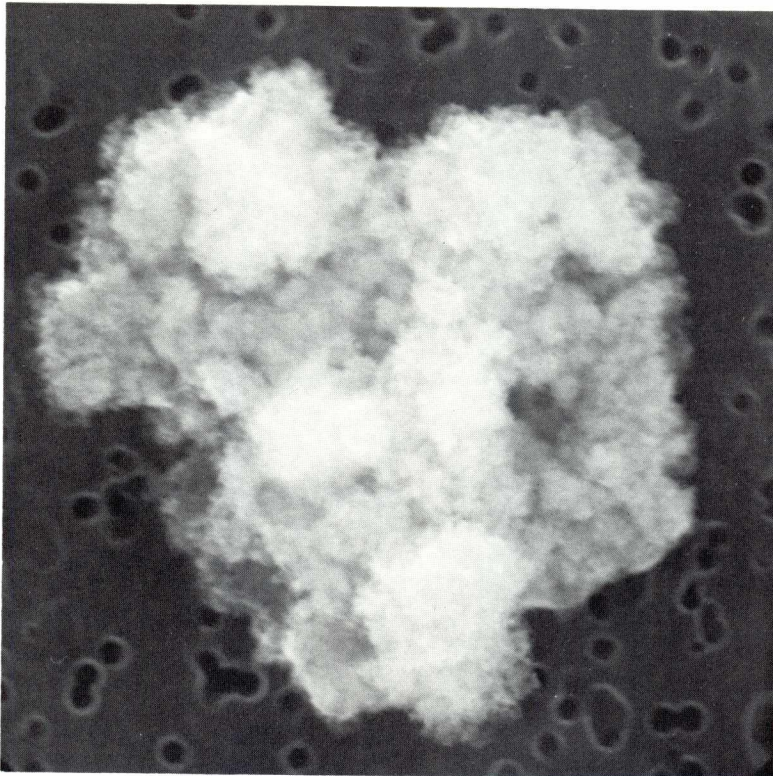
SIZE: 20
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53341

W7F5

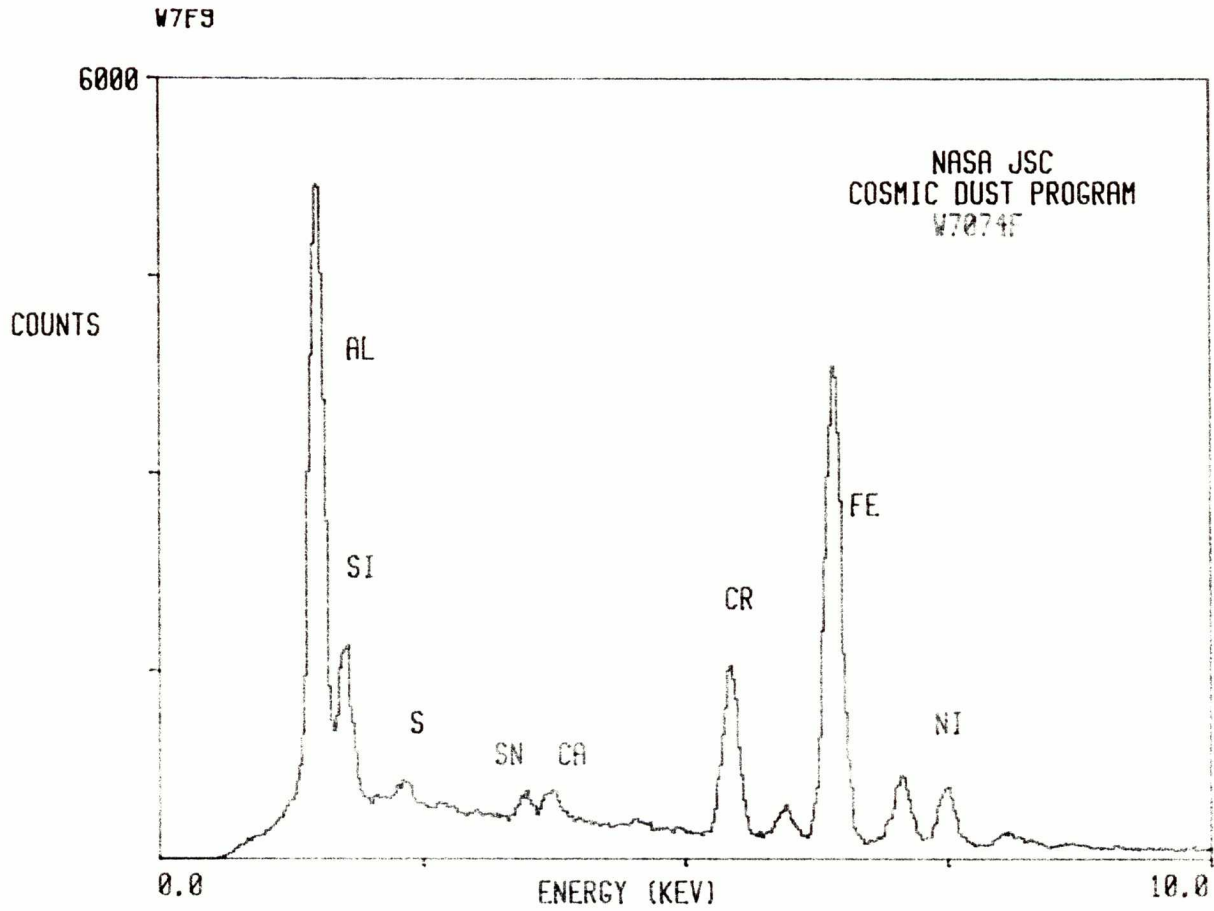


W7074 F 9

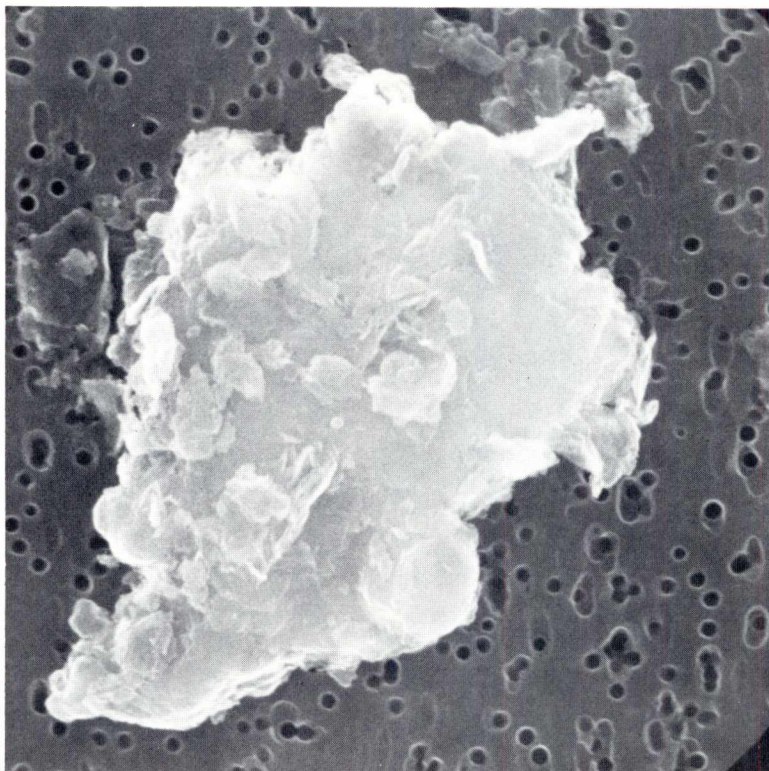


SIZE: 7
SHAPE: I
TRANS.: O
COLOR: Black
LUSTER: D
TYPE: TCA
COMMENTS:

S-88-53345



W7074 F 11

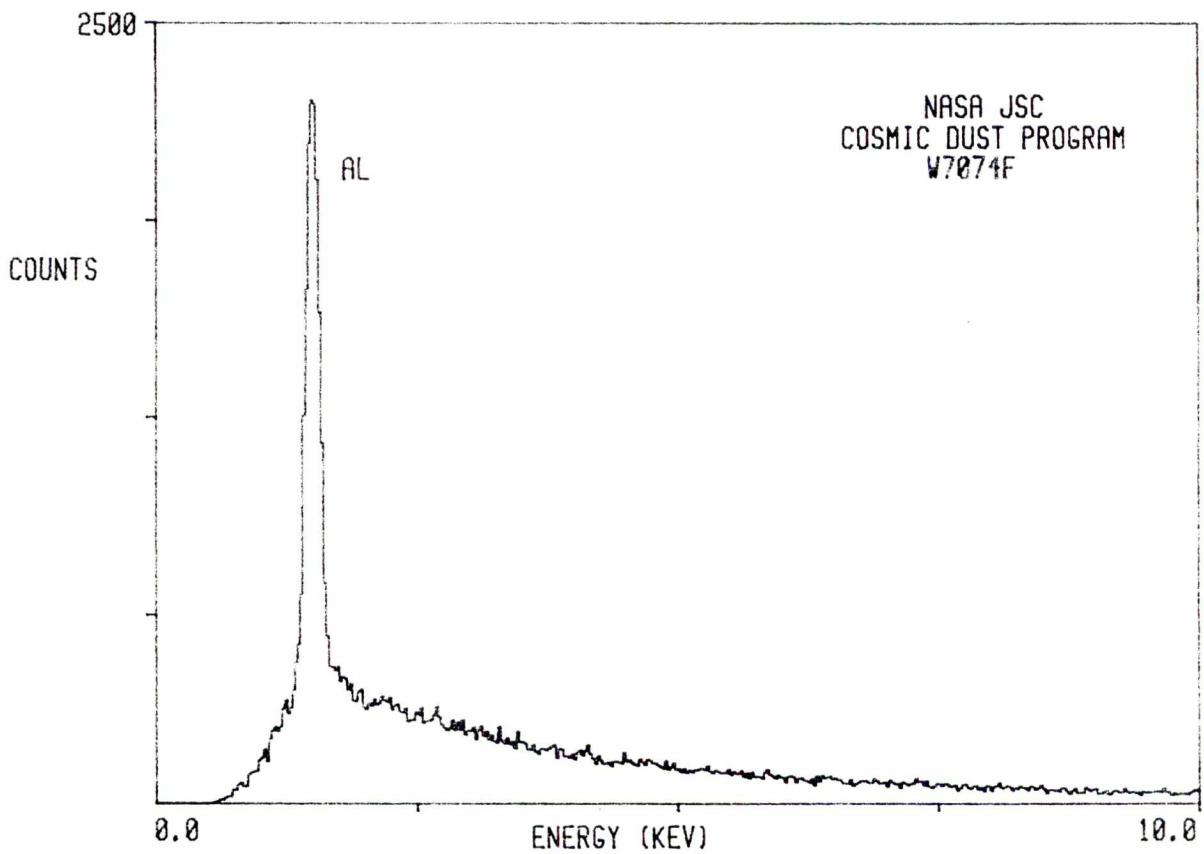


SIZE: 12
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/M
TYPE: TCA

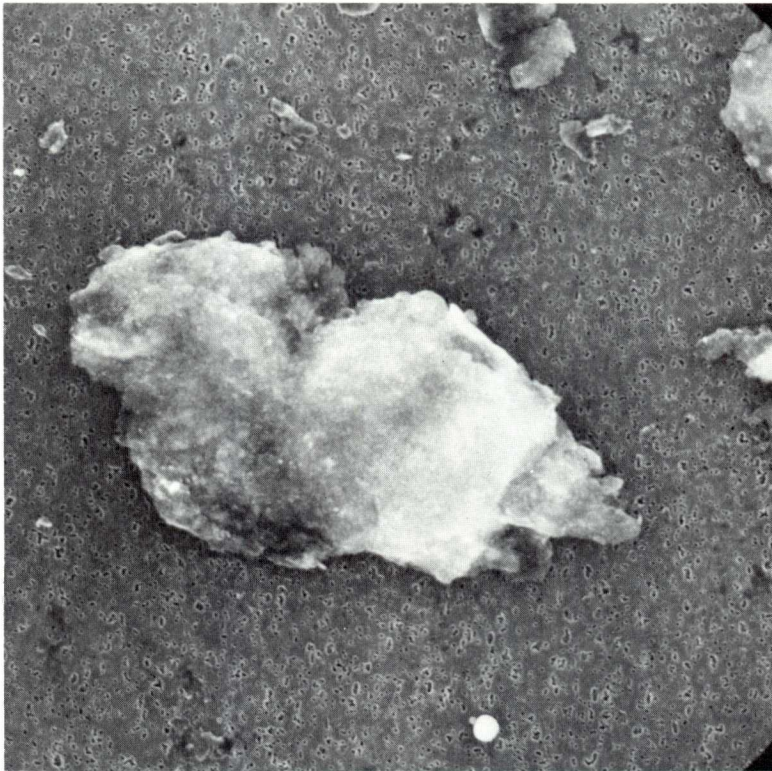
COMMENTS:
Largest particle
in a field of
particles

S-88-53347

W7F11



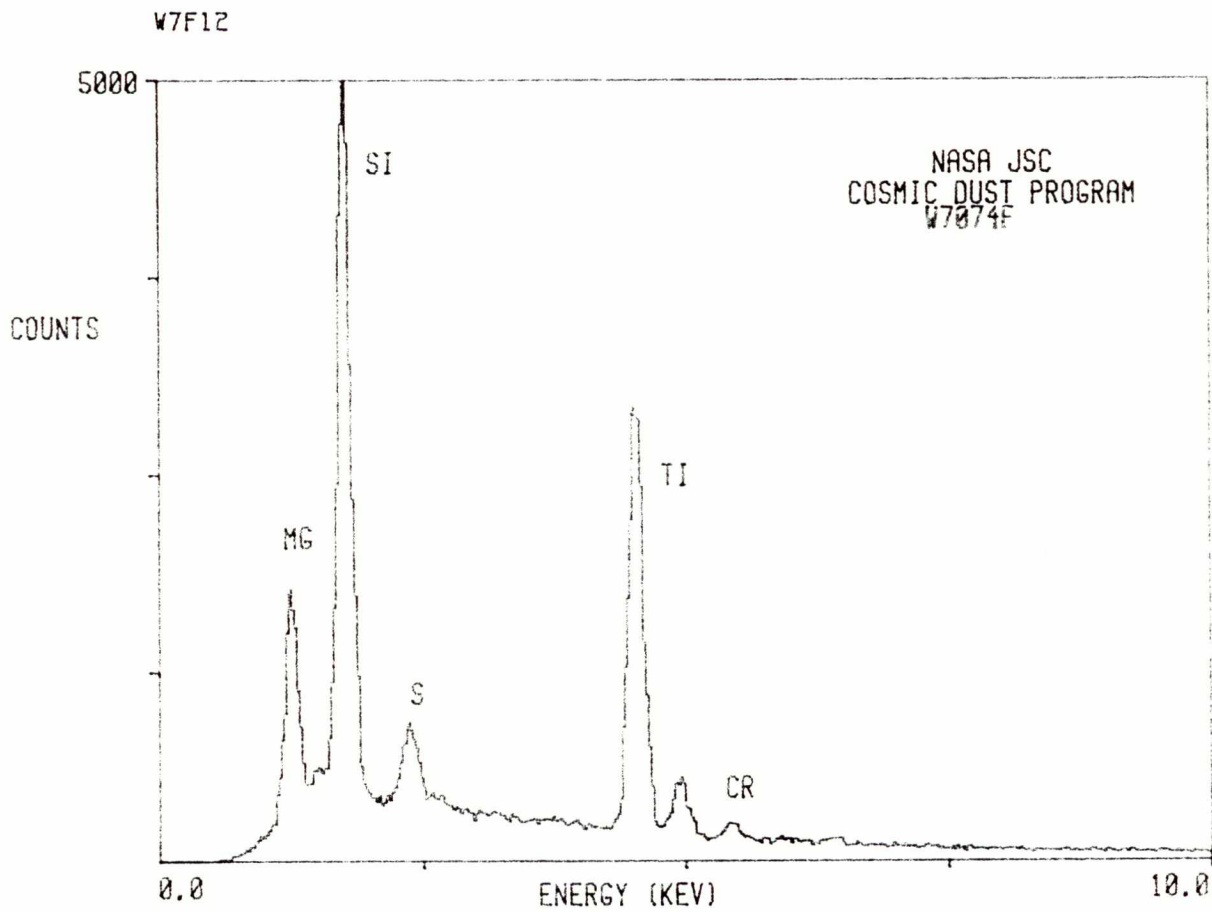
W7074 F 12



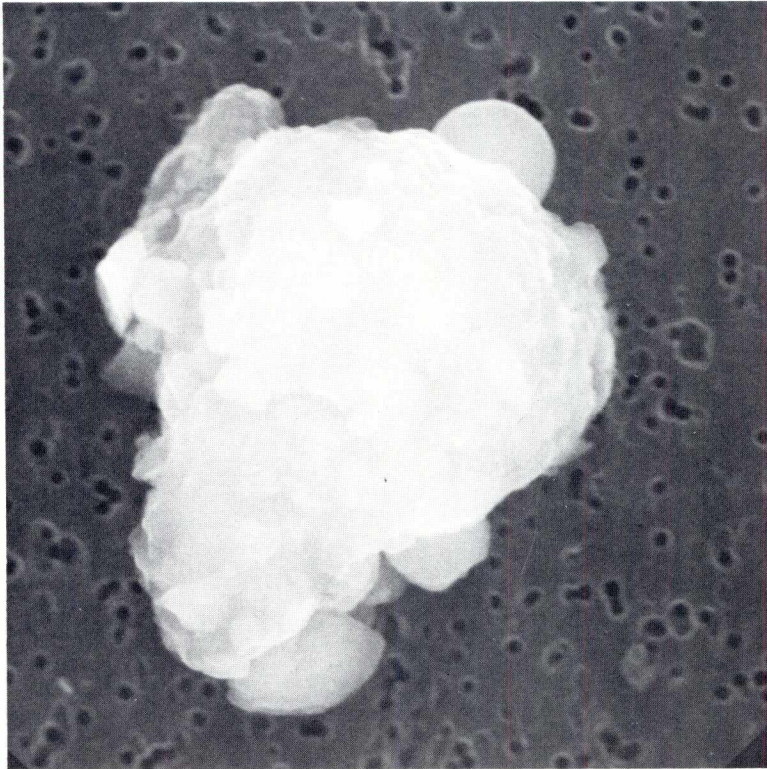
SIZE: 60x40
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA

COMMENTS:
Largest particle
in a field of
particles

S-88-53348



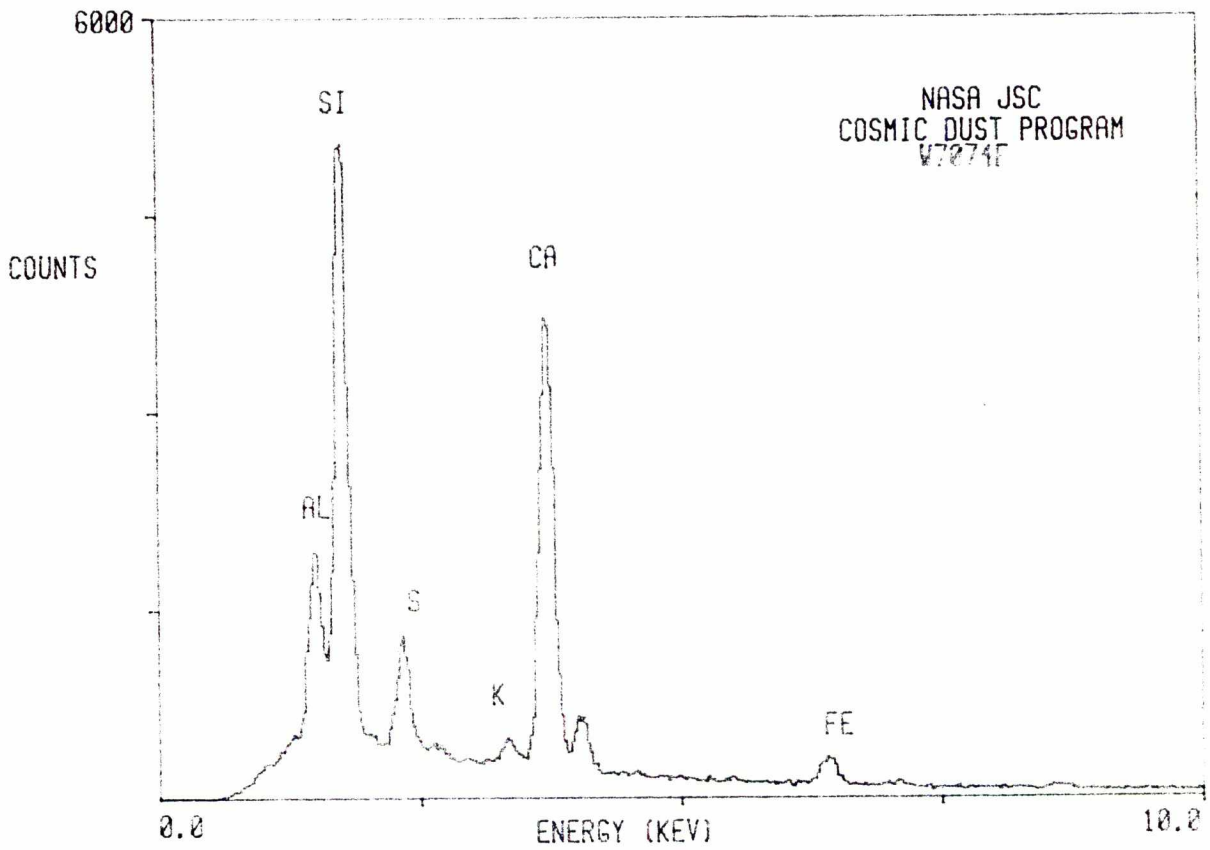
W7074 F 14



SIZE: 11
SHAPE: I
TRANS.: TL/O
COLOR: Colorless to black
LUSTER: SV/D
TYPE: TCA
COMMENTS:

S-88-53349

W7F14



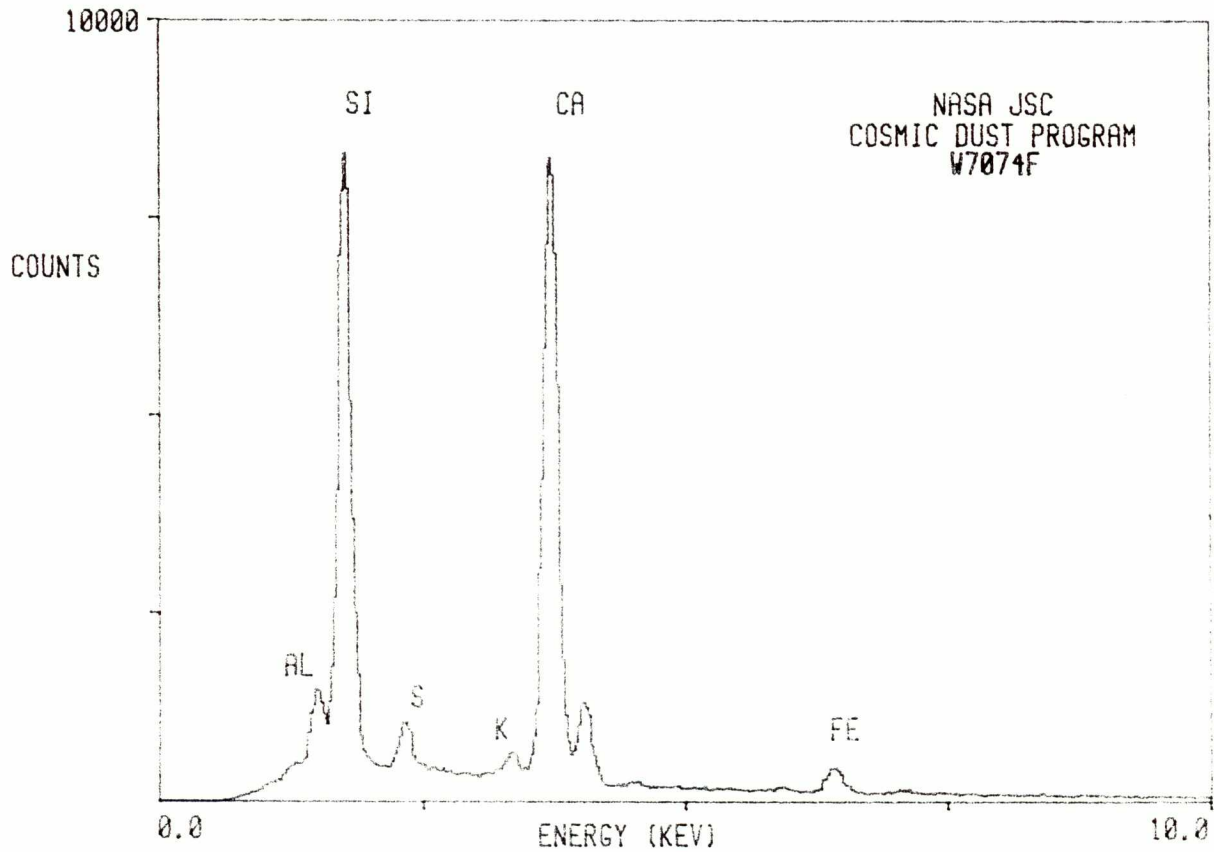
W7074 F 15



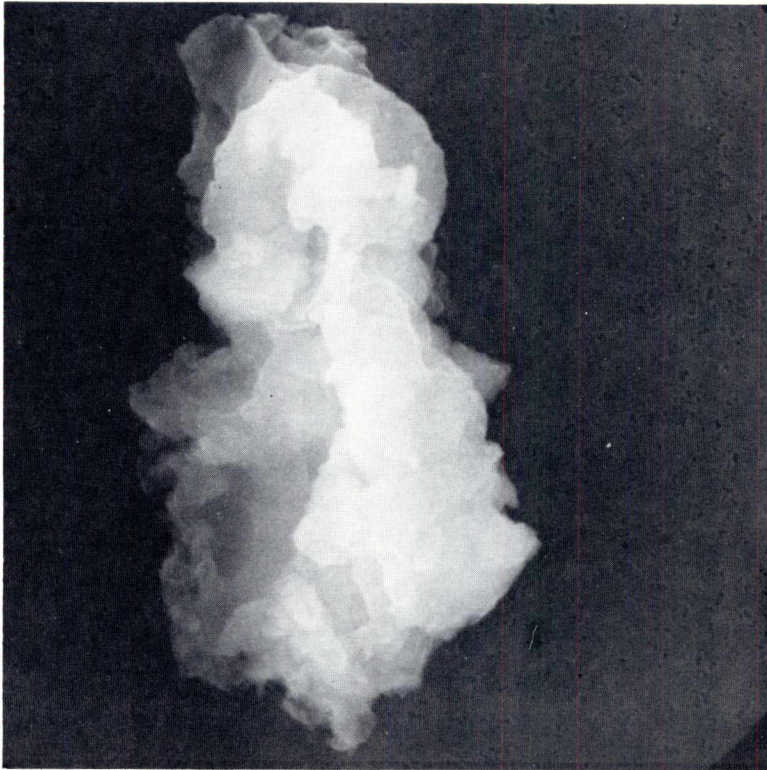
SIZE: 30x28
SHAPE: I
TRANS.: TL
COLOR: White to yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53350

W7F15



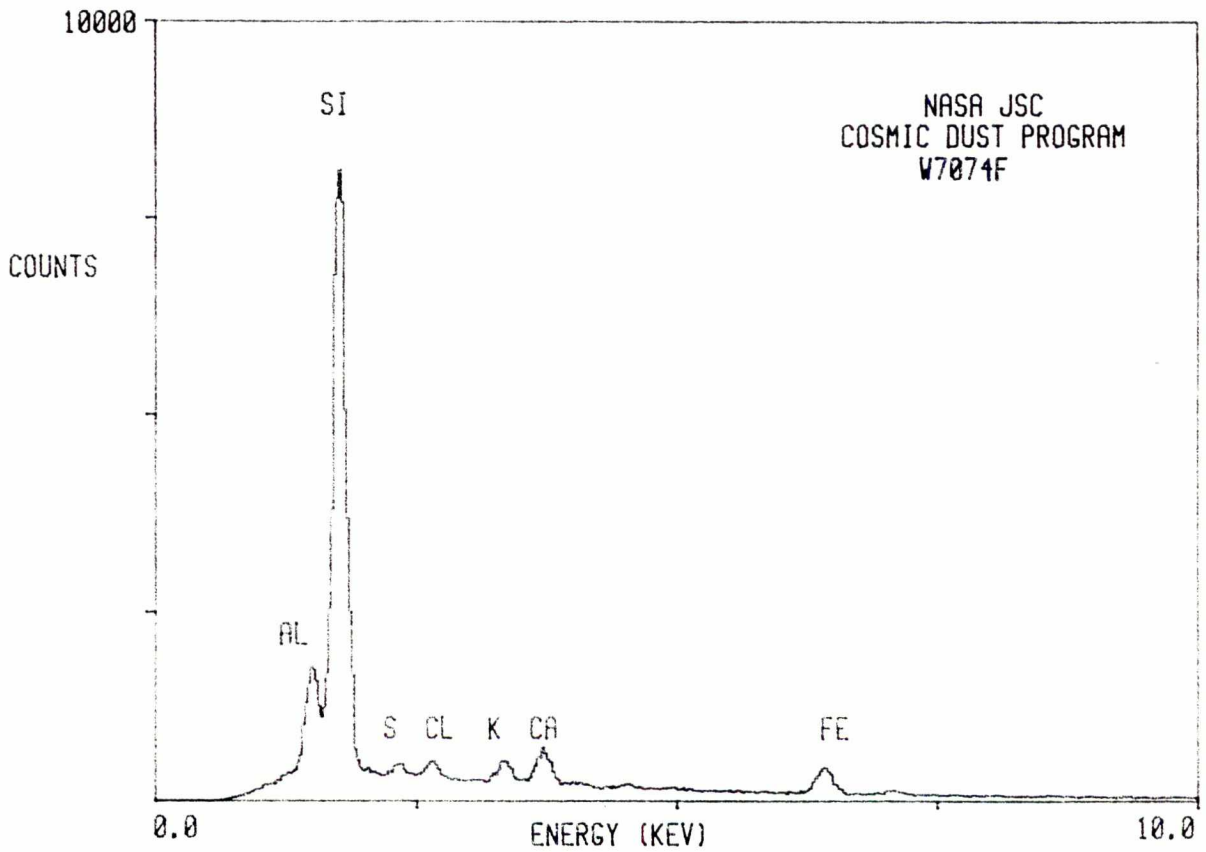
W7074 F 16



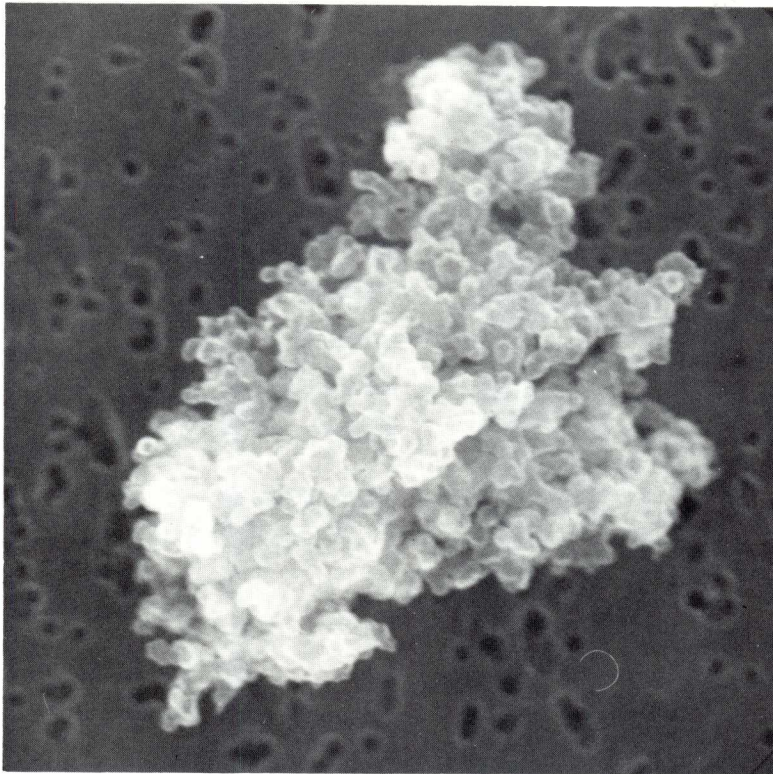
SIZE: 30x15
SHAPE: I
TRANS.: TL/O
COLOR: Orange to black
LUSTER: R/D
TYPE: TCA
COMMENTS:

S-88-53351

W7F16

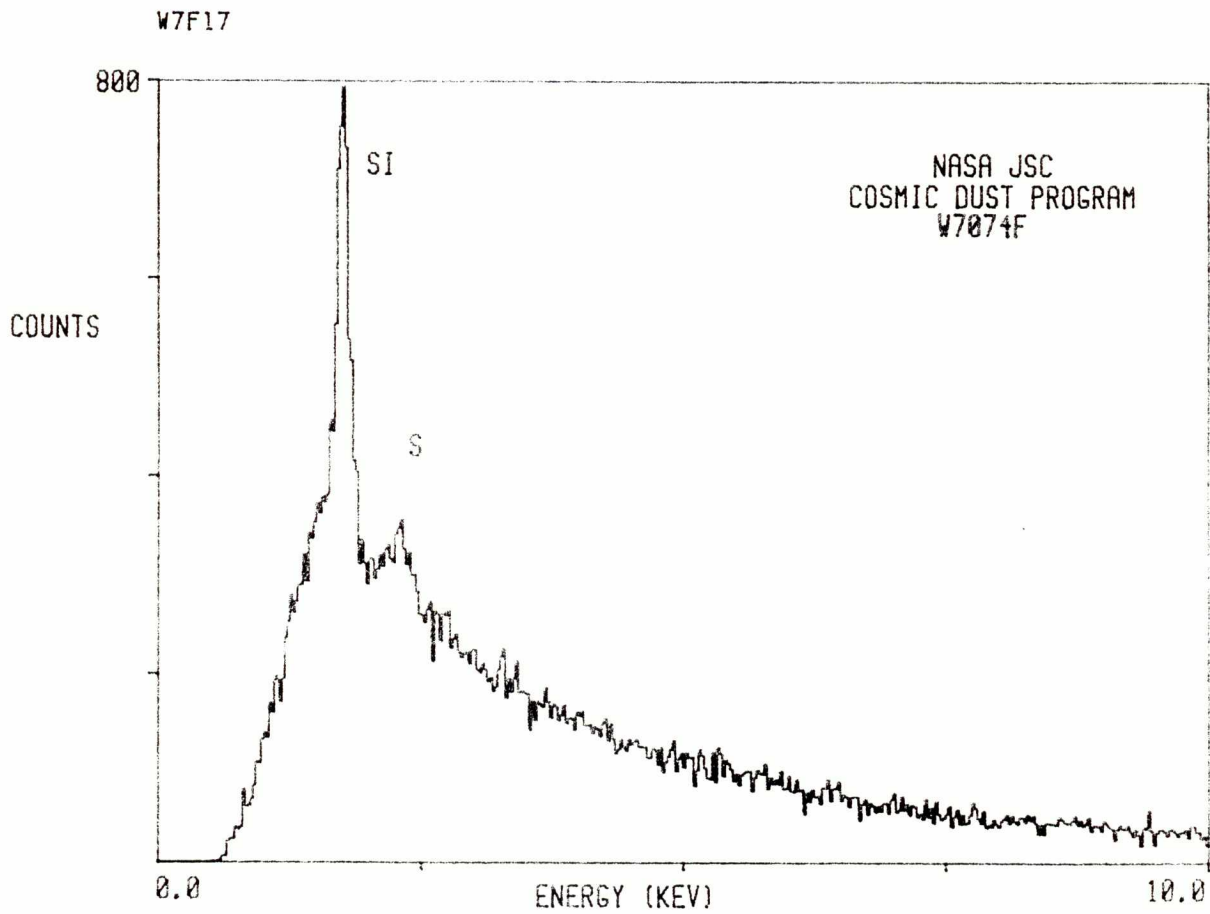


W7074 F 17

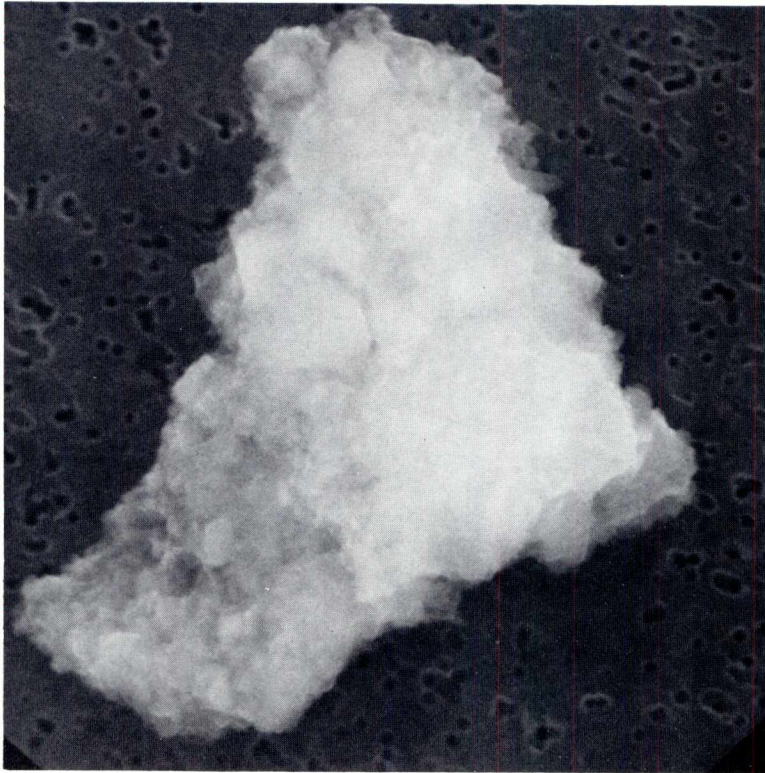


SIZE: 11x9
SHAPE: I
TRANS.: TL/O
COLOR: Colorless to black
LUSTER: SV/D
TYPE: TCA
COMMENTS:

S-88-53352

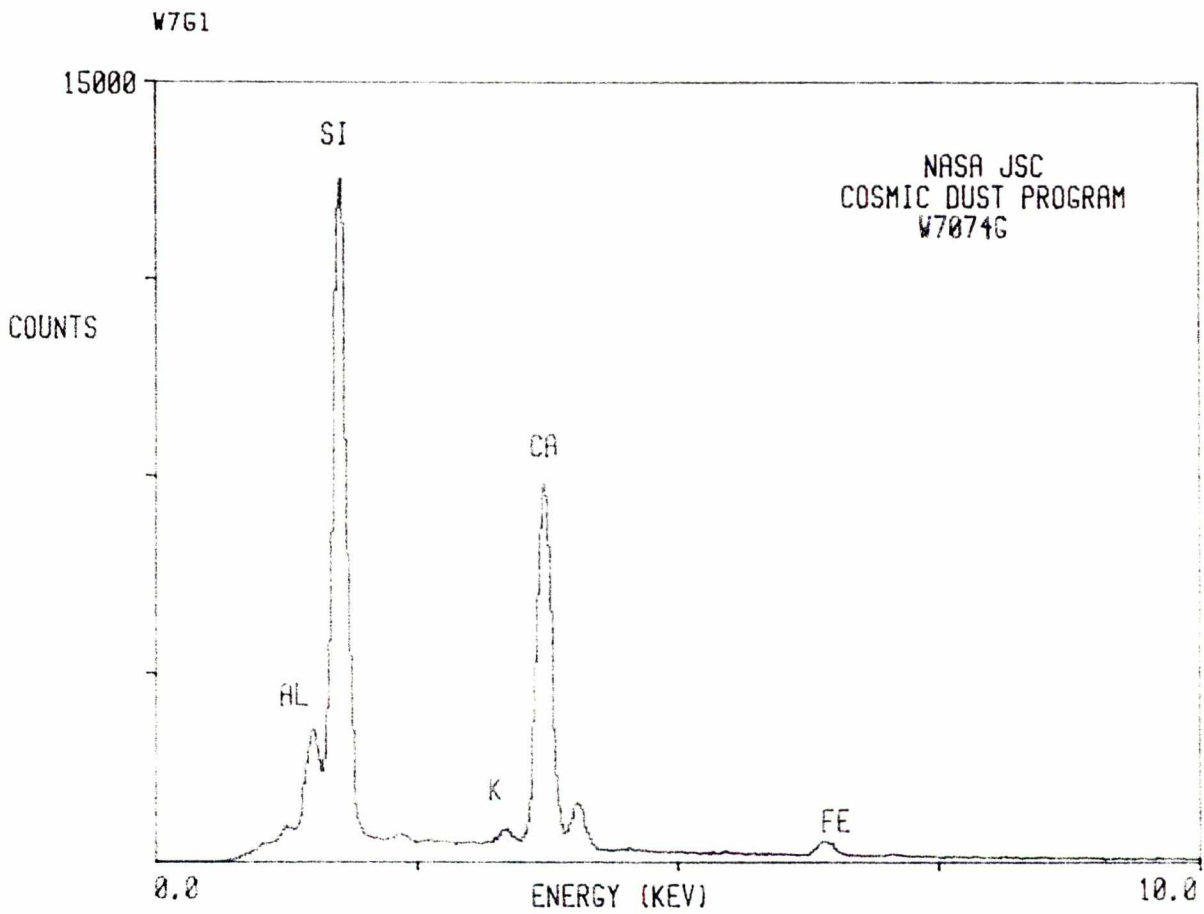


W7074 G 1

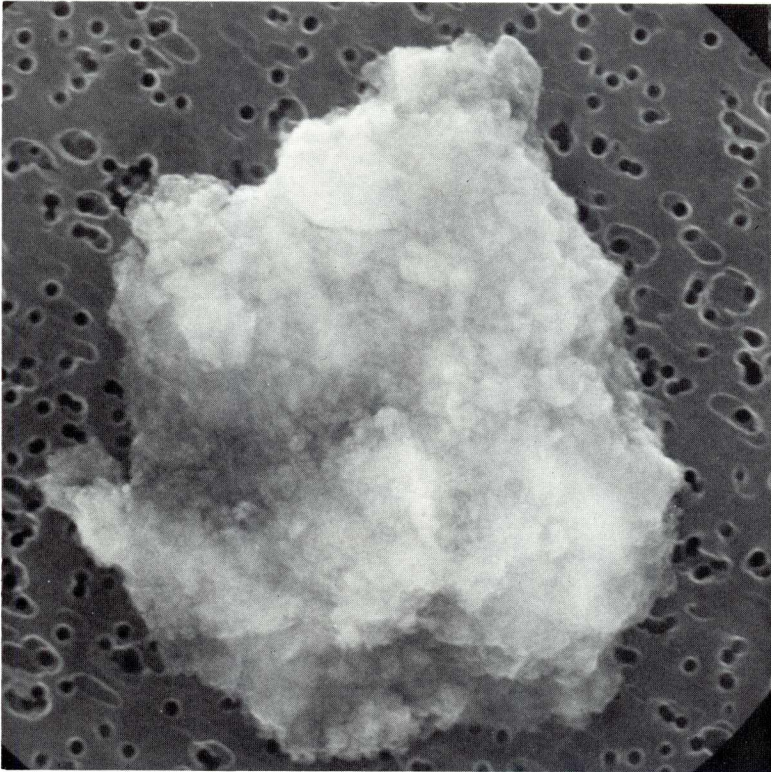


SIZE: 15
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:
Related to W7074G2

S-88-53353



W7074 G 2

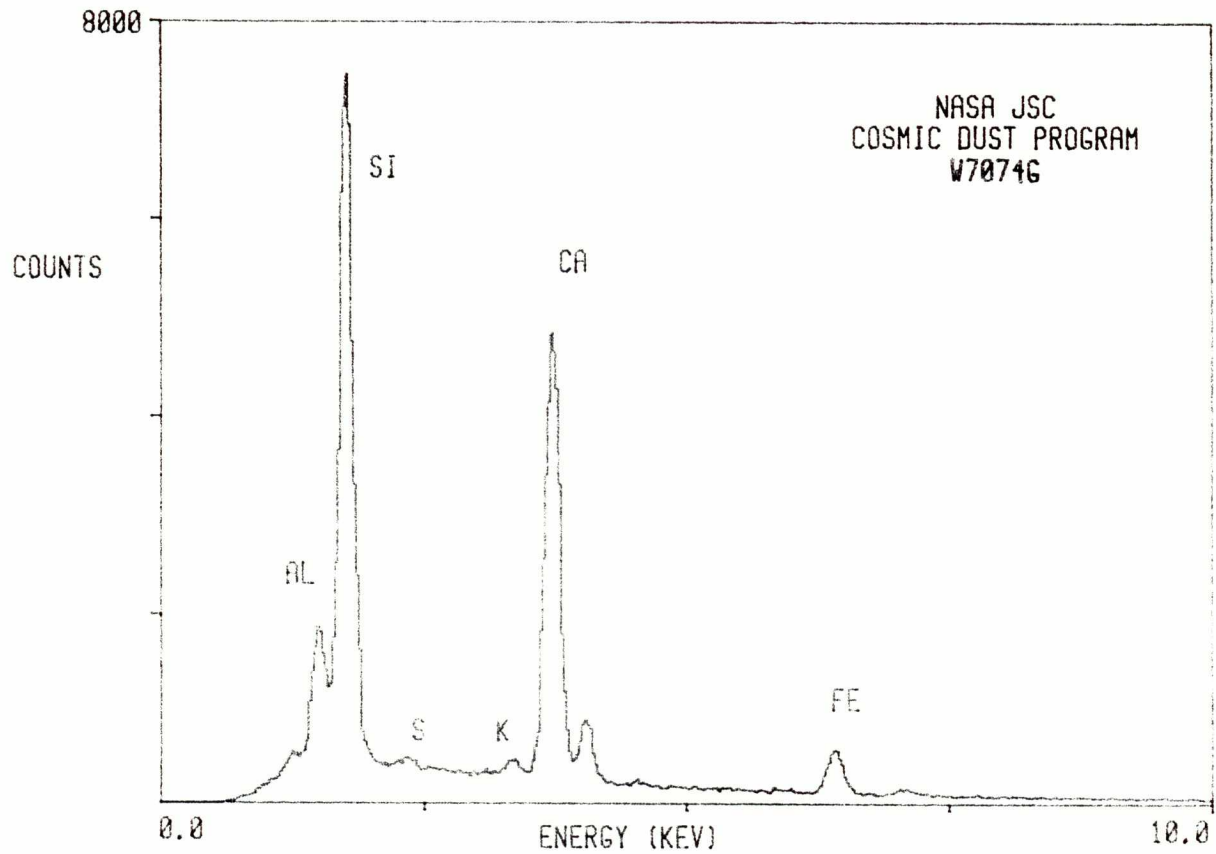


SIZE: 17
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA

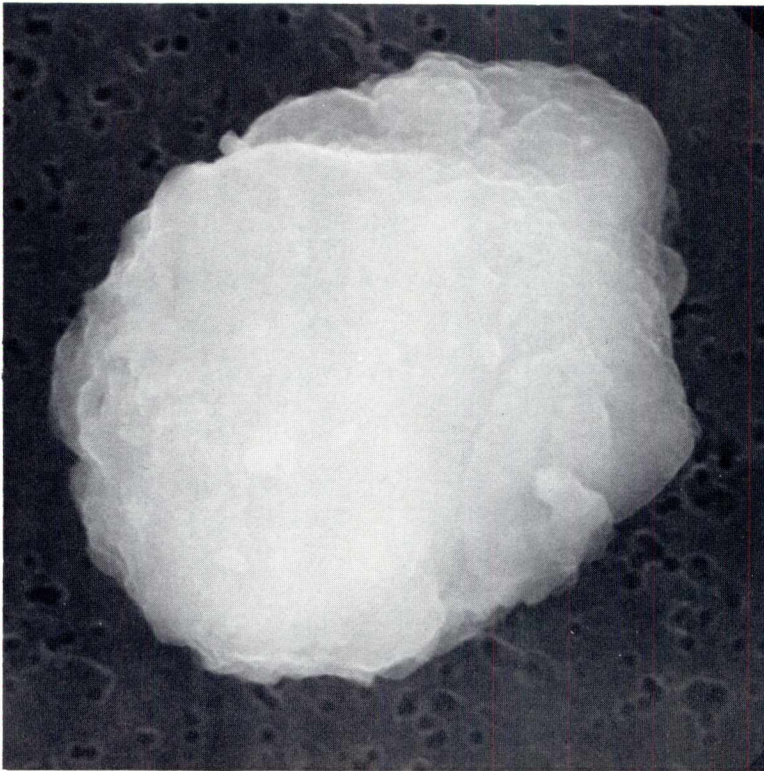
COMMENTS:
Related to W7074G1

S-88-53354

W762



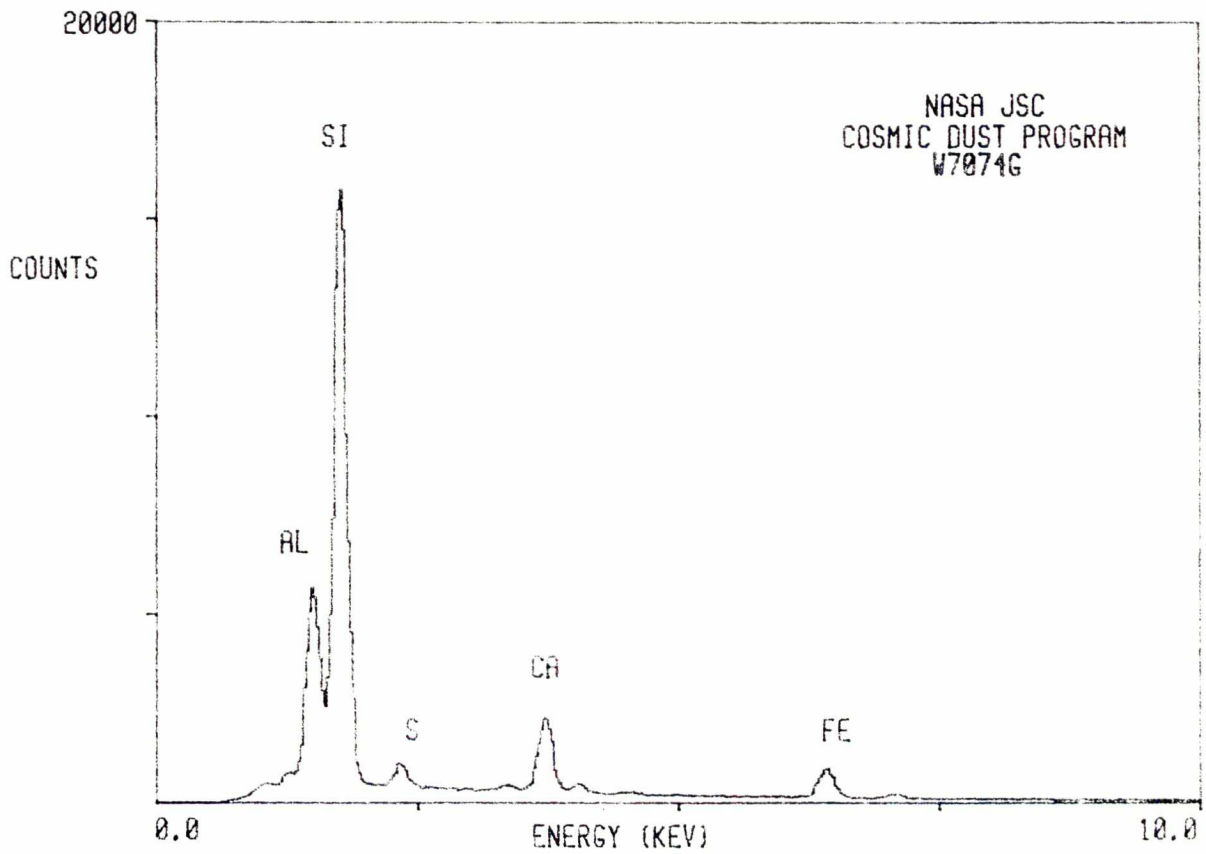
W7074 G 5



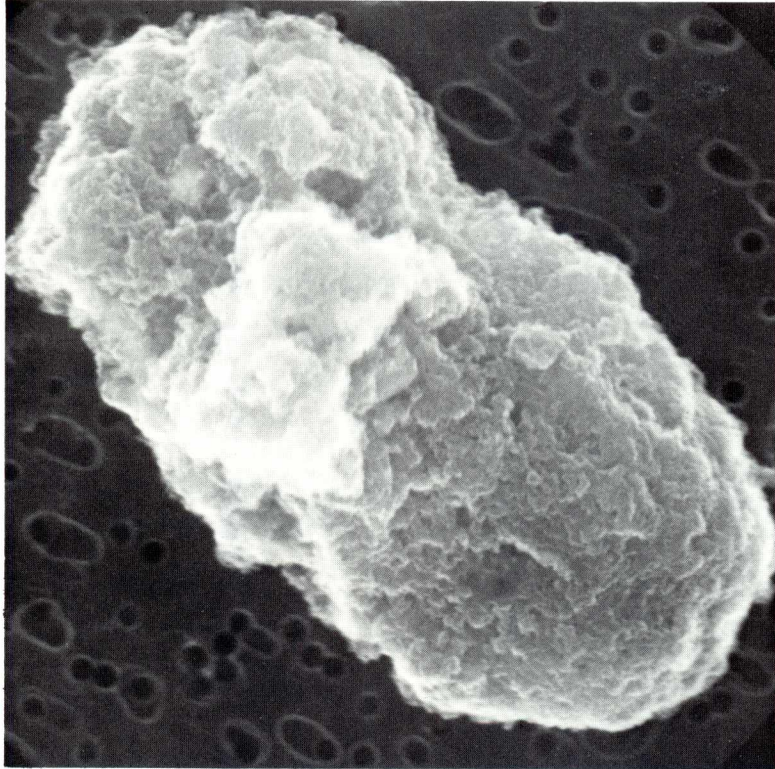
SIZE: 15
SHAPE: S?
TRANS.: TL
COLOR: Yellow
LUSTER: SV
TYPE: TCA
COMMENTS:

S-88-53357

W765



W7074 G 8



SIZE: 12x6

SHAPE: I

TRANS.: O

COLOR: Black

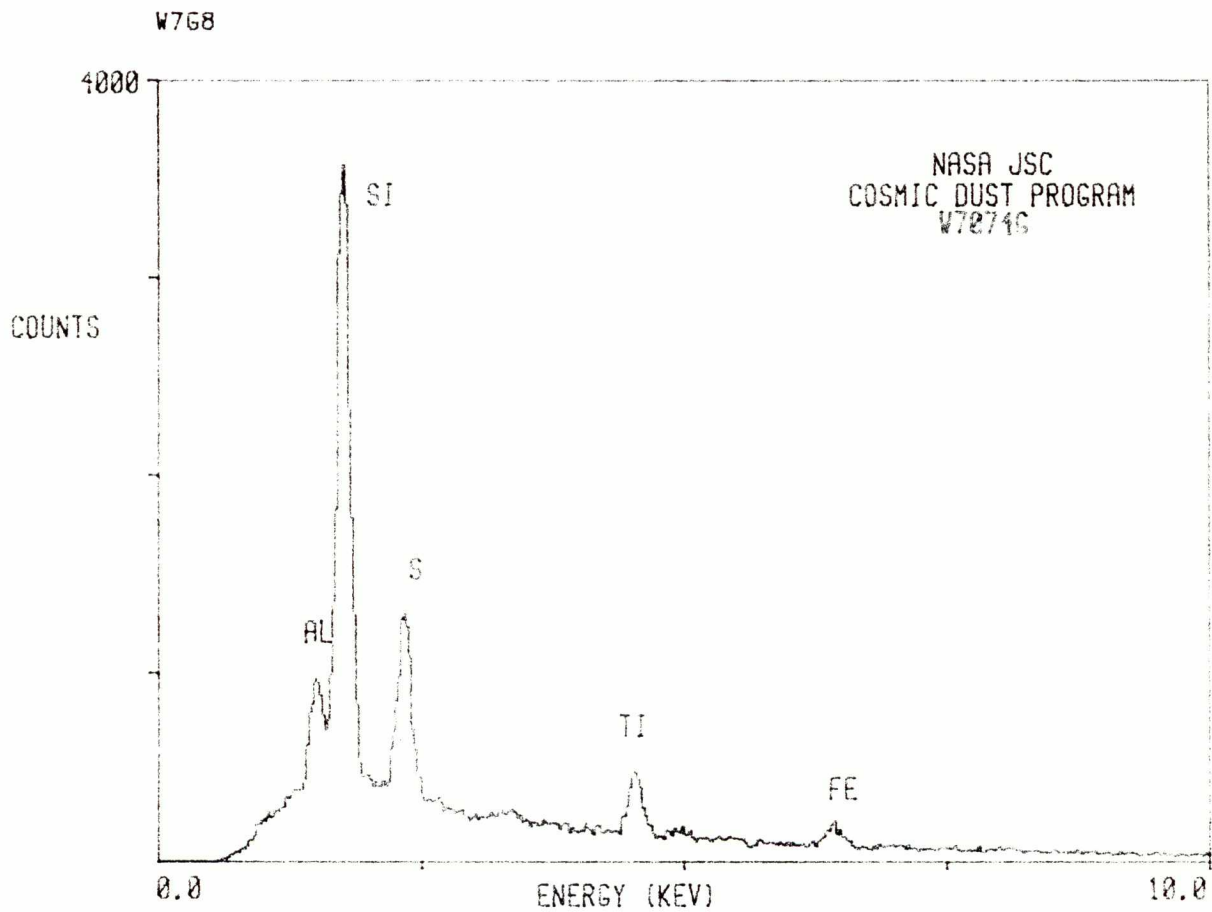
LUSTER: D

TYPE: TCA

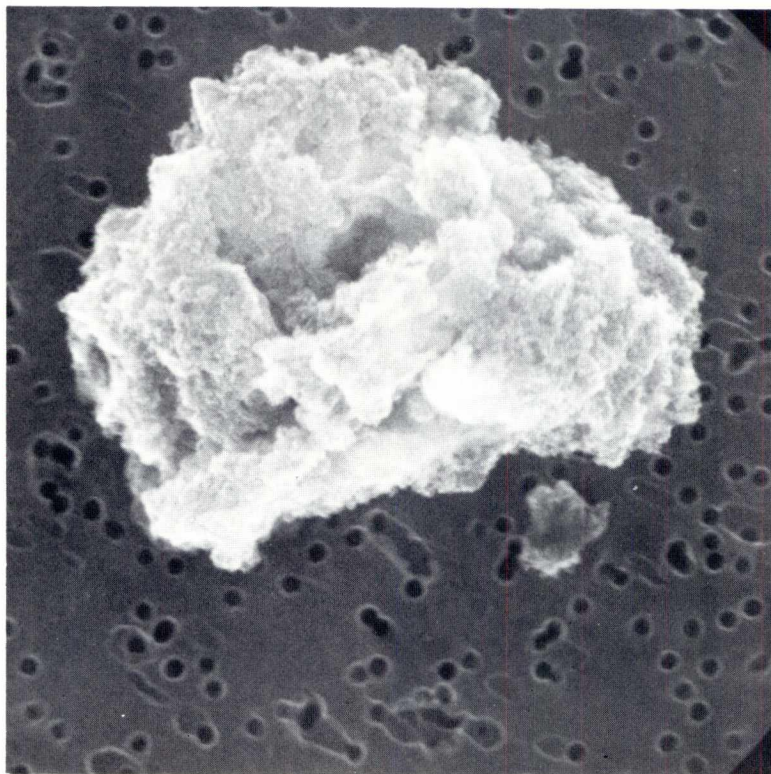
COMMENTS:

Related to W7074G9

S-88-53360



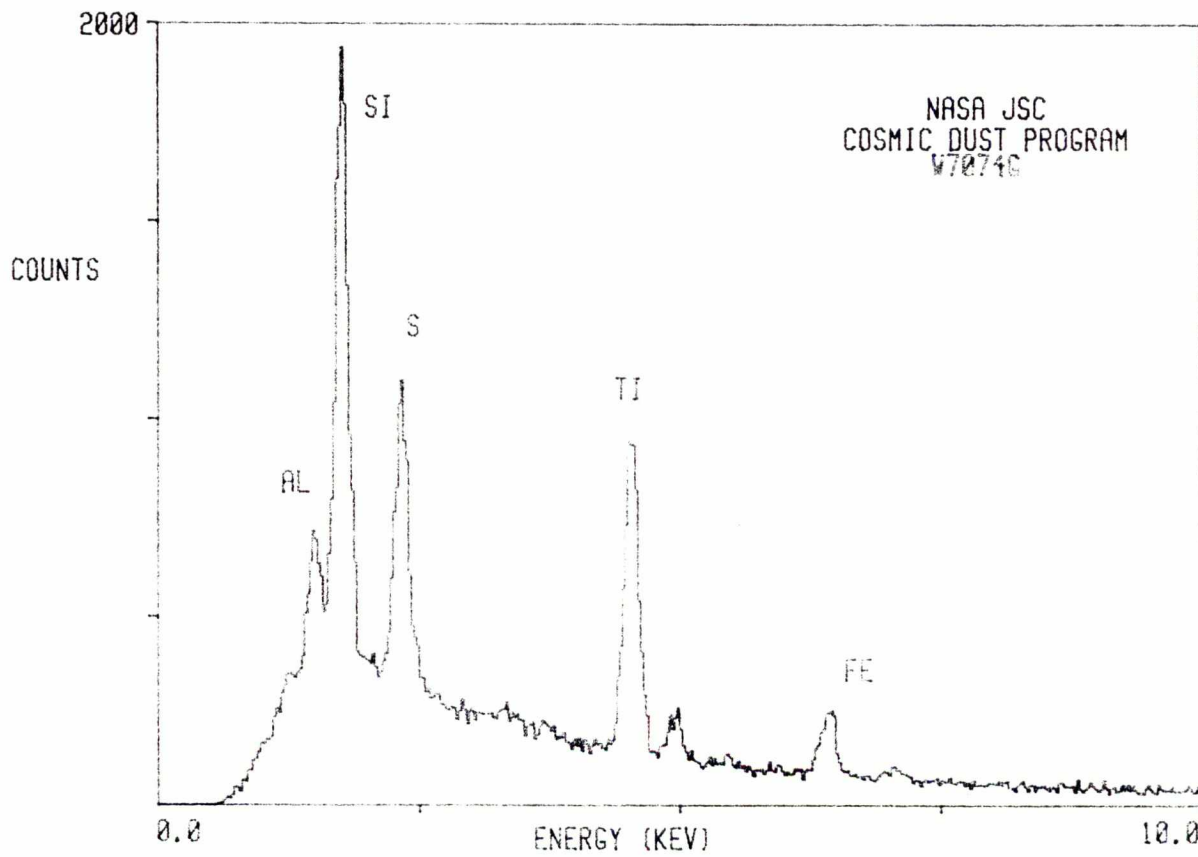
W7074 G 9



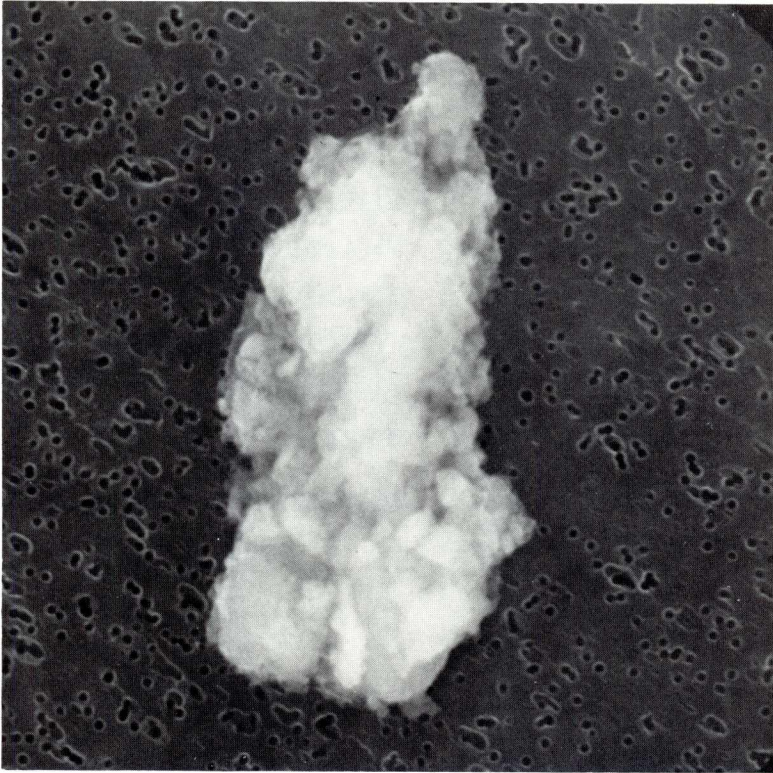
SIZE: 10
SHAPE: I
TRANS.: O
COLOR: Black
LUSTER: D
TYPE: TCA
COMMENTS:
Related to W7074G8

S-88-53361

W769



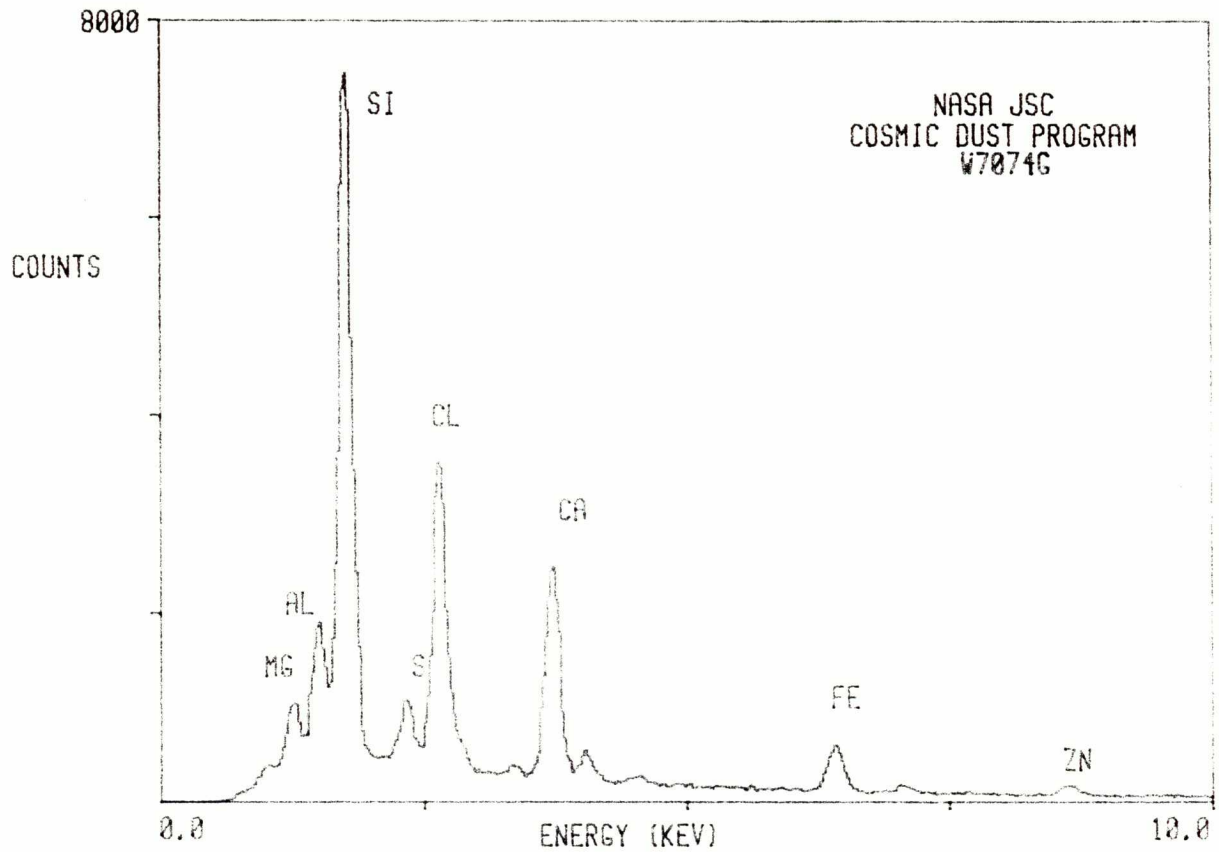
W7074 G 12



SIZE: 25x10
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCA
COMMENTS:

S-88-53363

W7612



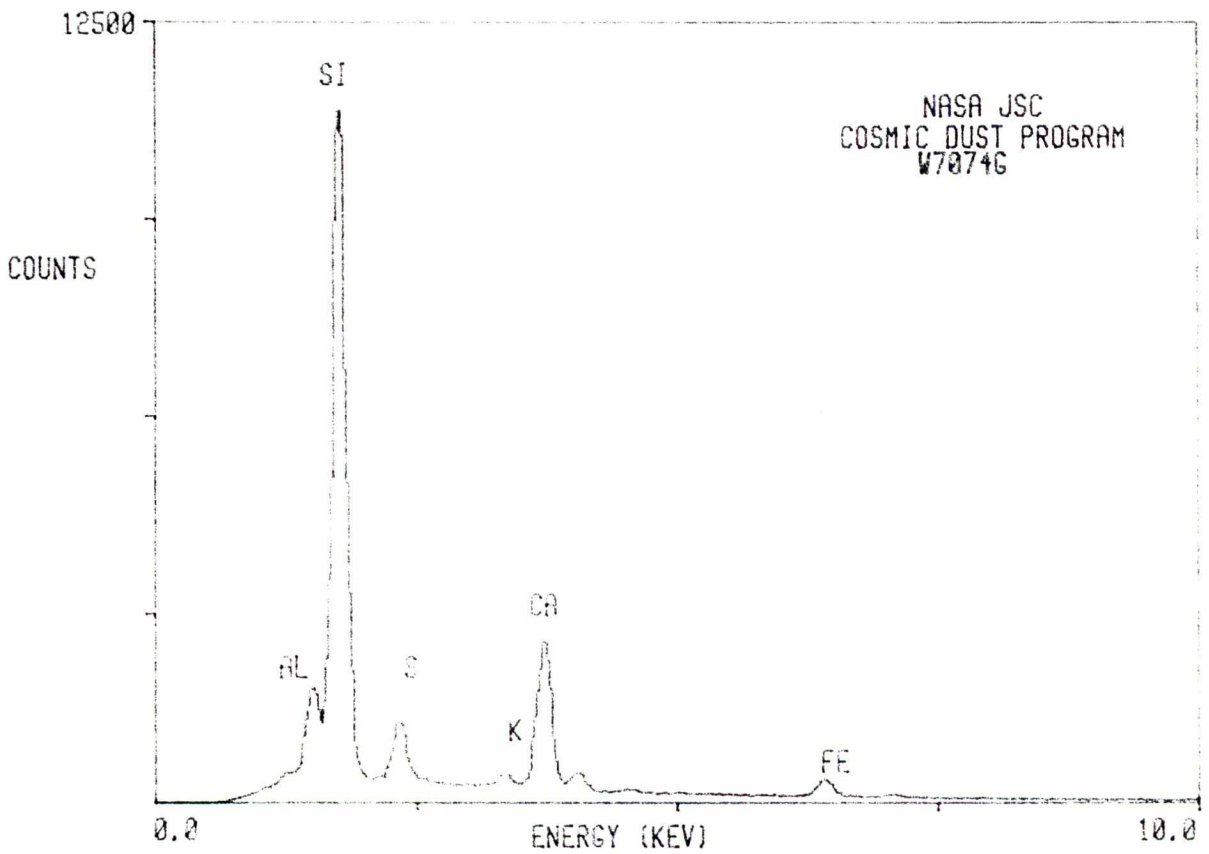
W7074 G 13



SIZE: 16x12
SHAPE: I
TRANS.: TL
COLOR: Orange to brown
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53364

W7613



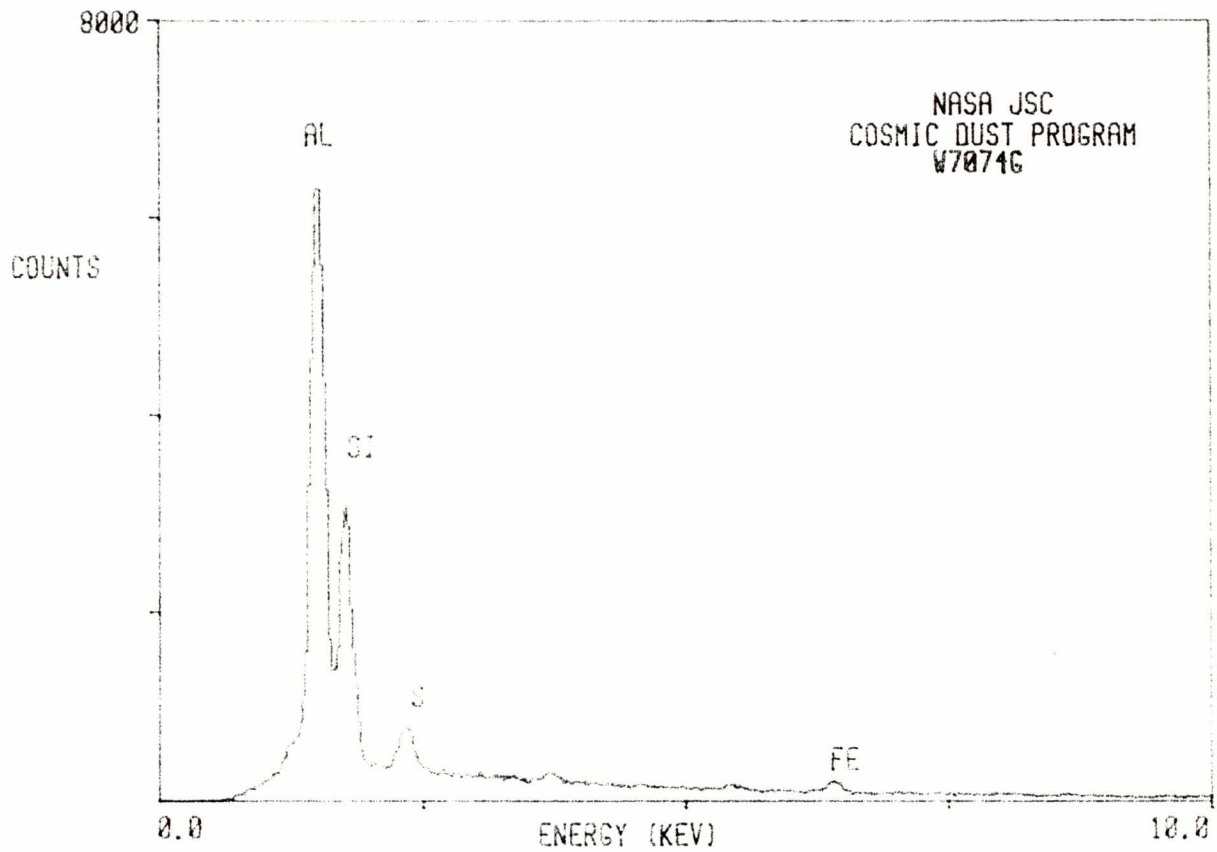
W7074 G 14



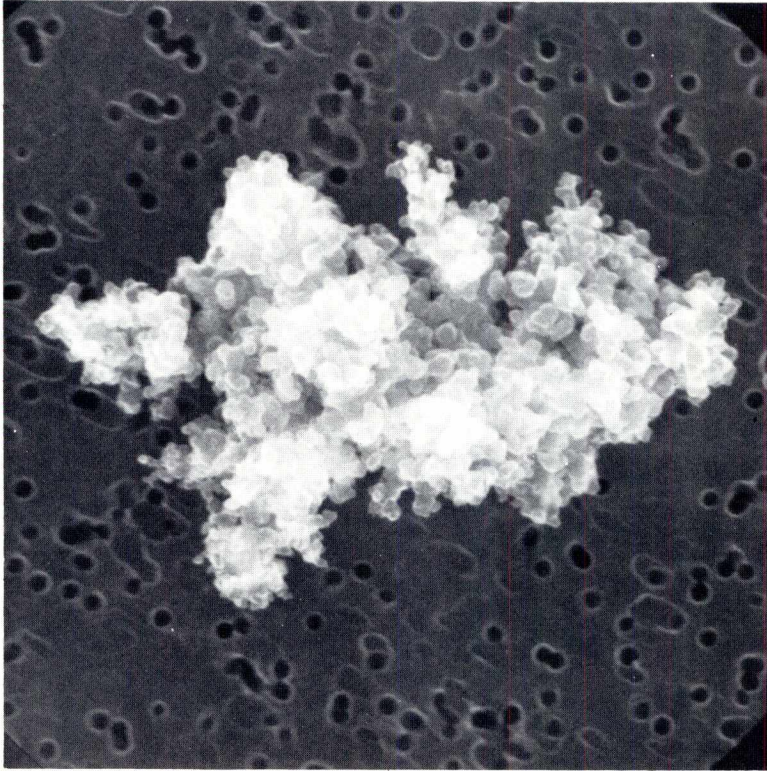
SIZE: 14x11
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCA
COMMENTS:

S-88-53365

W7614



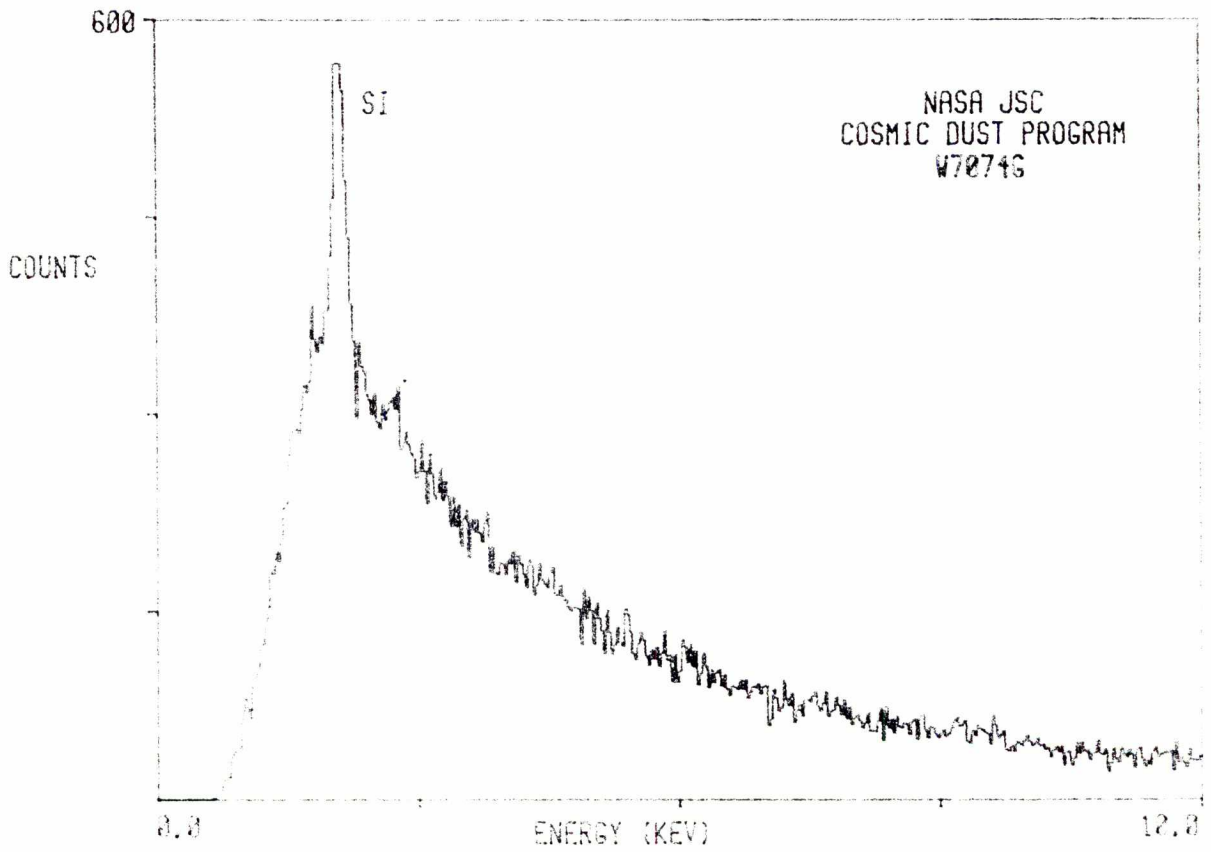
W7074 G 15



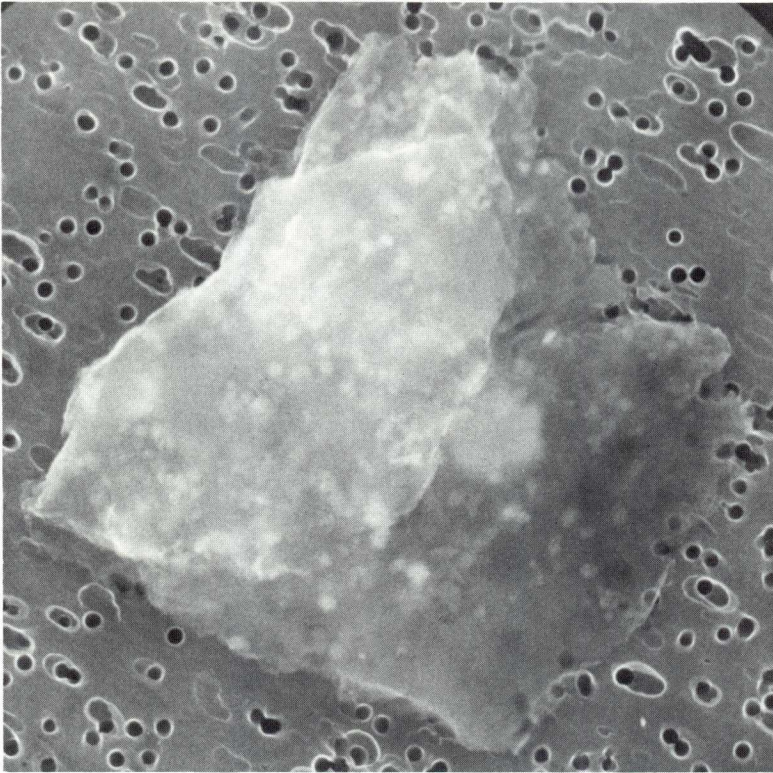
SIZE: 11x9
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCA
COMMENTS:

S-88-53366

W7G15



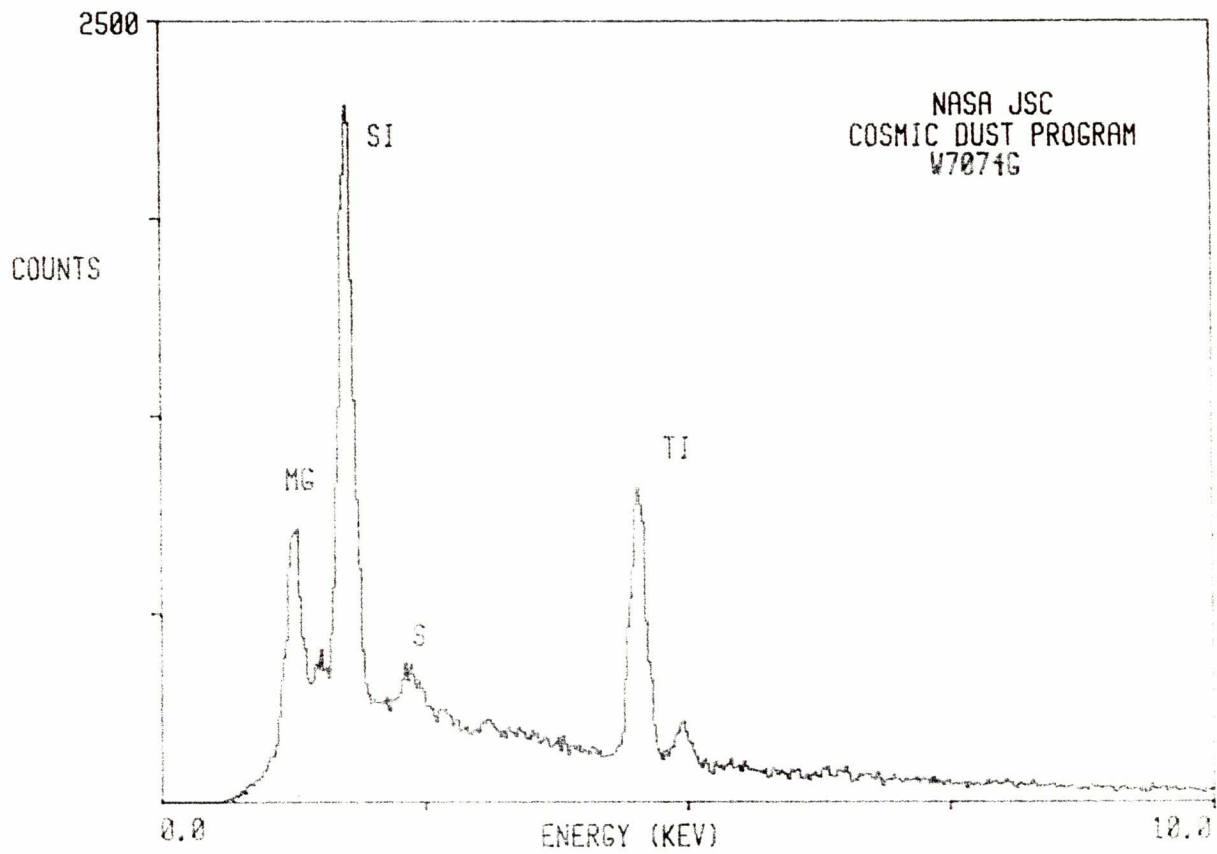
W7074 G 16



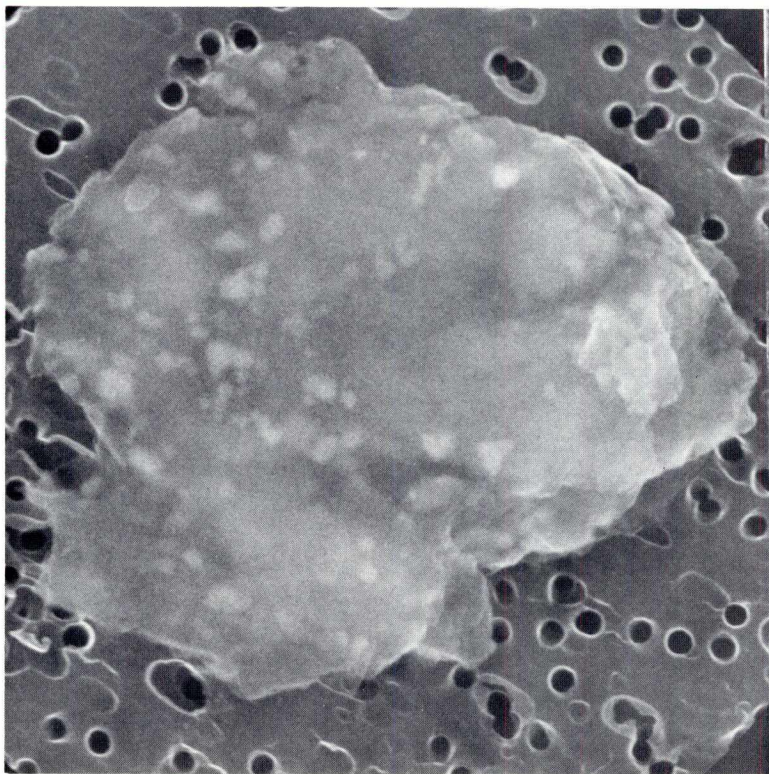
SIZE: 11x9
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53367

W7616



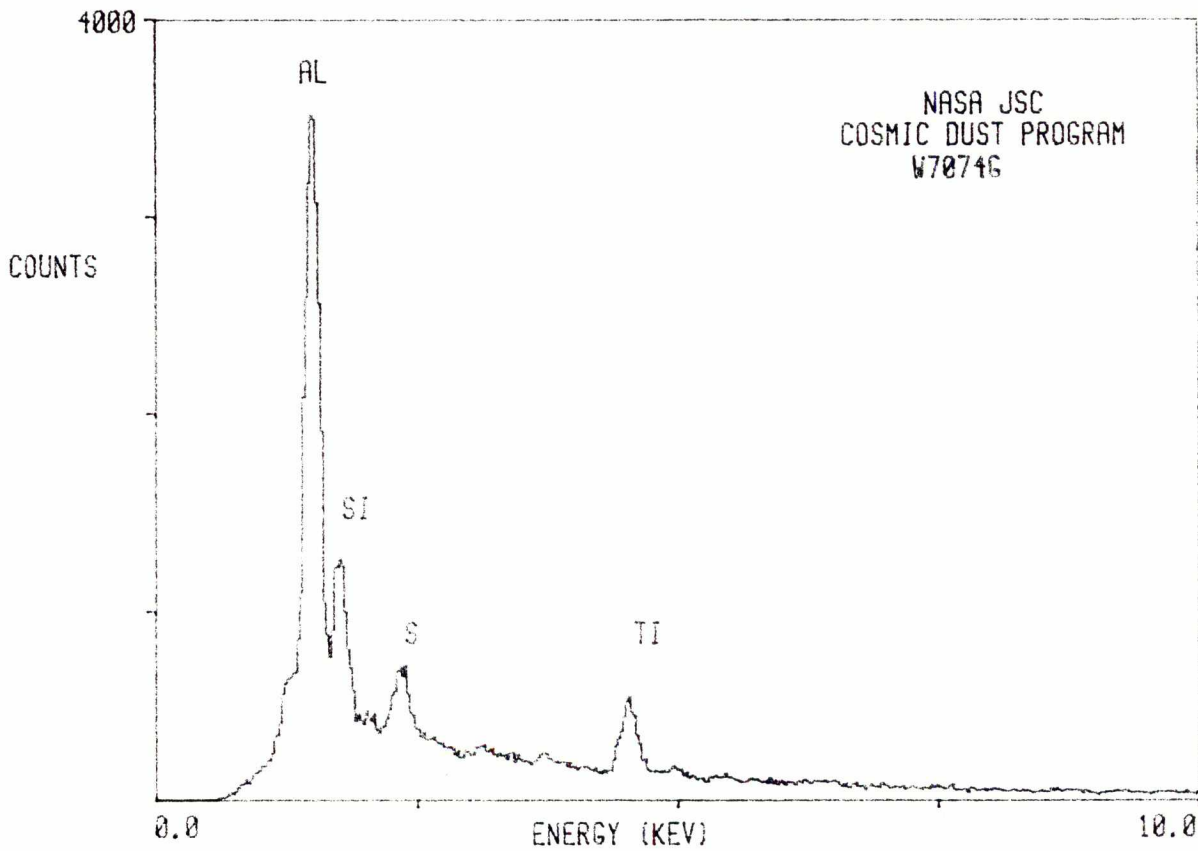
W7074 G 17



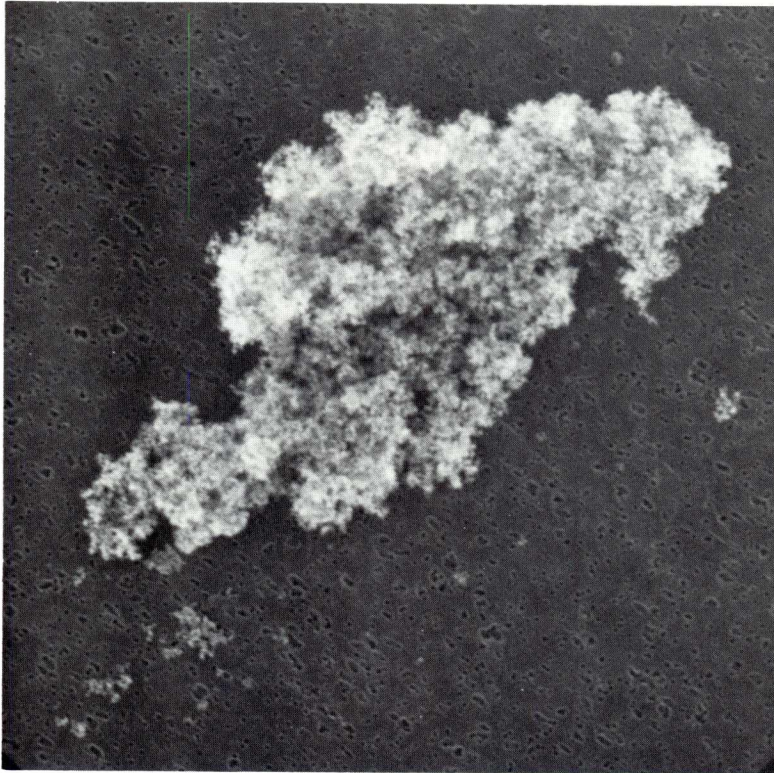
SIZE: 9
SHAPE: I
TRANS.: O
COLOR: Yellow
LUSTER: SM/R
TYPE: TCA
COMMENTS:

S-88-53368

W7617



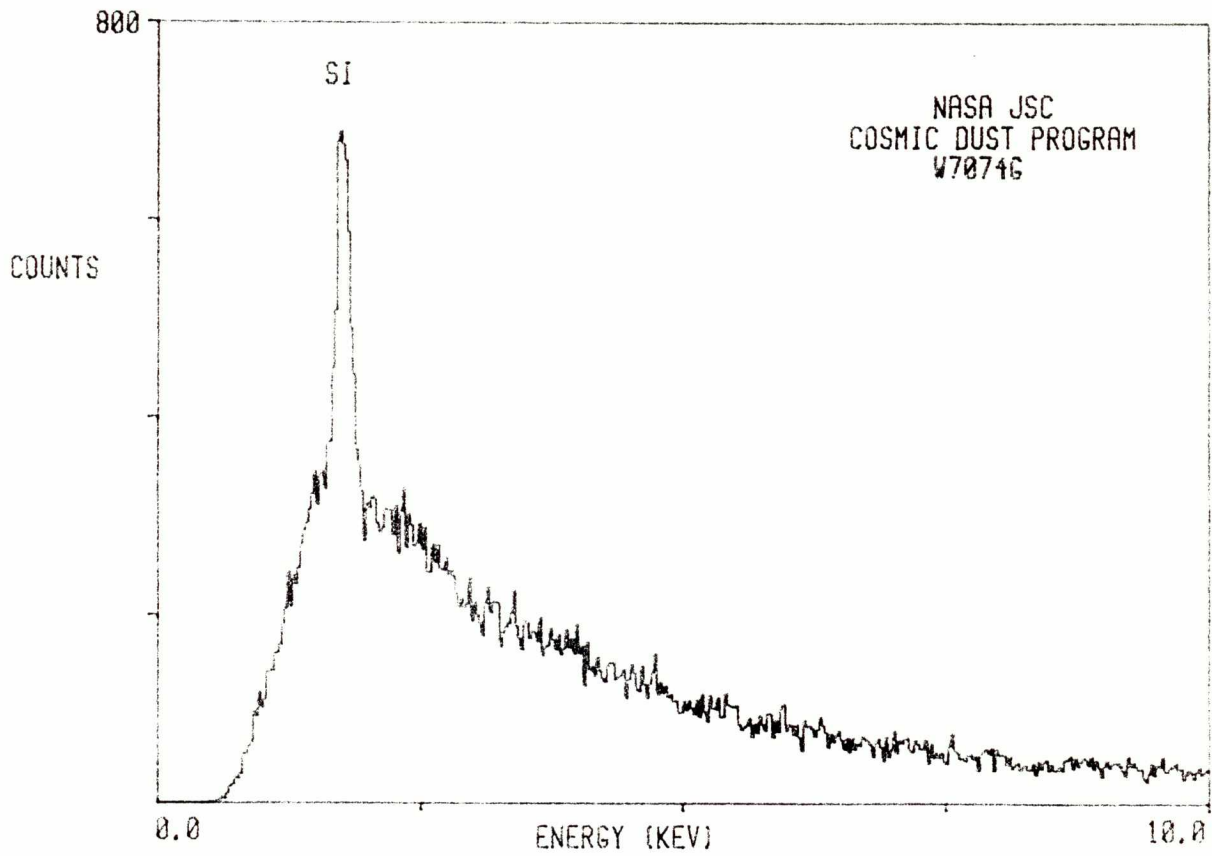
W7074 G 19



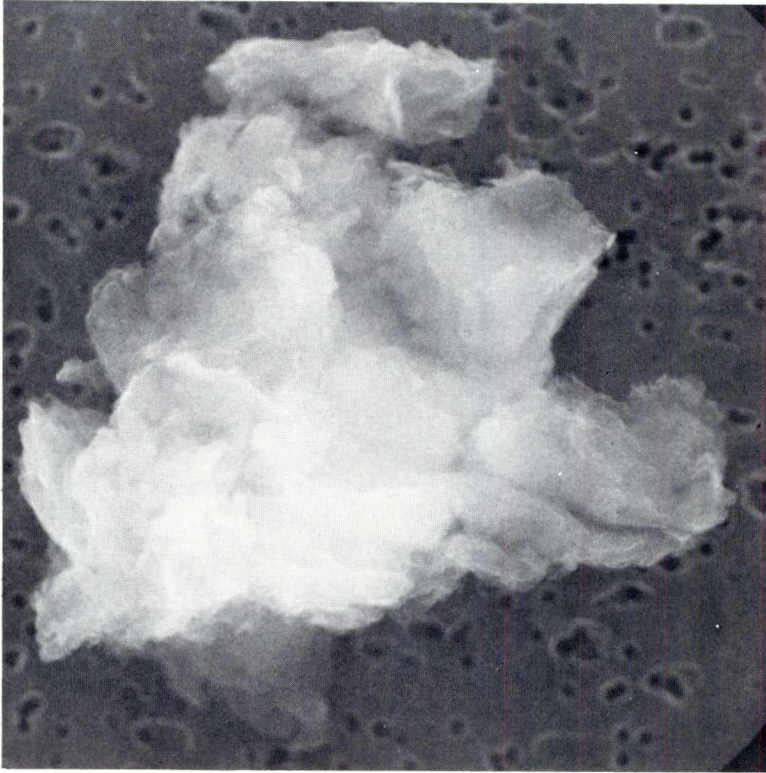
SIZE: 54x30
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCA
COMMENTS:

S-88-53369

W7619



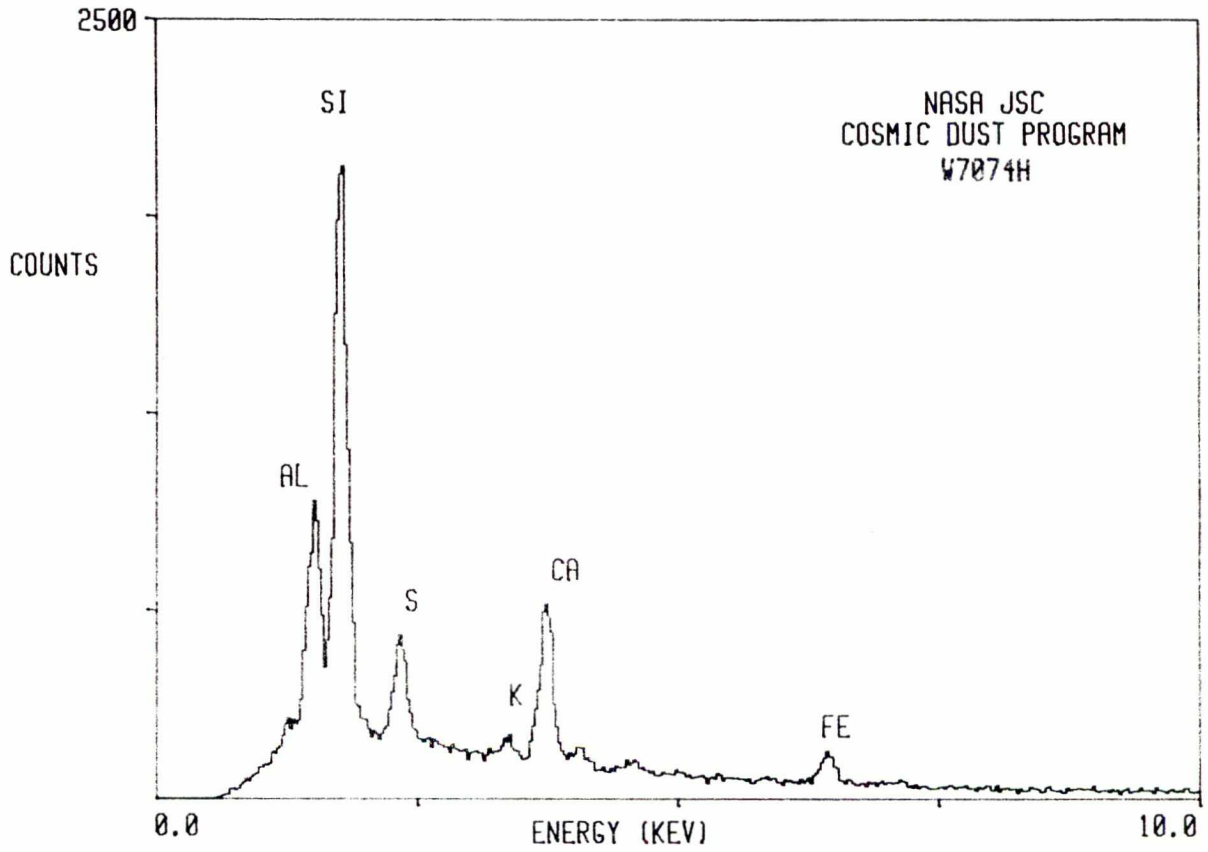
W7074 H 5



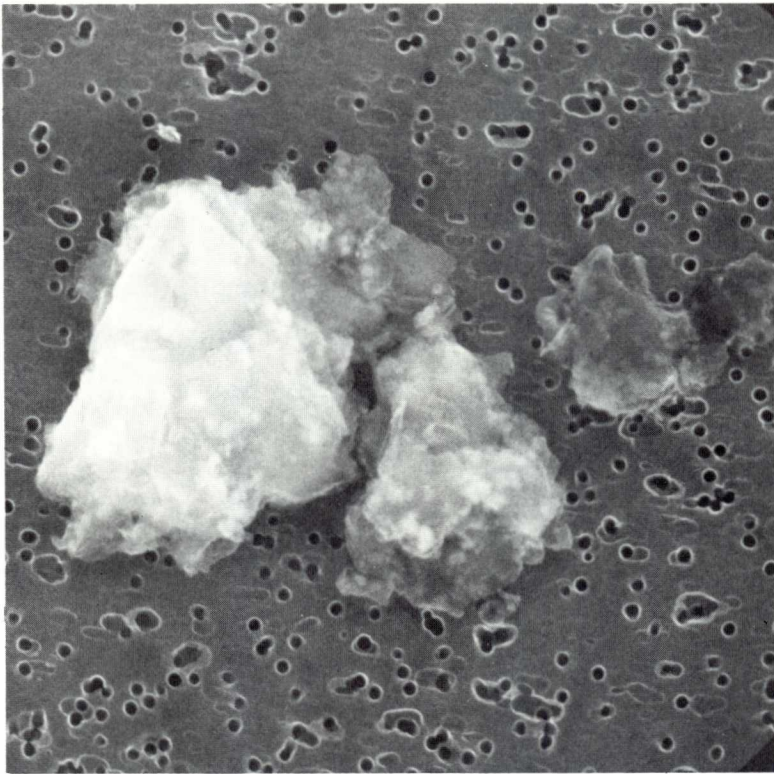
SIZE: 17
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53374

W7H5



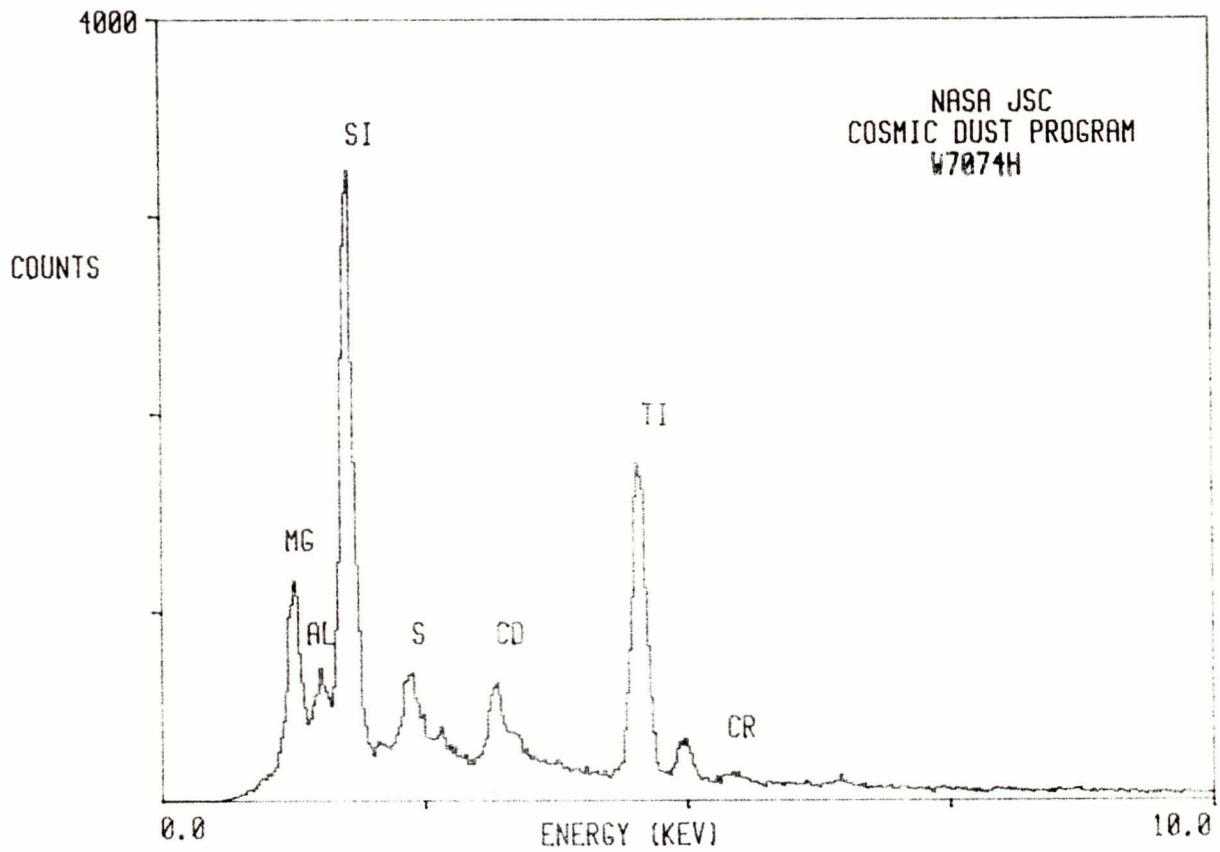
W7074 H 6



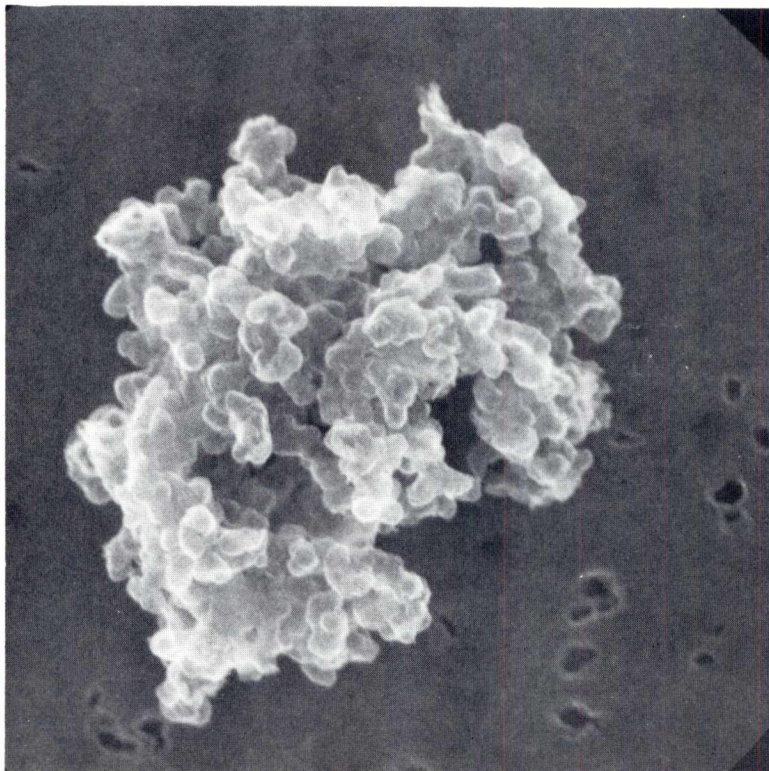
SIZE: 15x11
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53375

W7H6



W7074 H 8

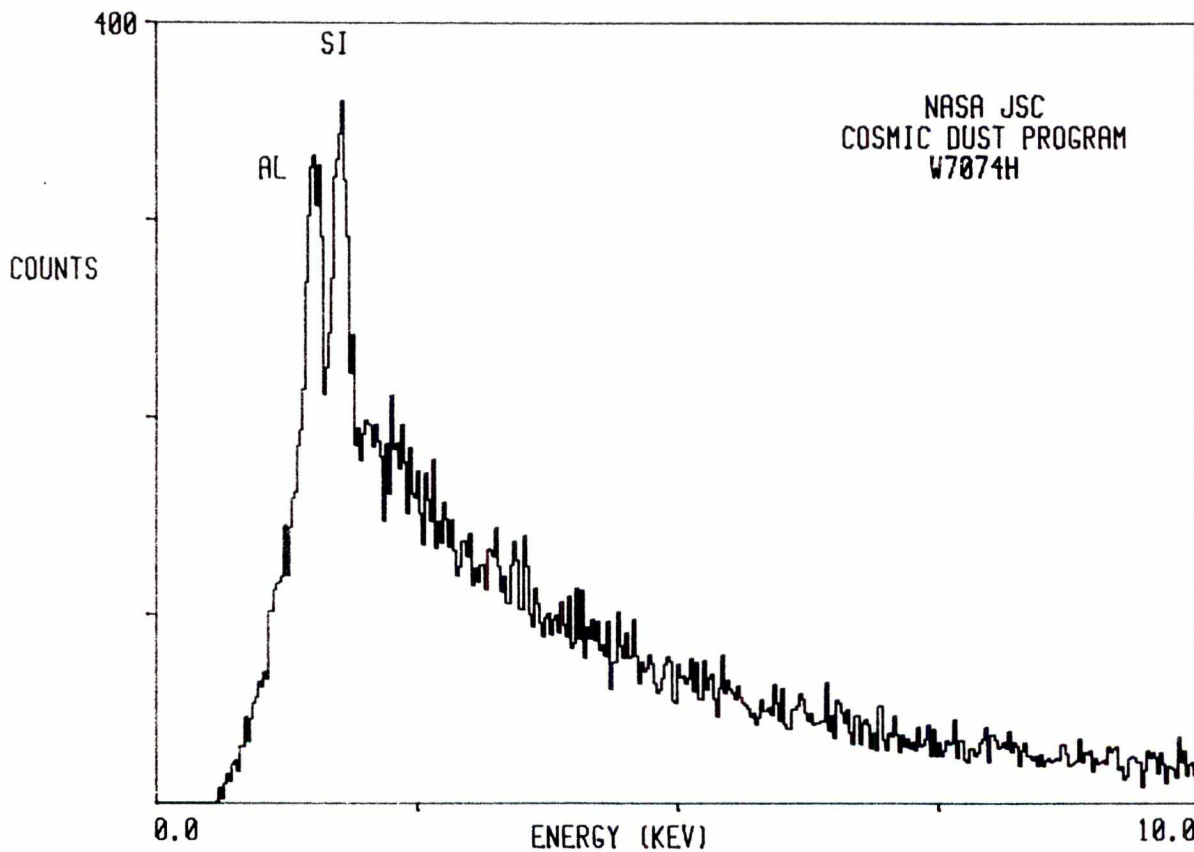


SIZE: 9x8
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCA

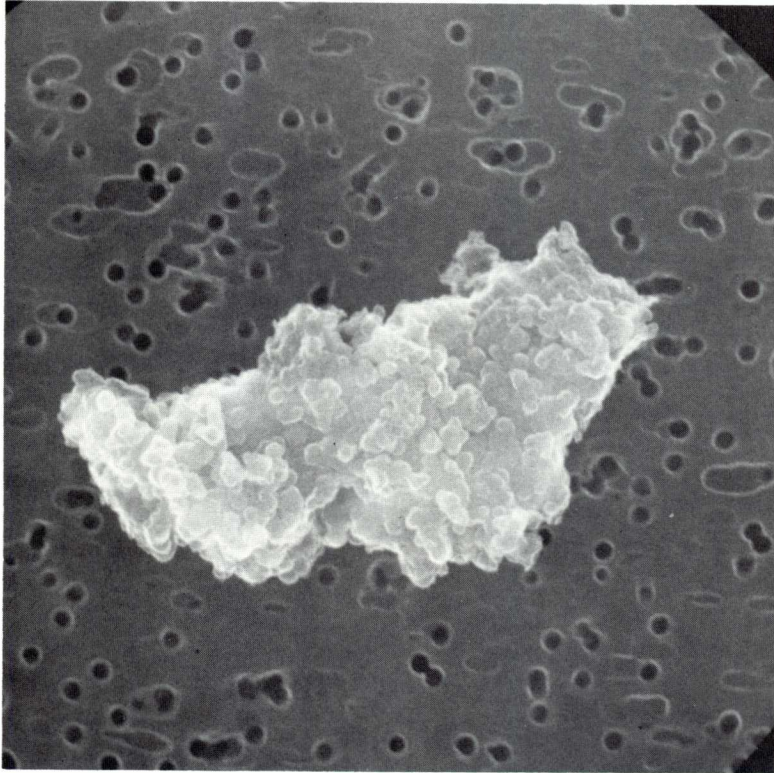
COMMENTS:
May be related to
W7074H9

S-88-53377

W7H8



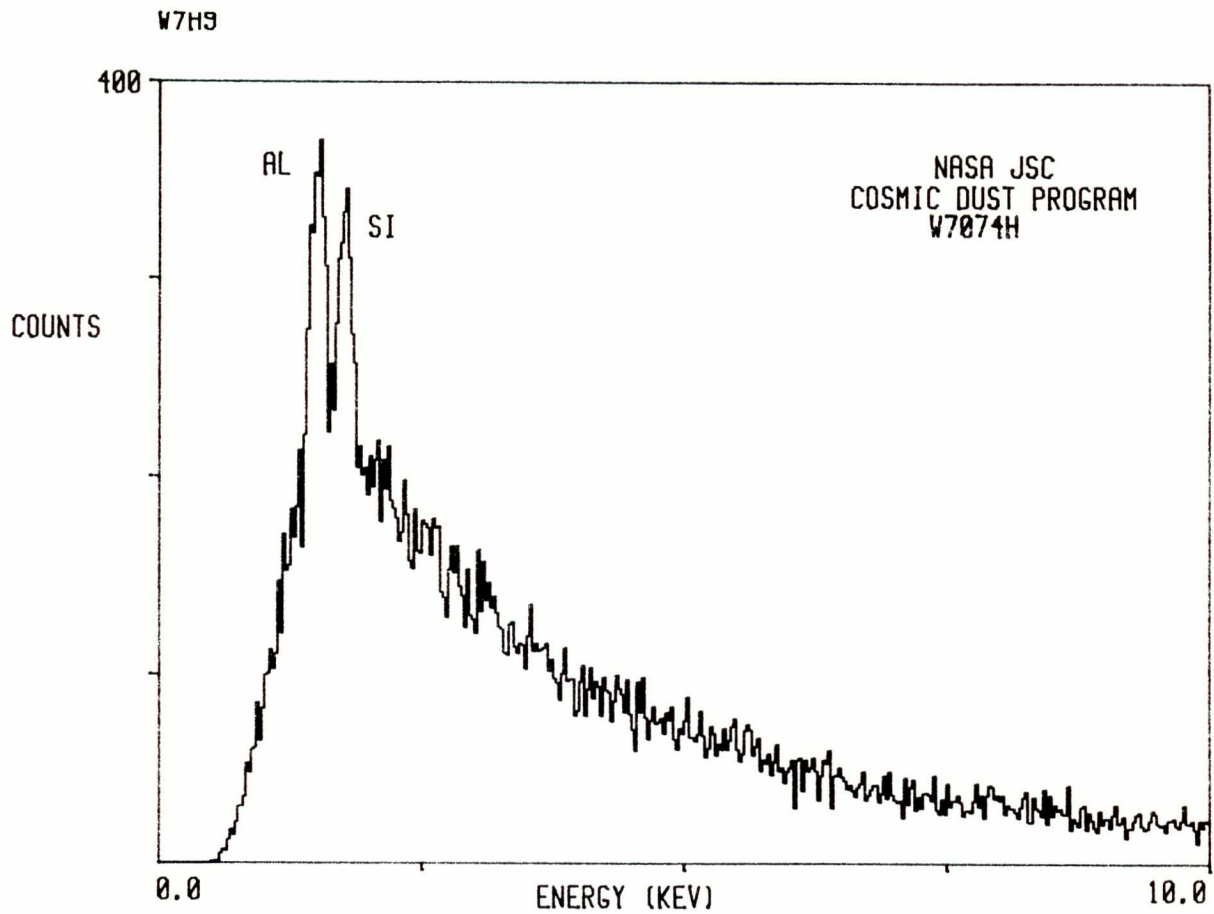
W7074 H 9



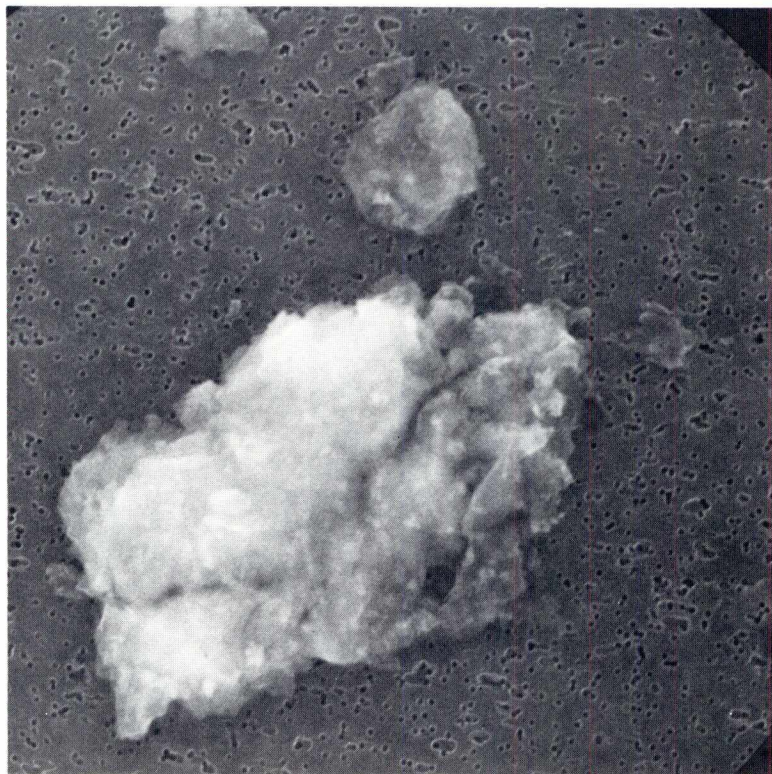
SIZE: 11x6
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCA

COMMENTS:
May be related to
W7074H8

S-88-53378



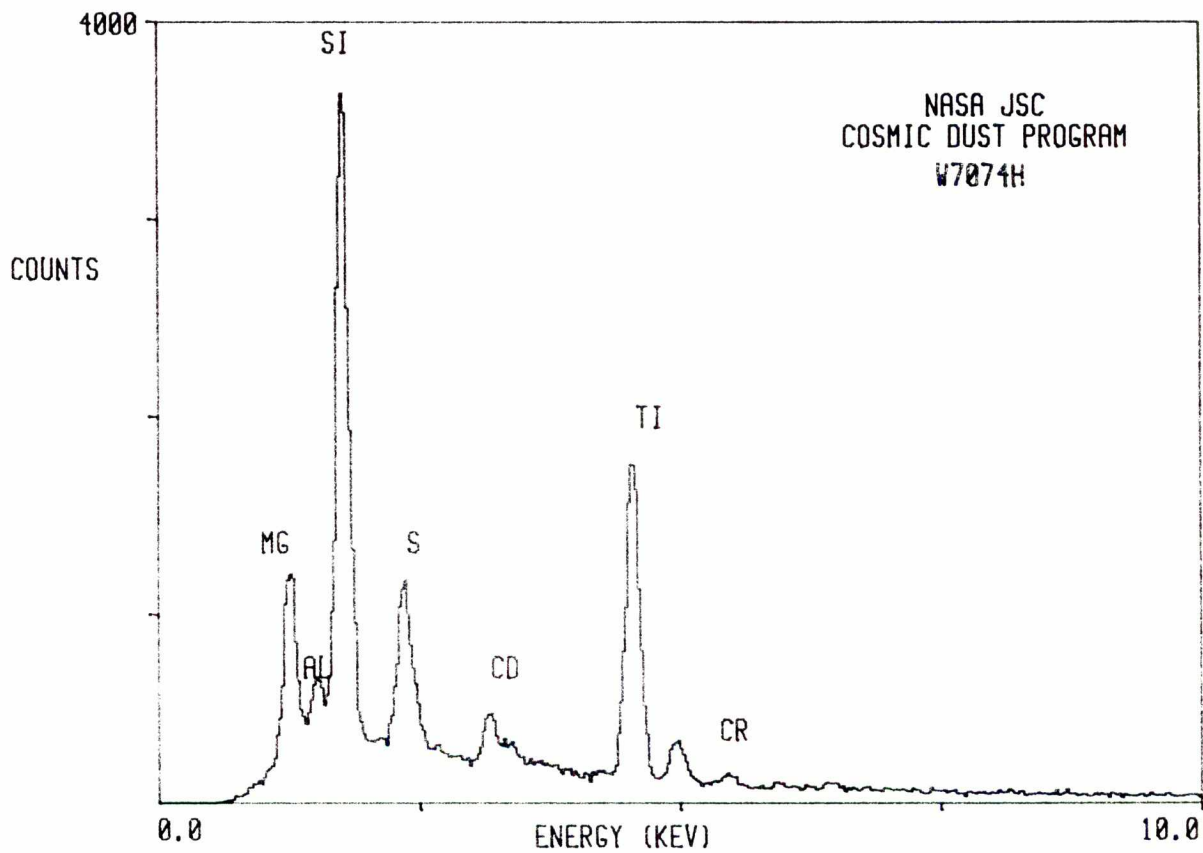
W7074 H 10



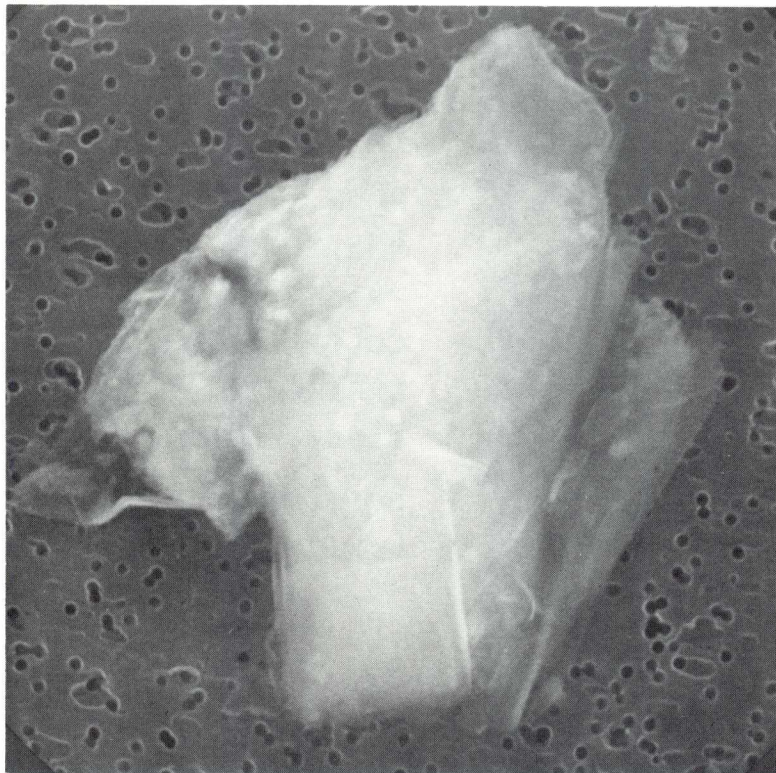
SIZE: 51x30
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53379

W7H10



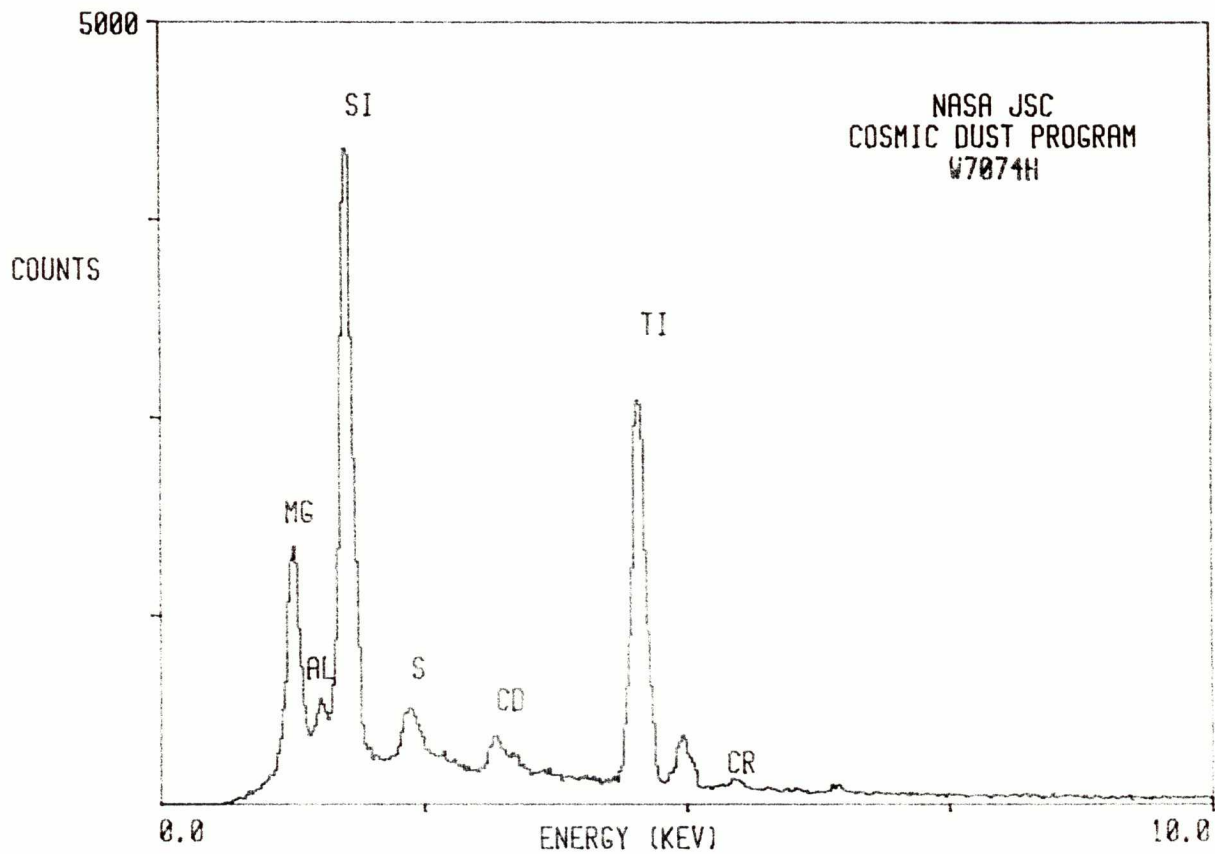
W7074 H 11



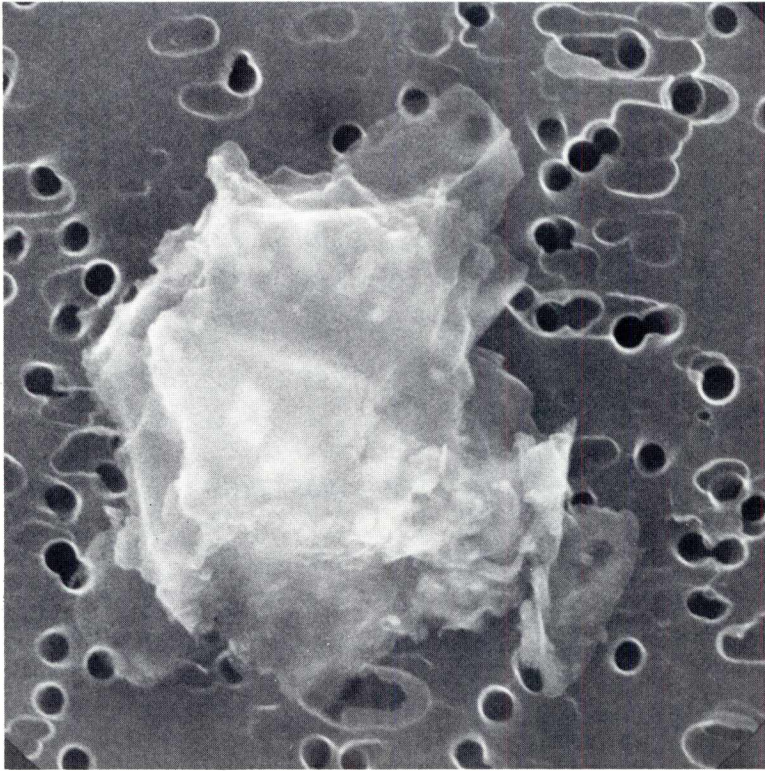
SIZE: 17x15
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53380

W7H11

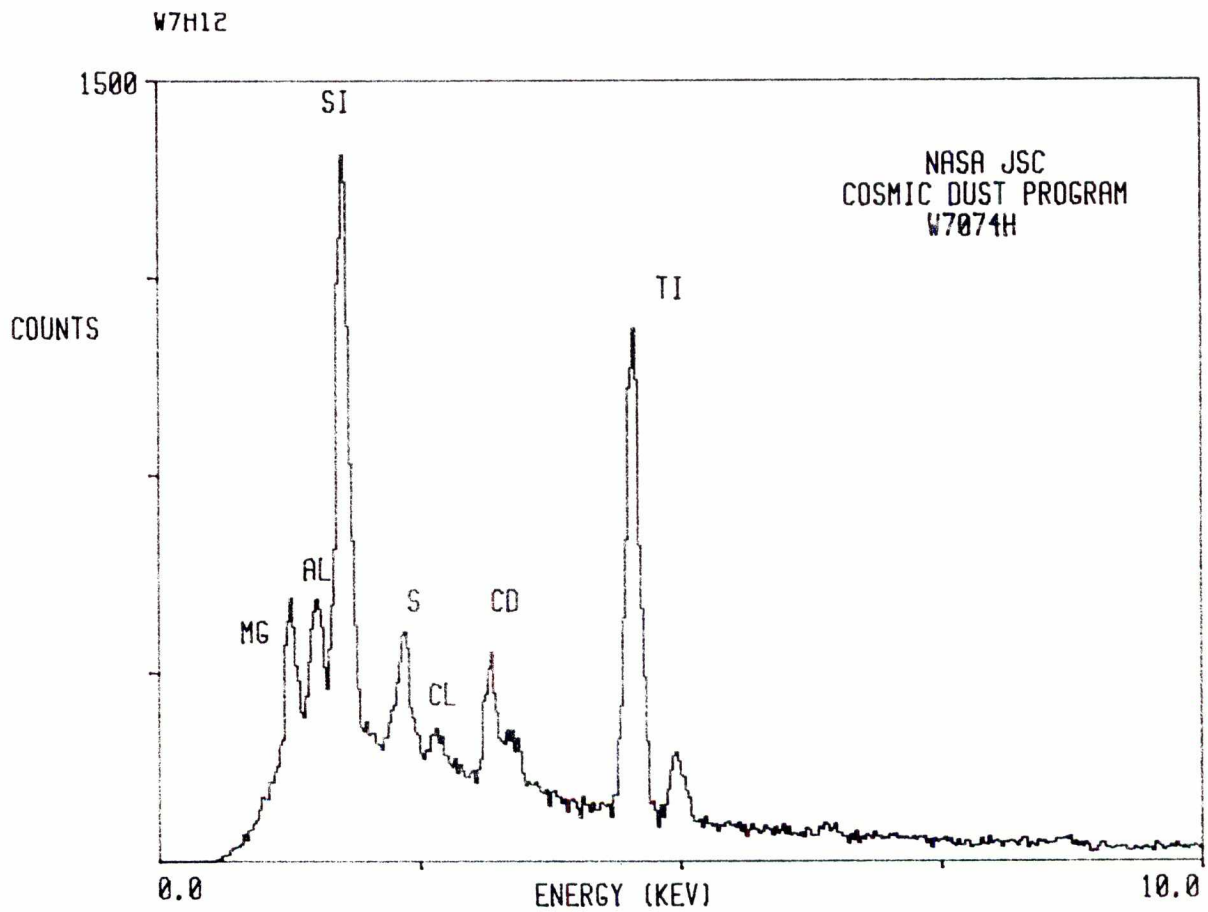


W7074 H 12

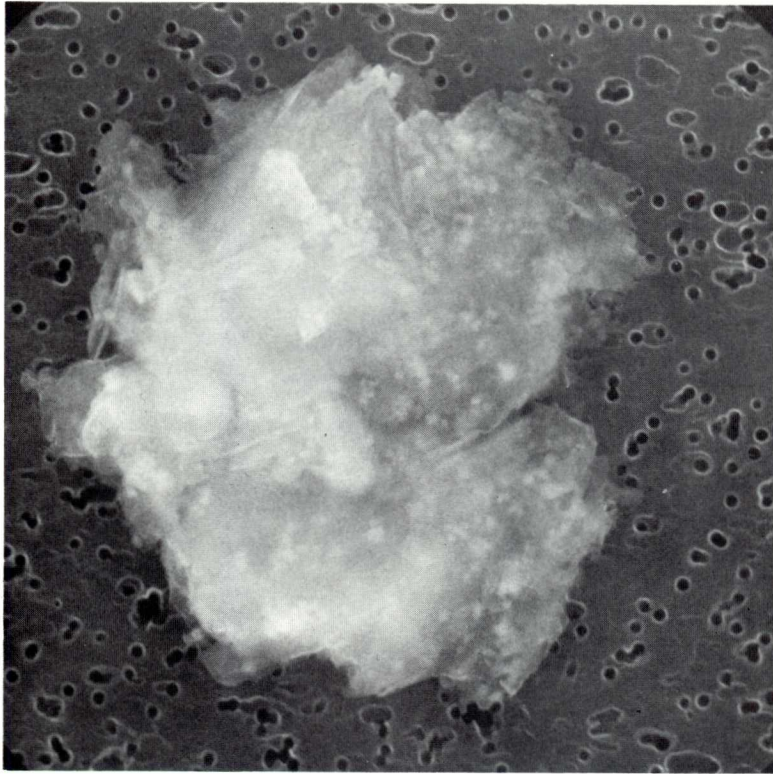


SIZE: 5
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53381



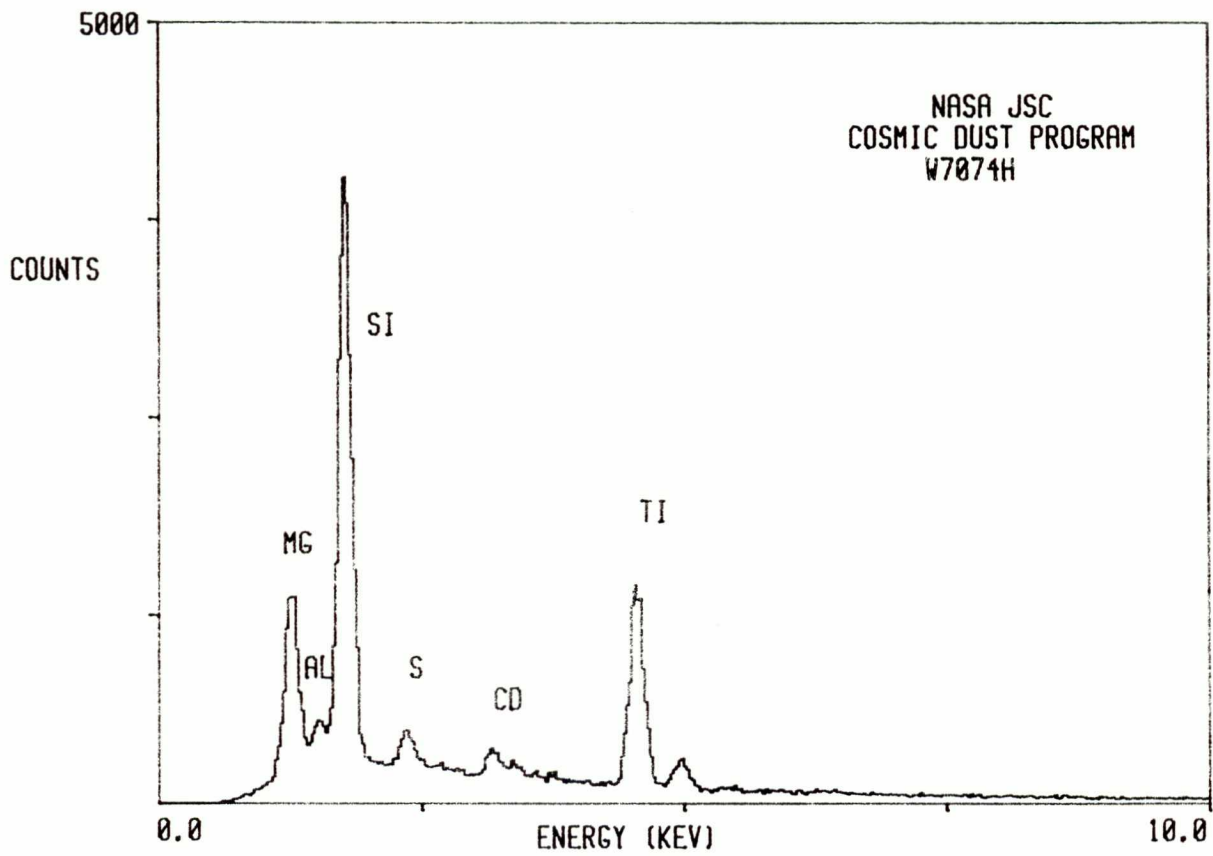
W7074 H 13



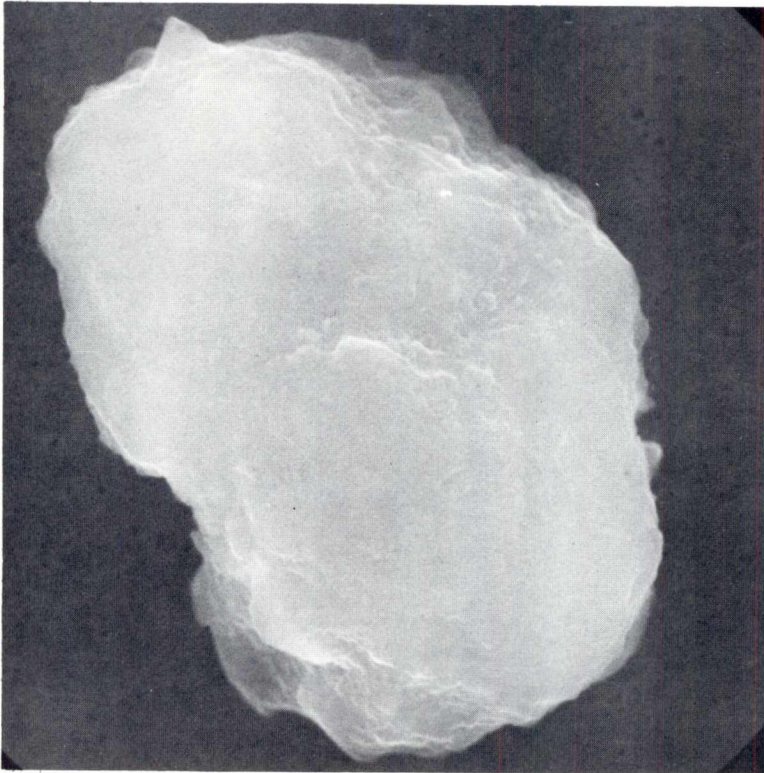
SIZE: 15
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA
COMMENTS:

S-88-53382

W7H13



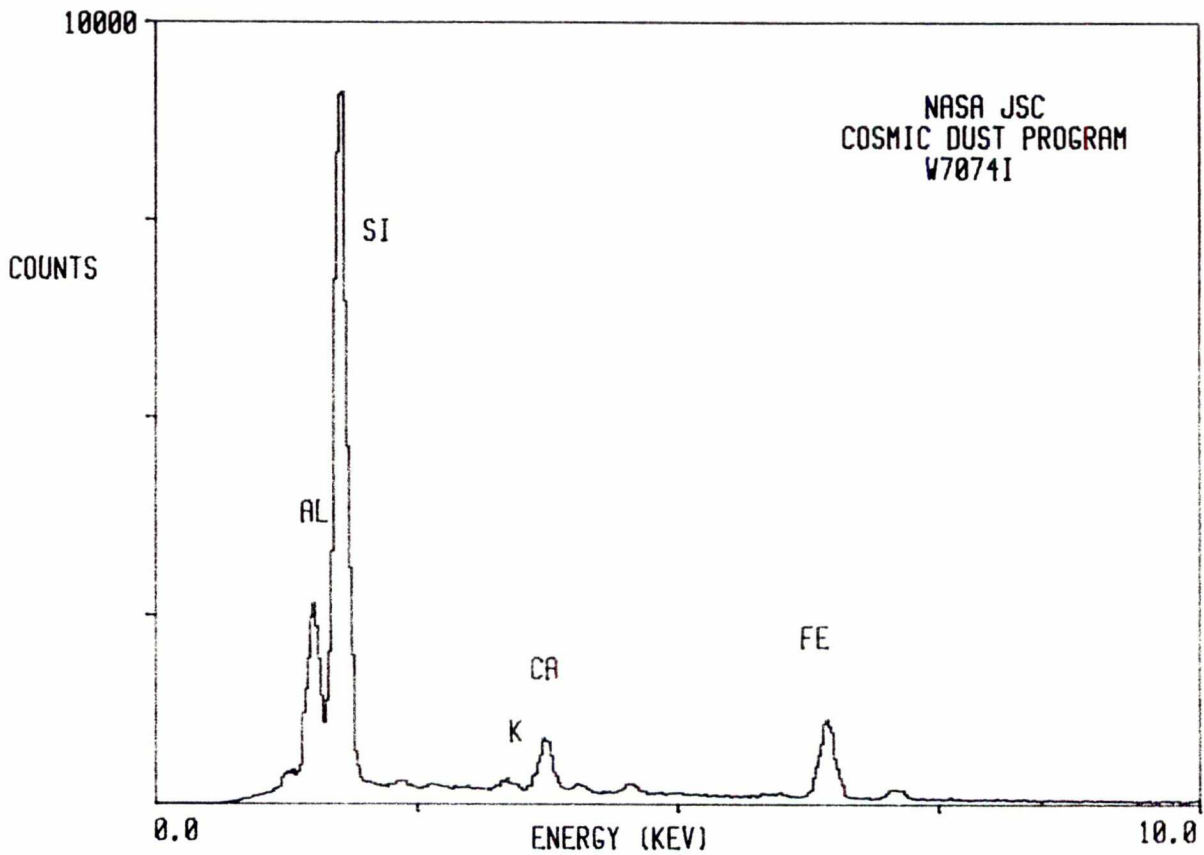
W7074 I 1



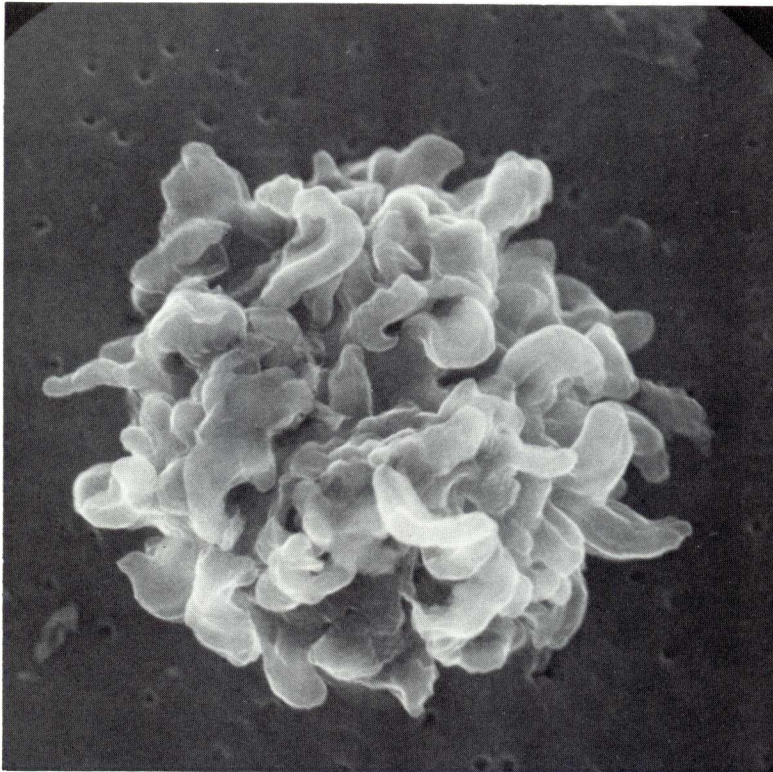
SIZE: 30x18
SHAPE: I
TRANS.: T/TL
COLOR: Orange
LUSTER: V/R
TYPE: TCA
COMMENTS:

S-88-53385

W711



W7074 I 3

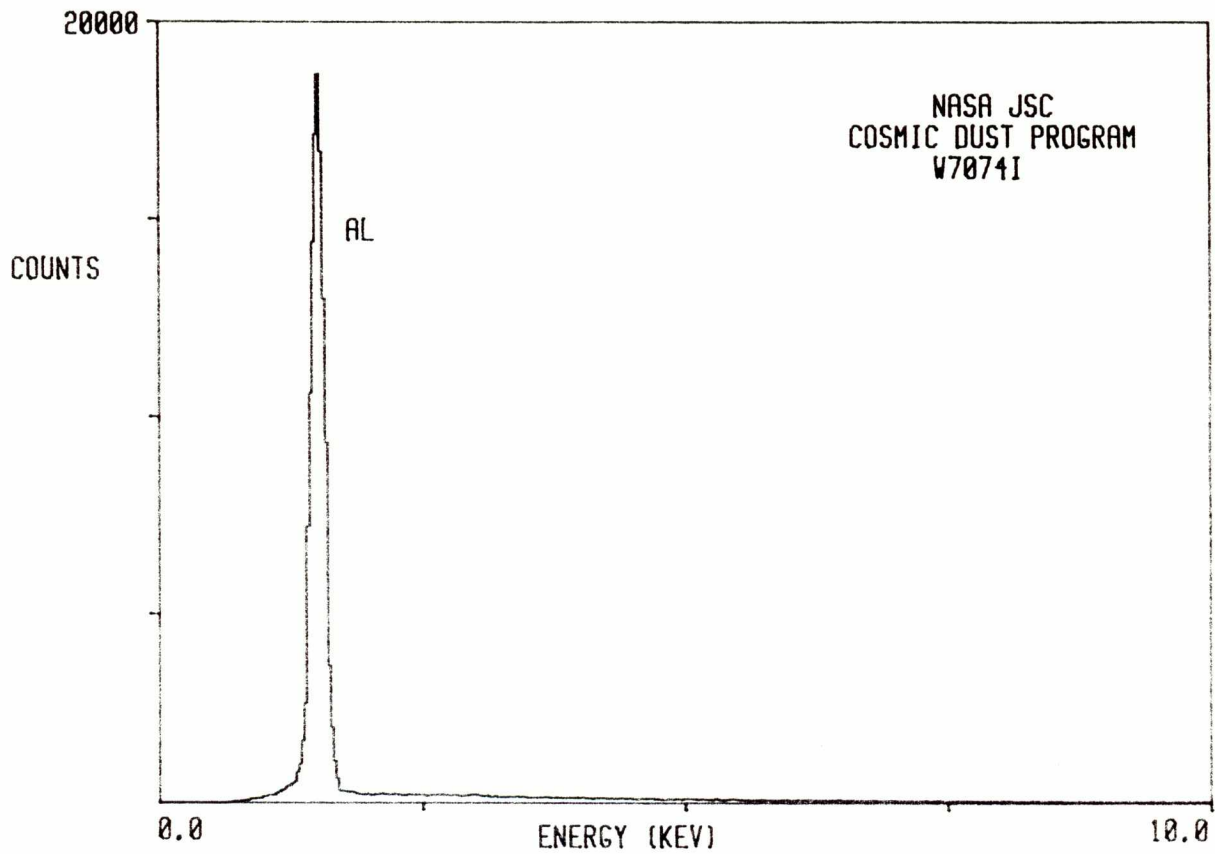


SIZE: 12x10
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCA

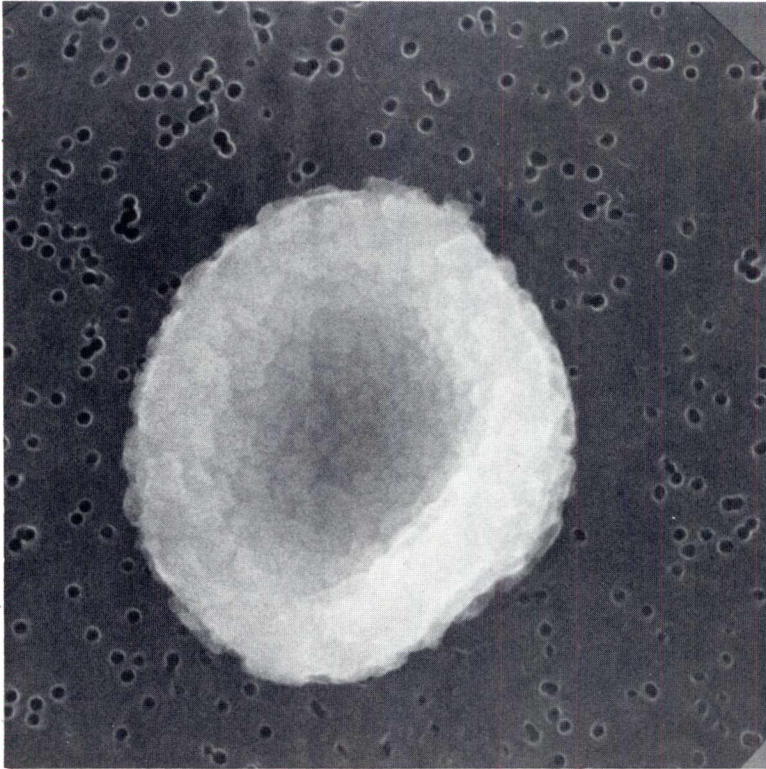
COMMENTS:
Largest particle
in a field of
particles

S-88-53387

W713



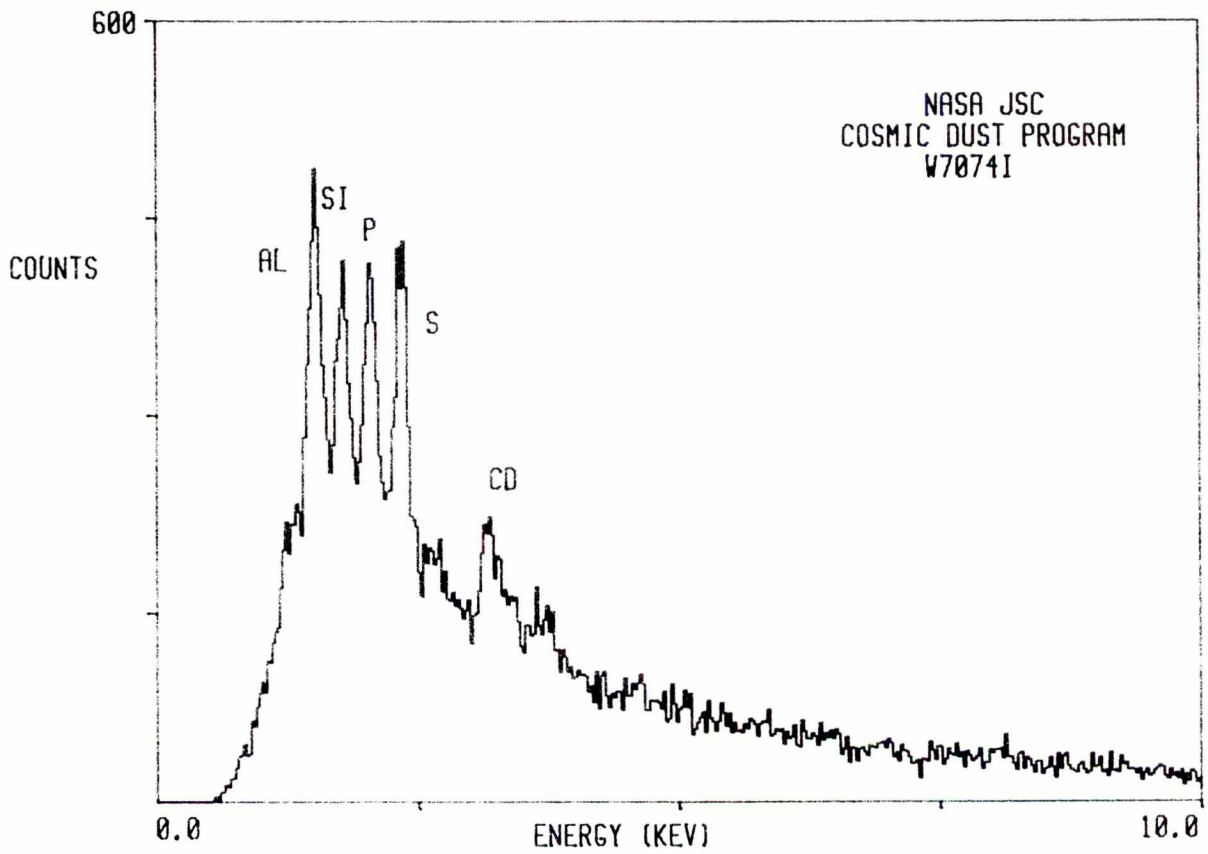
W7074 I 9



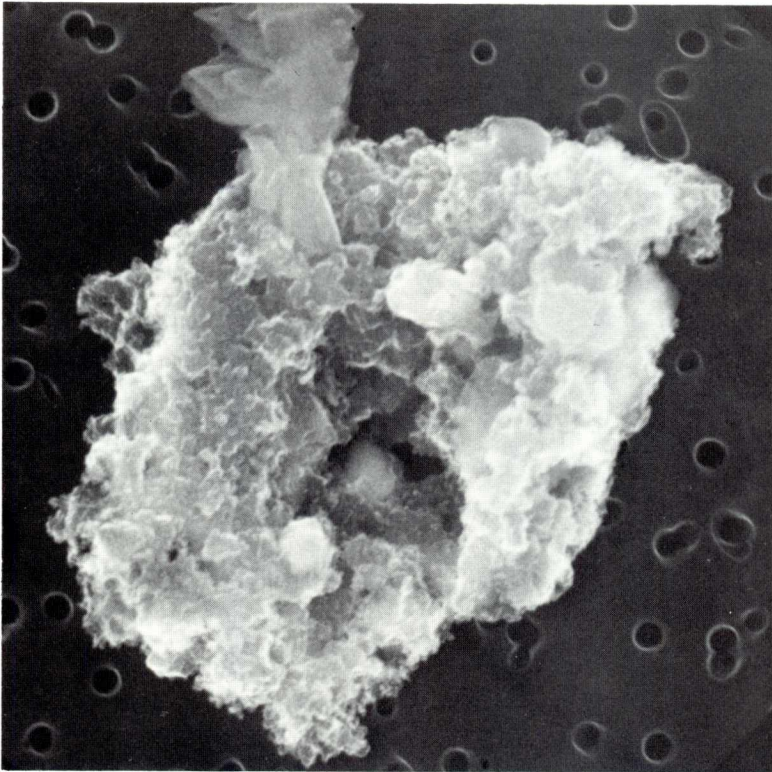
SIZE: 13
SHAPE: S
TRANS.: T/TL
COLOR: Orange
LUSTER: SV/R
TYPE: TCA
COMMENTS:

S-88-53392

W719



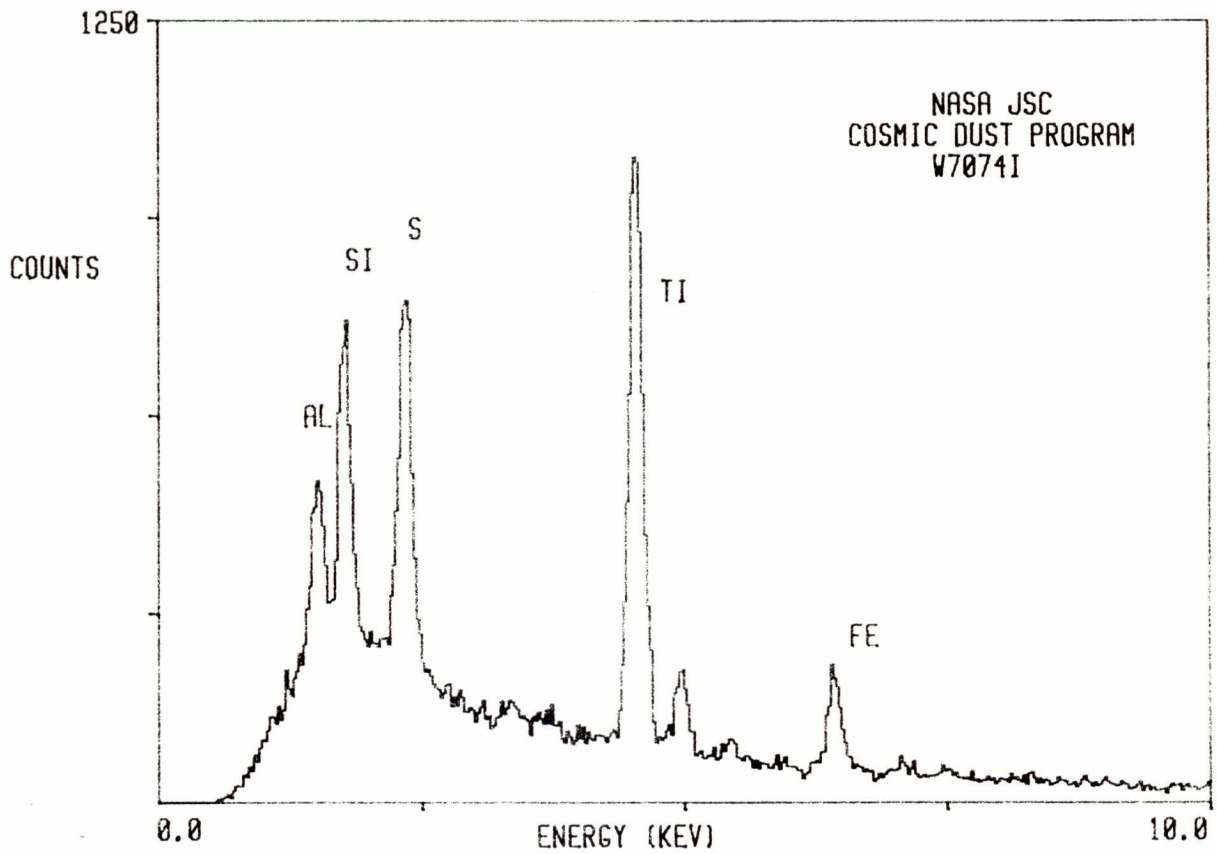
W7074 I 11



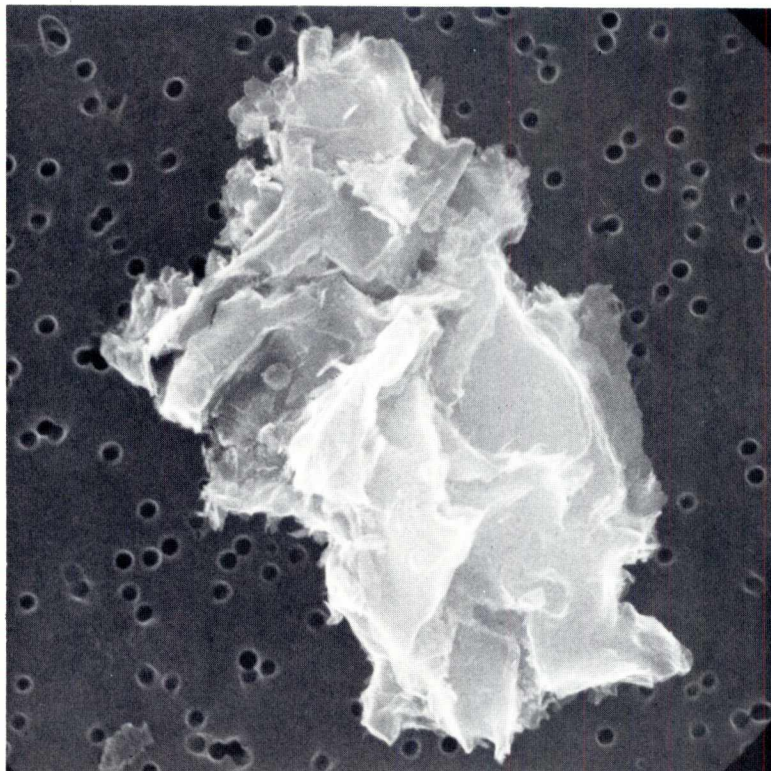
SIZE: 9x6
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCA
COMMENTS:

S-88-53393

W7I11



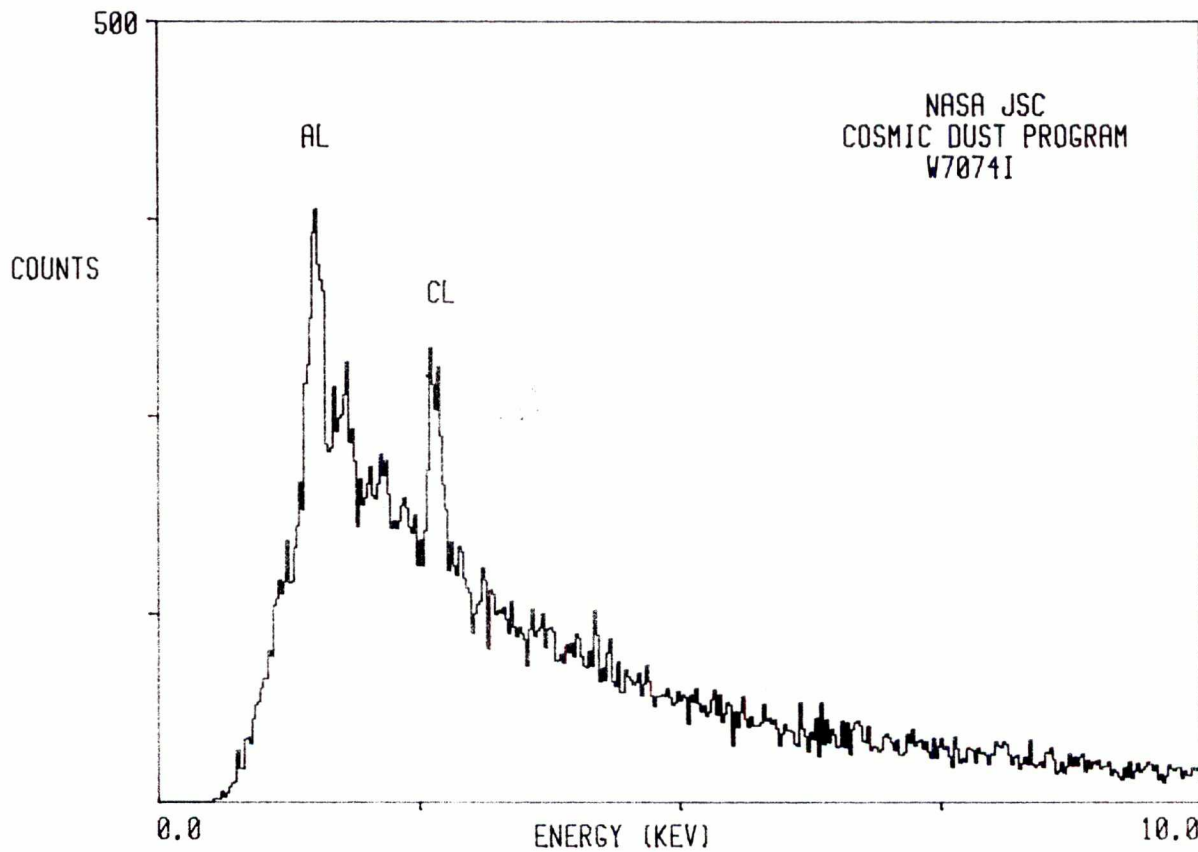
W7074 I 13



SIZE: 18x8
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/M
TYPE: TCA
COMMENTS:

S-88-53395

W7113



W7074 I 16

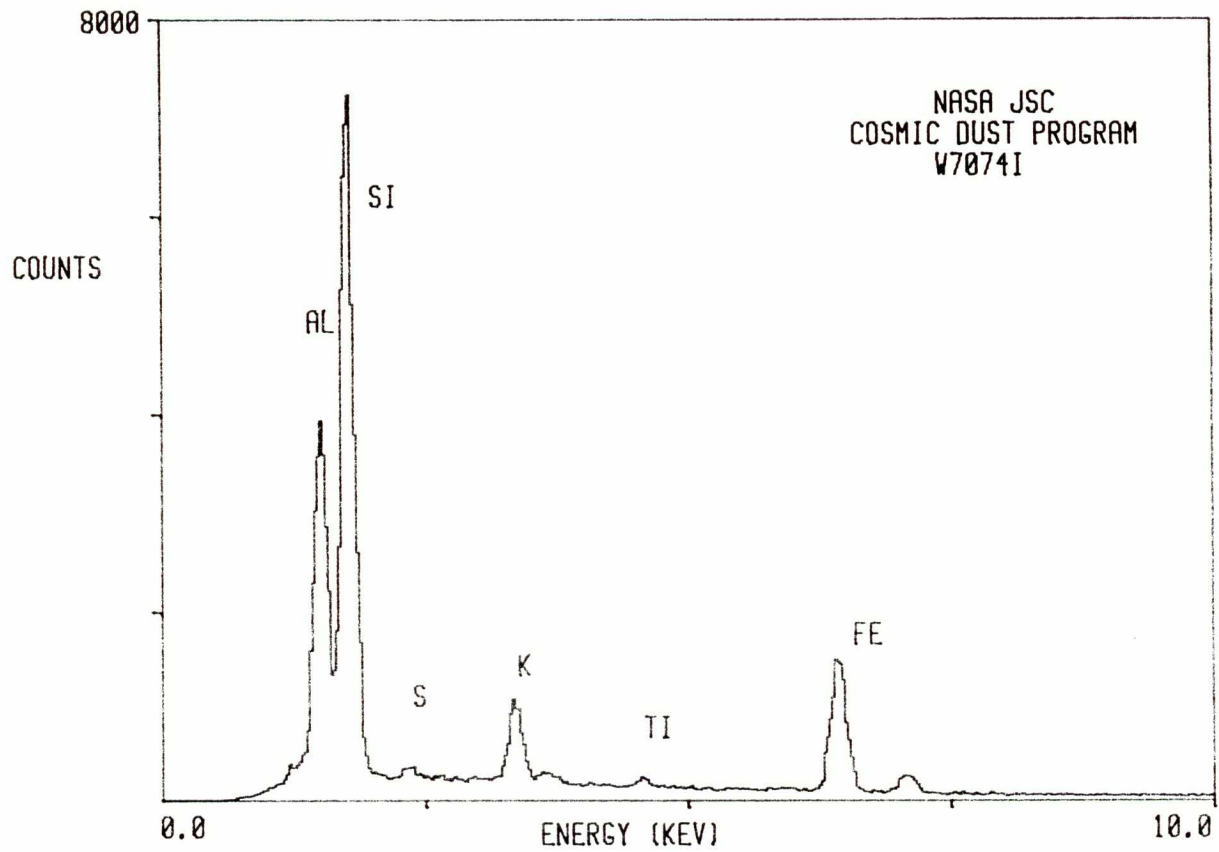


SIZE: 18x11
SHAPE: I
TRANS.: TL
COLOR: Orange
LUSTER: R
TYPE: TCA

COMMENTS:
Largest particle
in a field of
particles

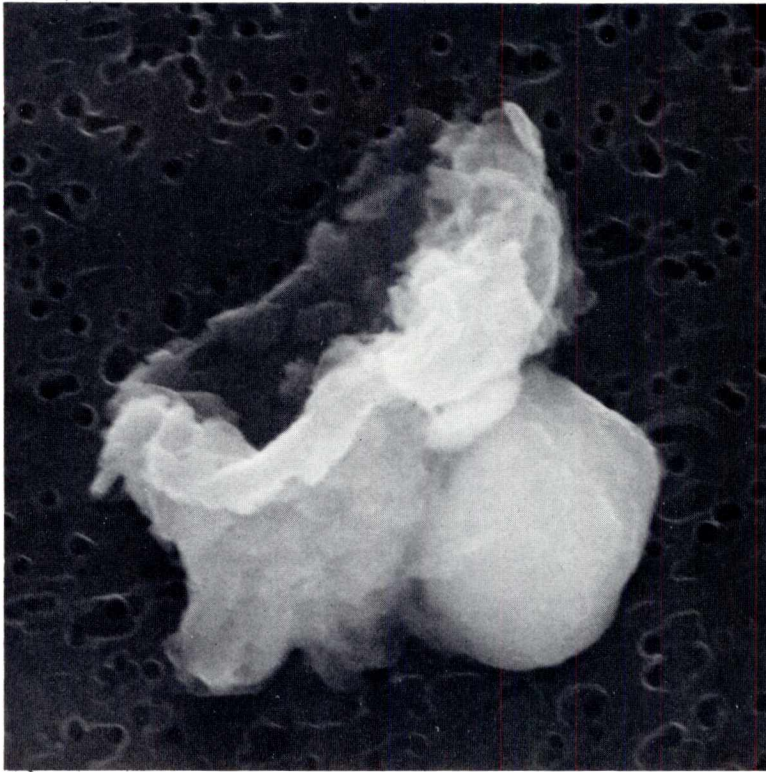
S-88-53397

W7116



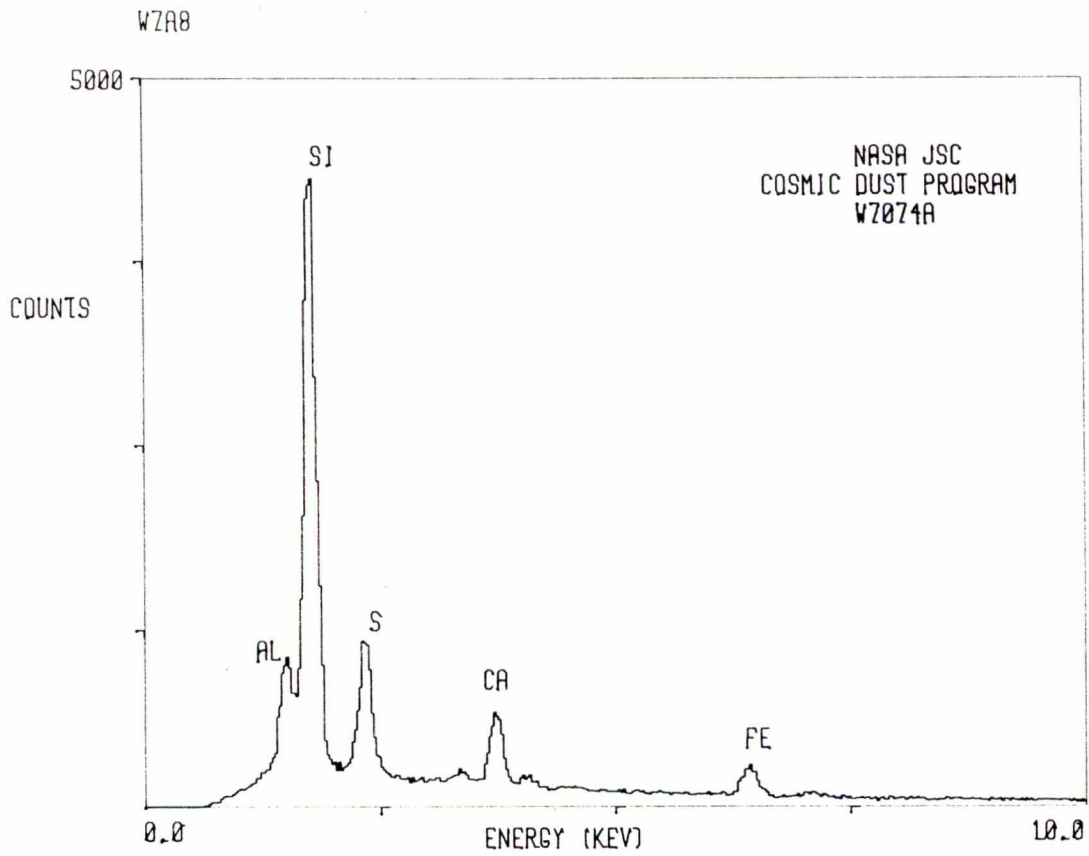
TERRESTRIAL CONTAMINATION (NATURAL)

W7074 A 8

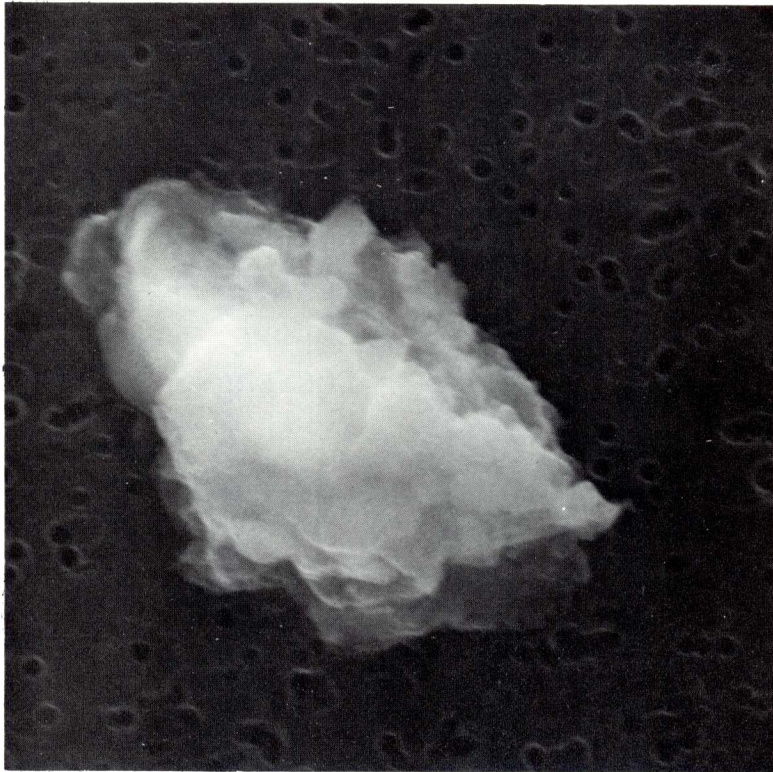


SIZE: 13x8
SHAPE: I
TRANS.: TL/O
COLOR: Yellow to black
LUSTER: D/SV
TYPE: TCN
COMMENTS:

S-88-53253

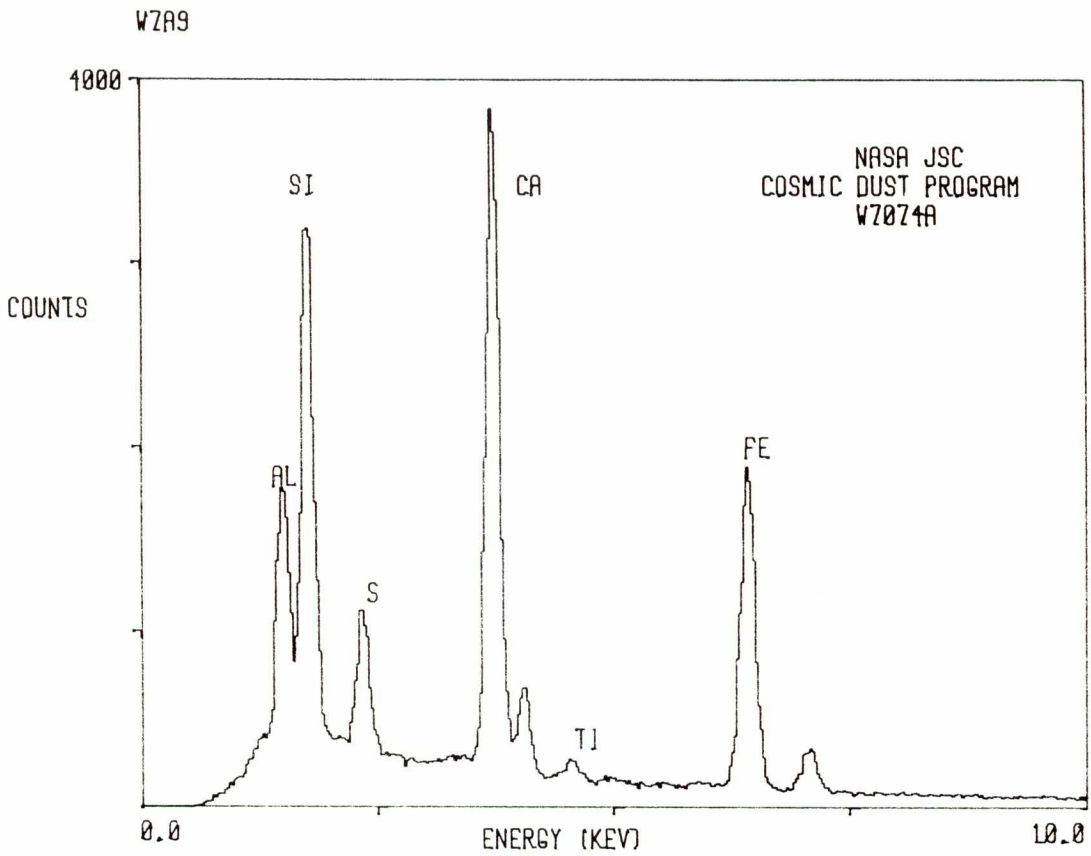


W7074 A 9



SIZE: 12x8
SHAPE: I
TRANS.: TL/O
COLOR: Yellow to black
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53254



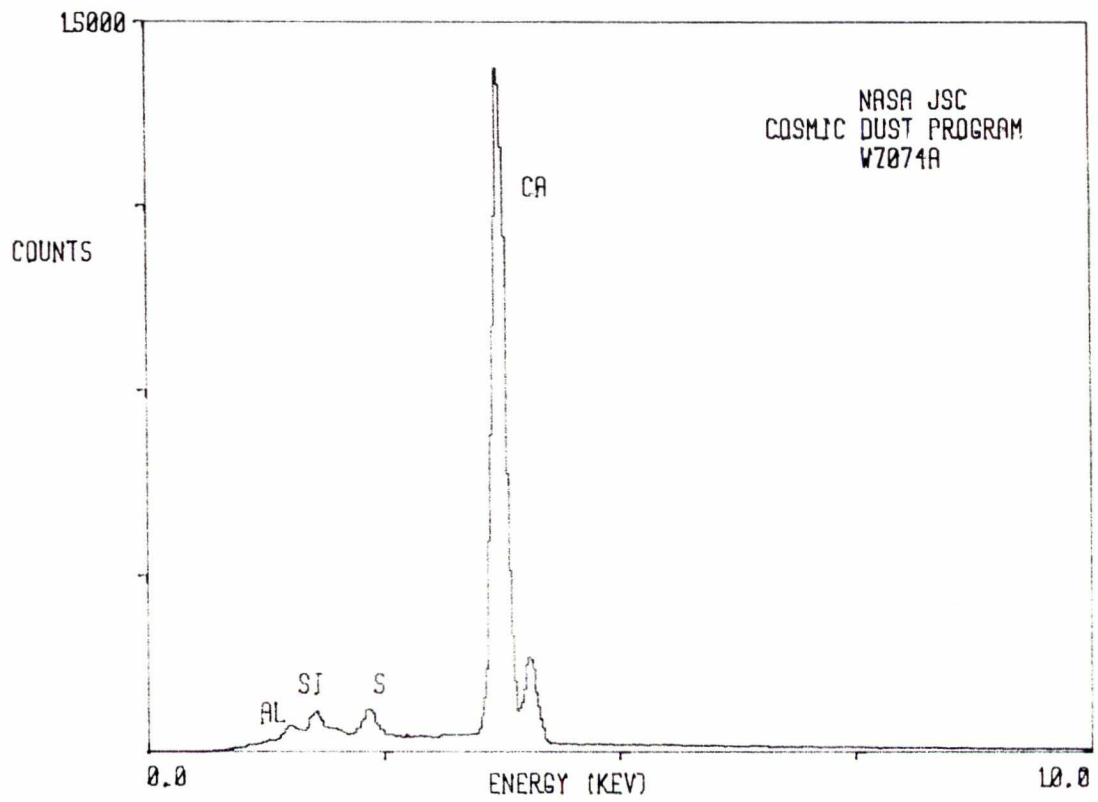
W7074 A 11



SIZE: 20x11
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: D
TYPE: TCN
COMMENTS:

S-88-53256

W7011

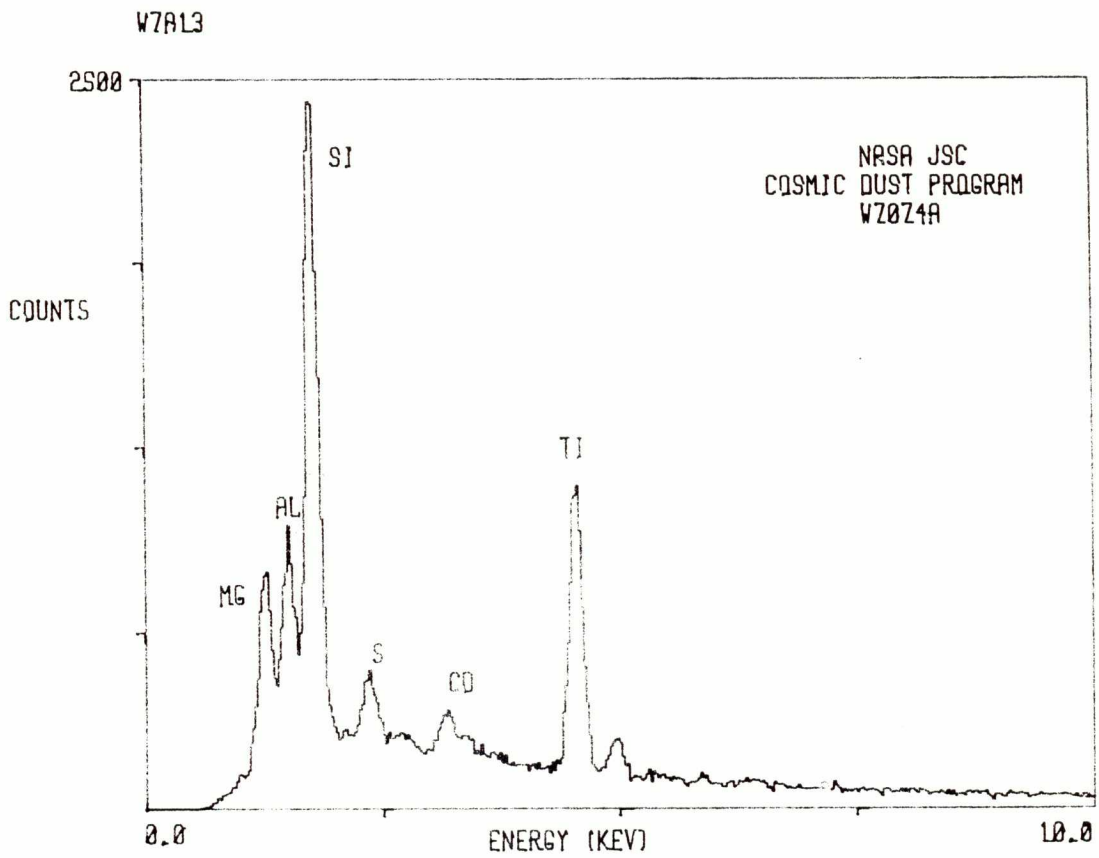


W7074 A 13

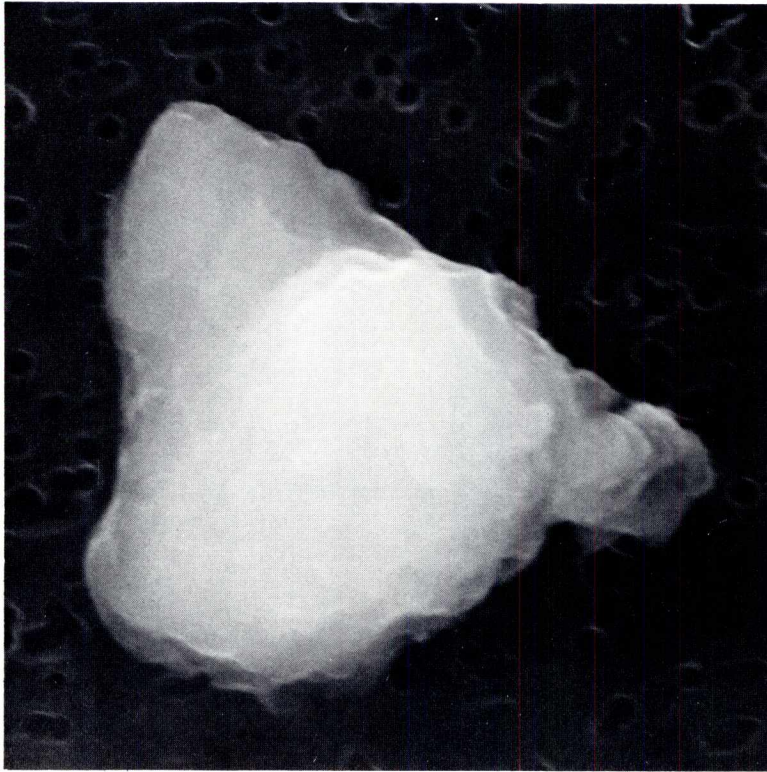


SIZE: 23x11
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: D
TYPE: TCN
COMMENTS:

S-88-53258

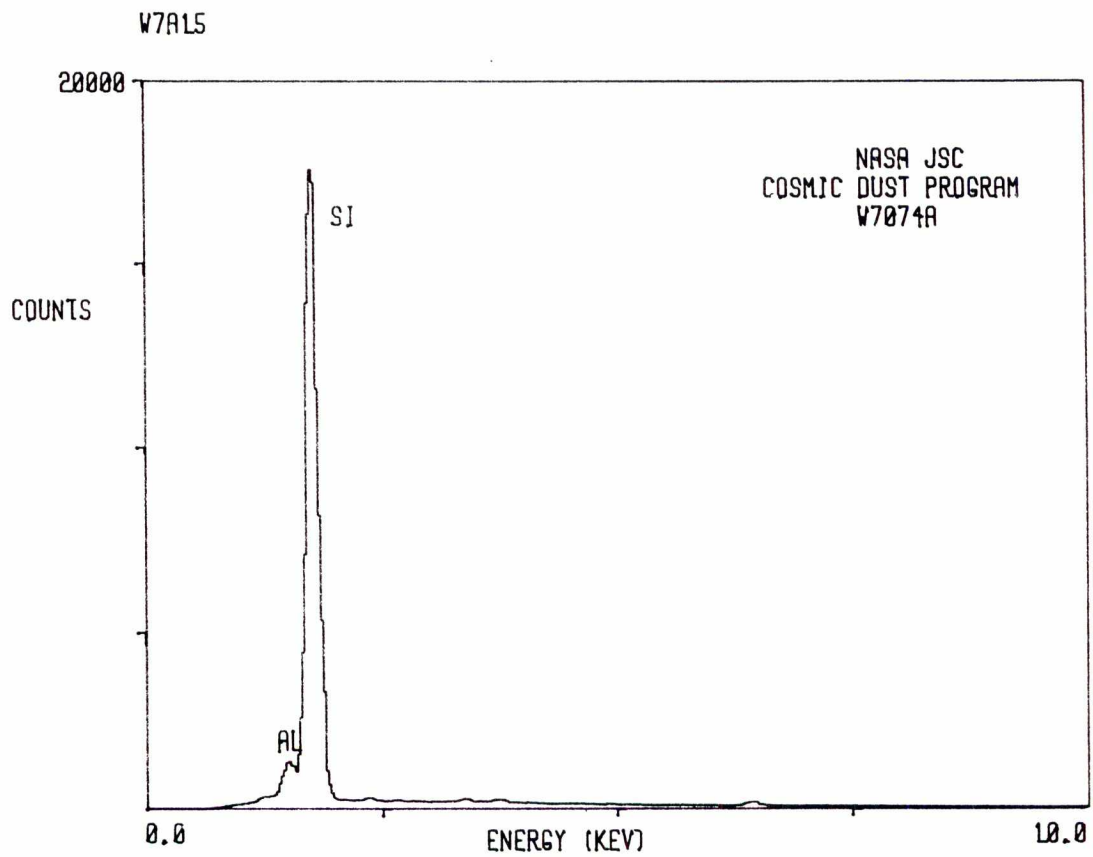


W7074 A 15

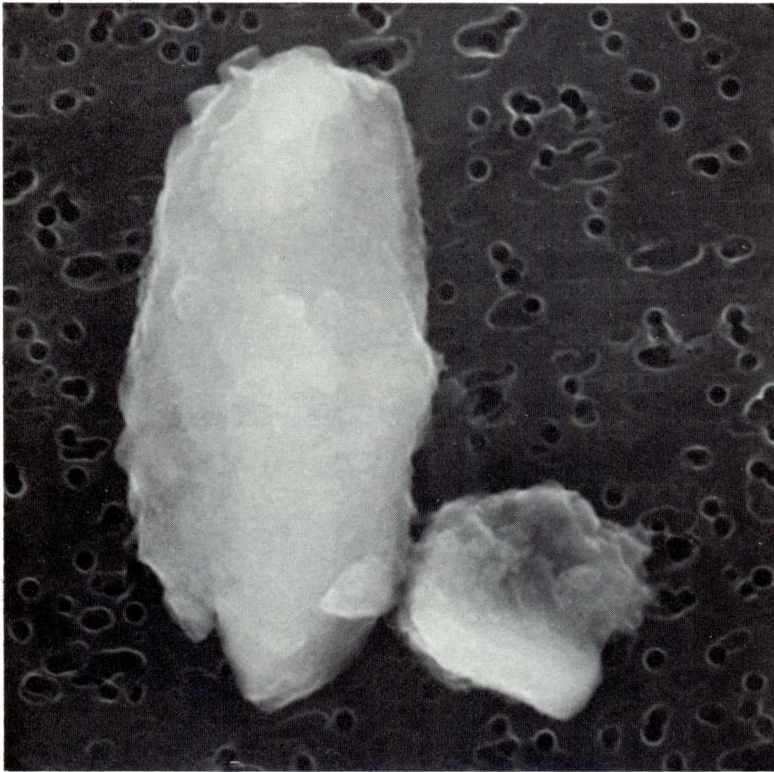


SIZE: 14x10
SHAPE: I
TRANS.: TL/O
COLOR: Colorless to black
LUSTER: SV/D
TYPE: TCN
COMMENTS:

S-88-53259

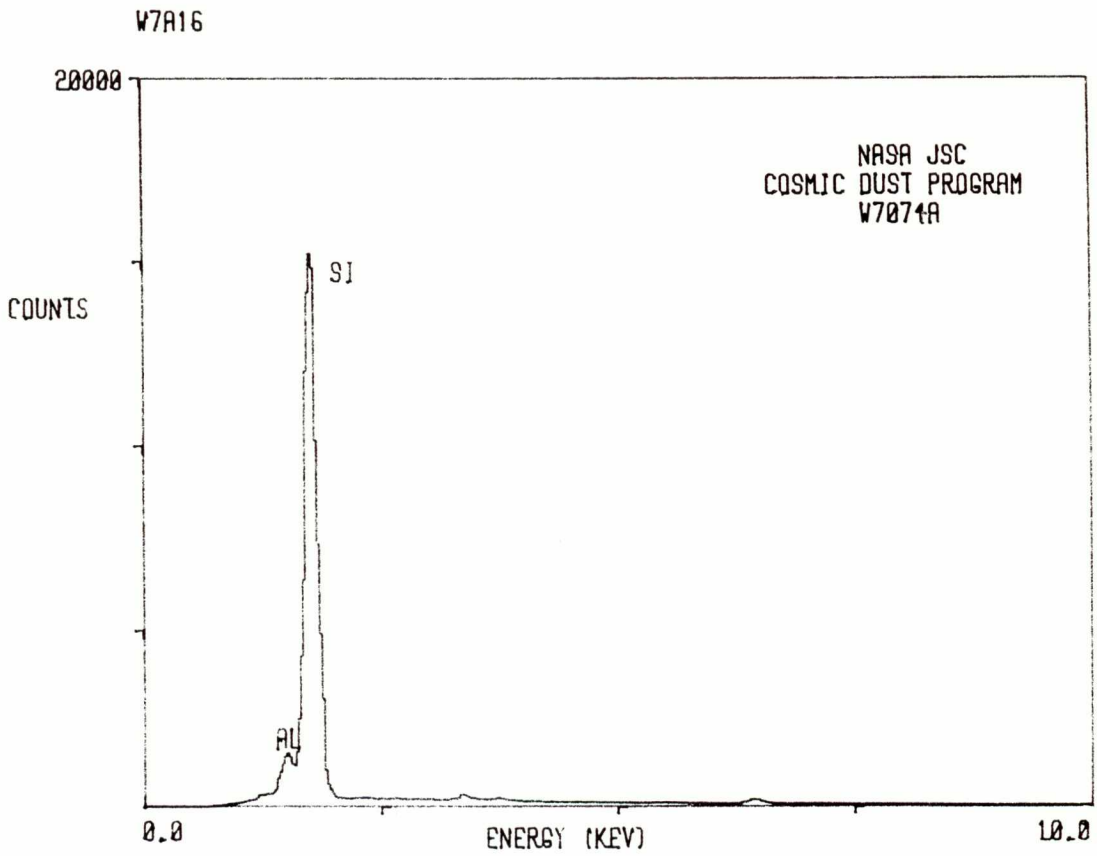


W7074 A 16

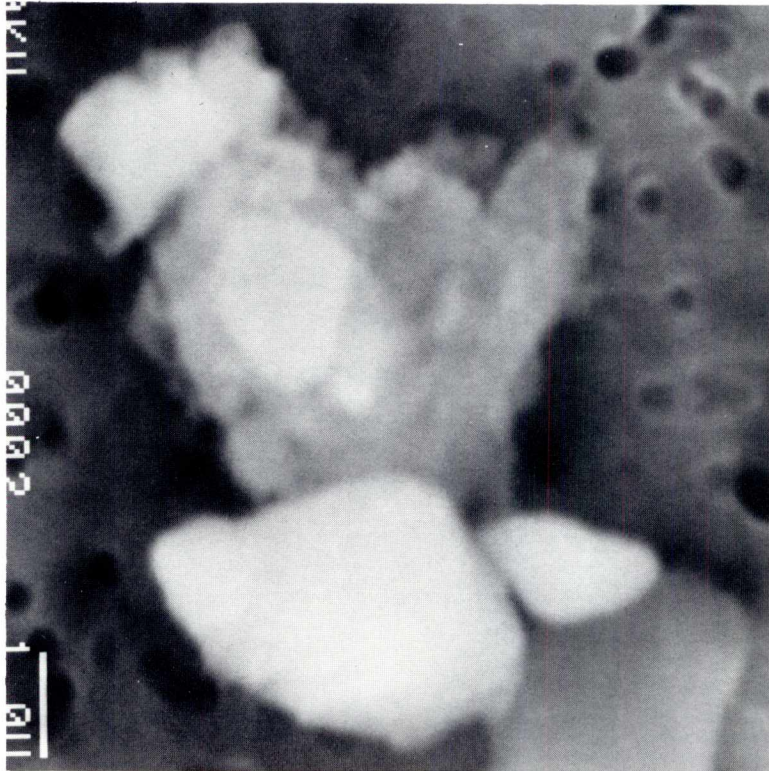


SIZE: 11x5
SHAPE: I
TRANS.: O
COLOR: Black
LUSTER: D
TYPE: TCN
COMMENTS:

S-88-53260

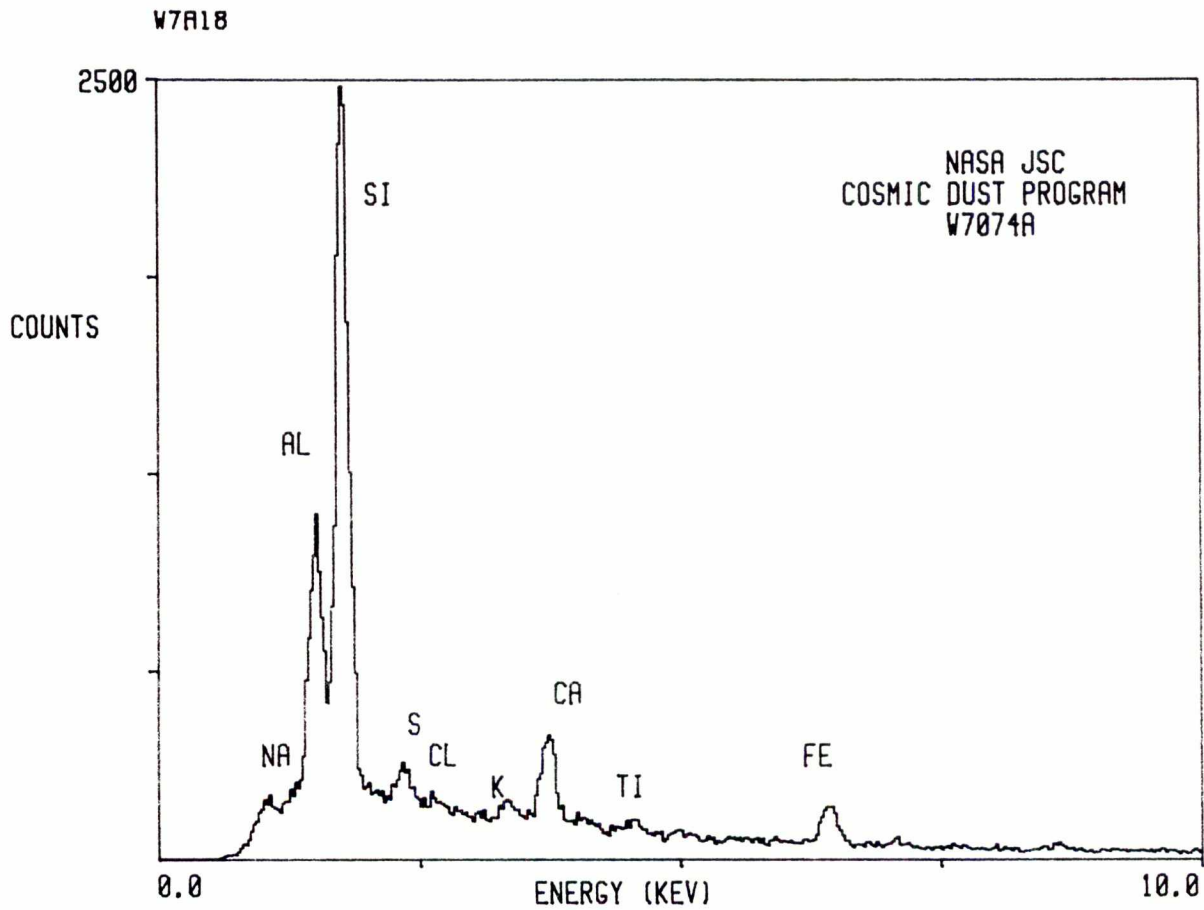


W7074 A 18

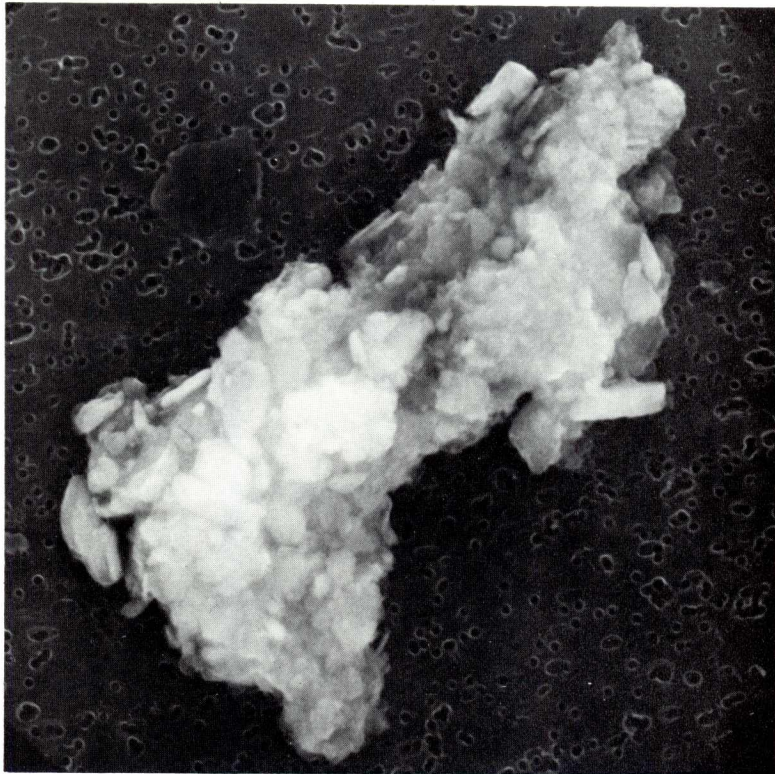


SIZE: 6
SHAPE: I
TRANS.: TL/O
COLOR: Colorless to black
LUSTER: SV/D
TYPE: TCN
COMMENTS:
May be related to
W7074A27

S-88-53261



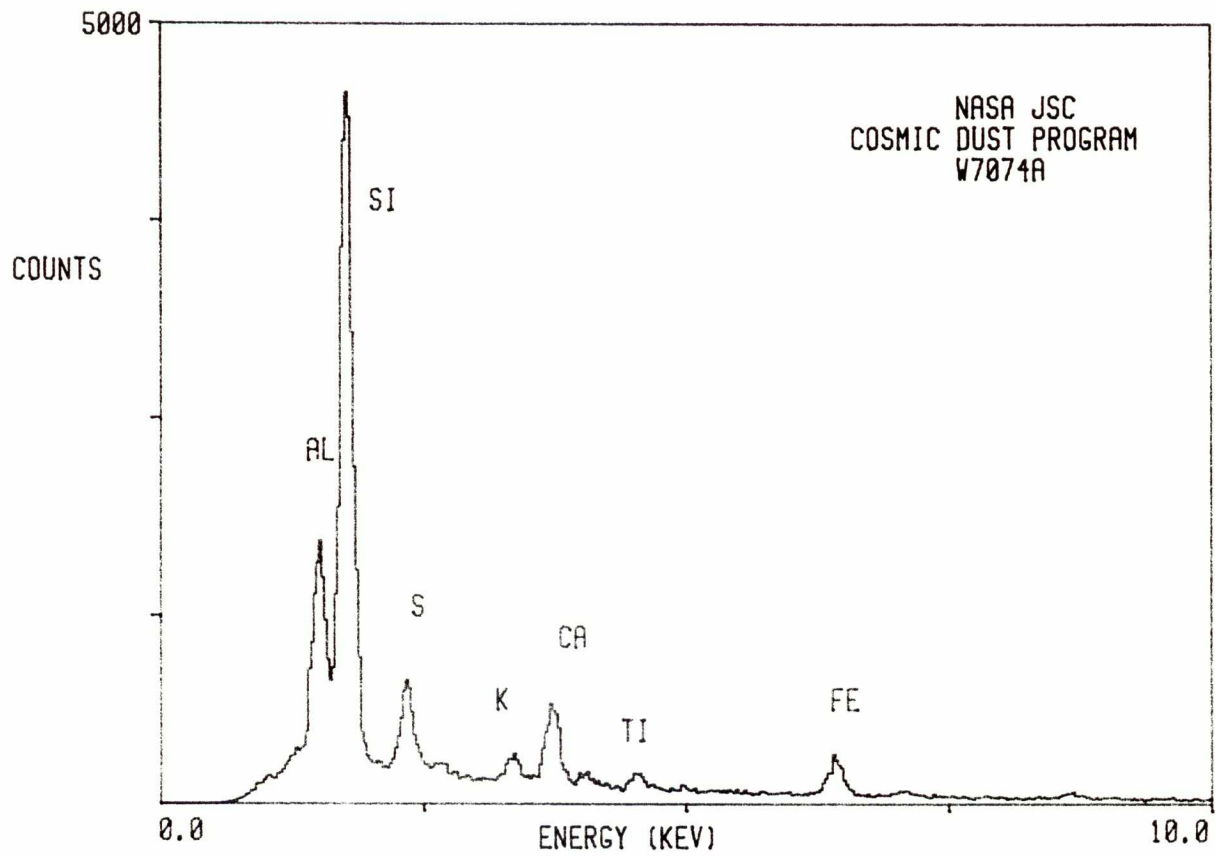
W7074 A 20



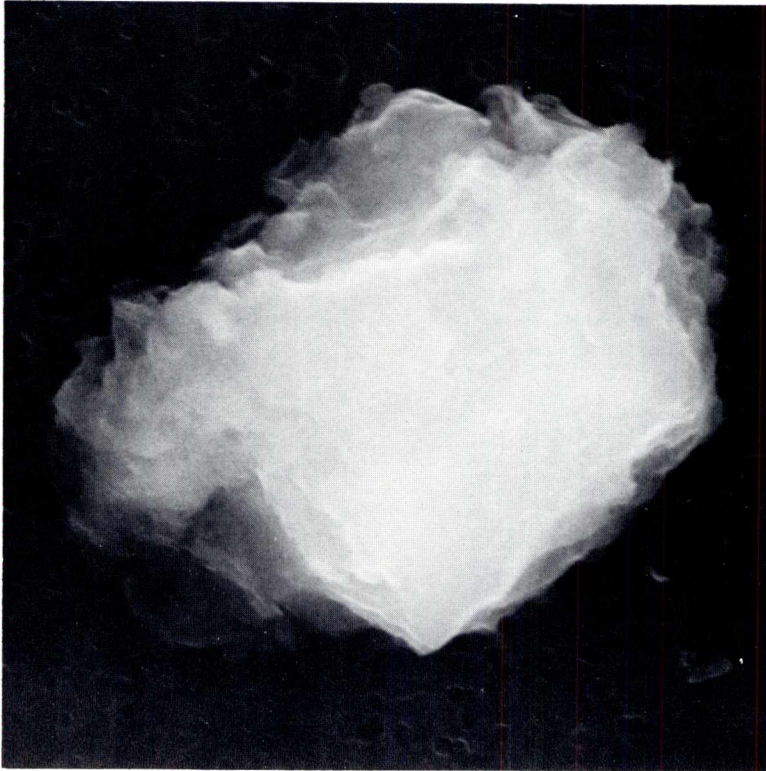
SIZE: 29x11
SHAPE: I
TRANS.: TL/O
COLOR: Colorless to black
LUSTER: SV/D
TYPE: TCN
COMMENTS:

S-88-53262

W7A20



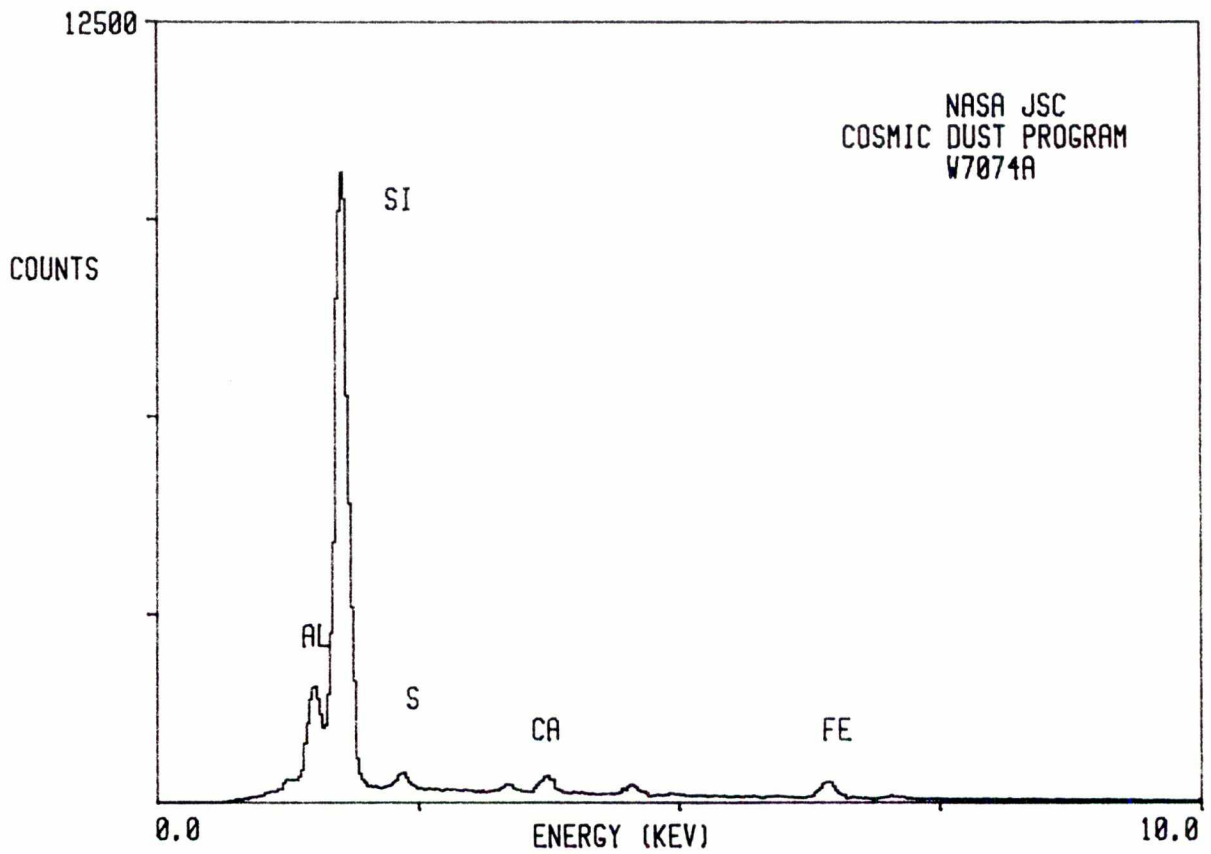
W7074 A 21



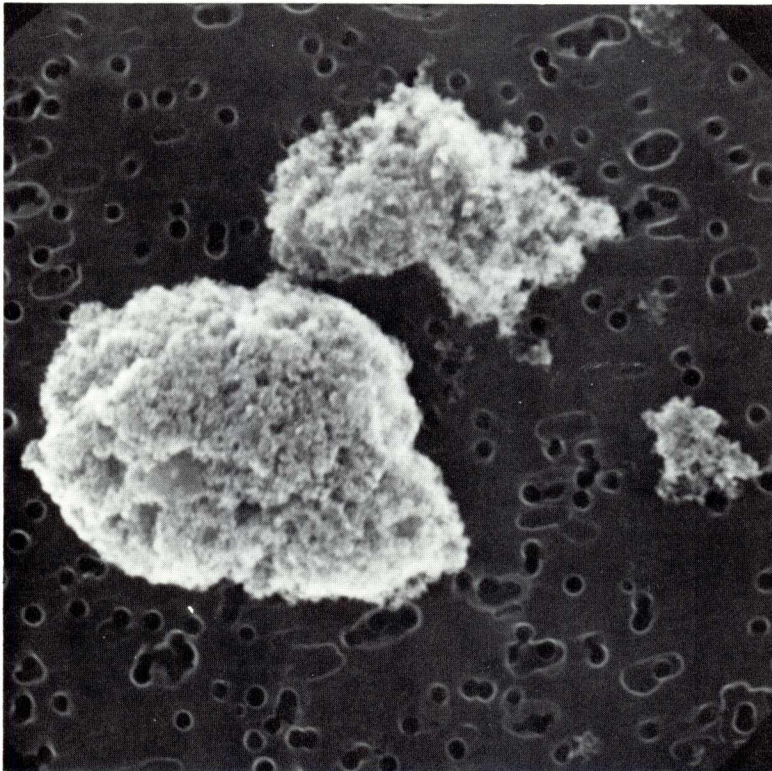
SIZE: 15x12
SHAPE: I
TRANS.: TL/O
COLOR: Yellow to black
LUSTER: R/D
TYPE: TCN
COMMENTS:

S-88-53263

W7R21



W7074 A 22

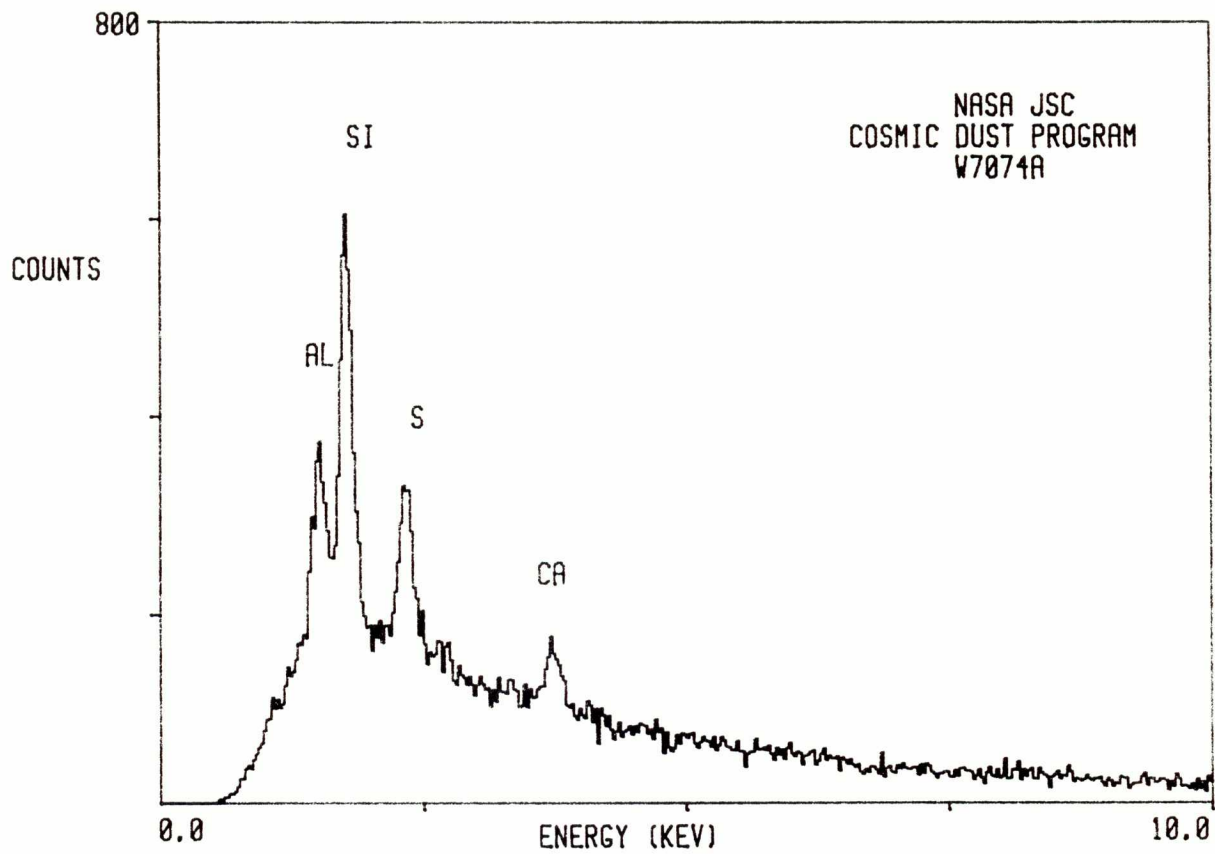


SIZE: 11x9
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCN

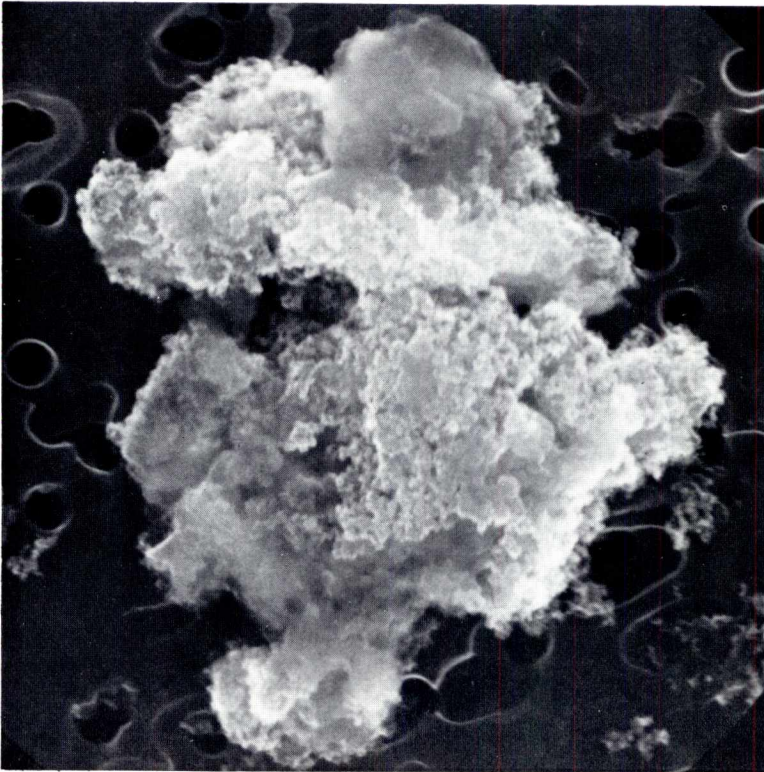
COMMENTS:
Largest particle
in the field of
particles. May be
related to
W7074A23

S-88-53264

W7A22



W7074 A 23

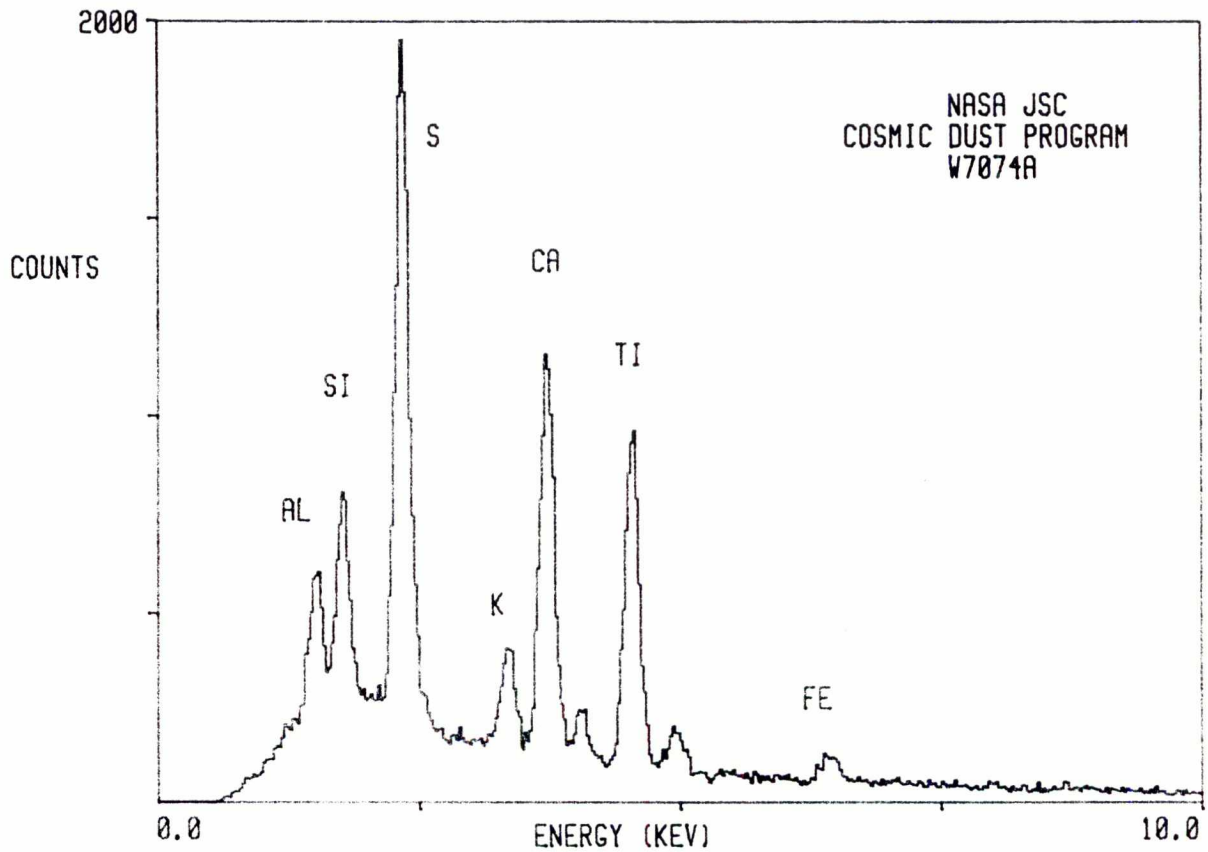


SIZE: 6
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM
TYPE: TCN

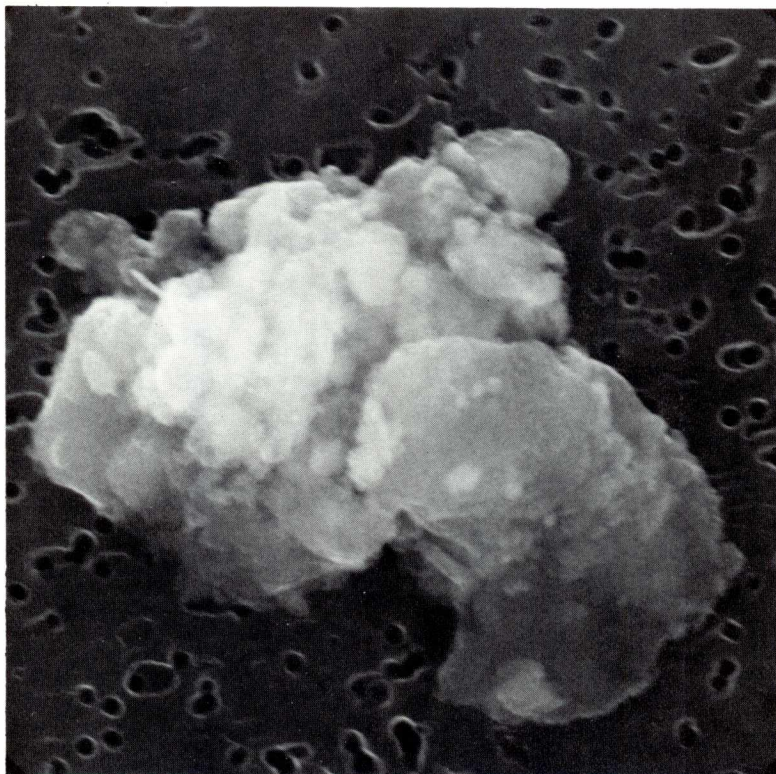
COMMENTS:
May be related to
W7074A22

S-88-53265

W7A23



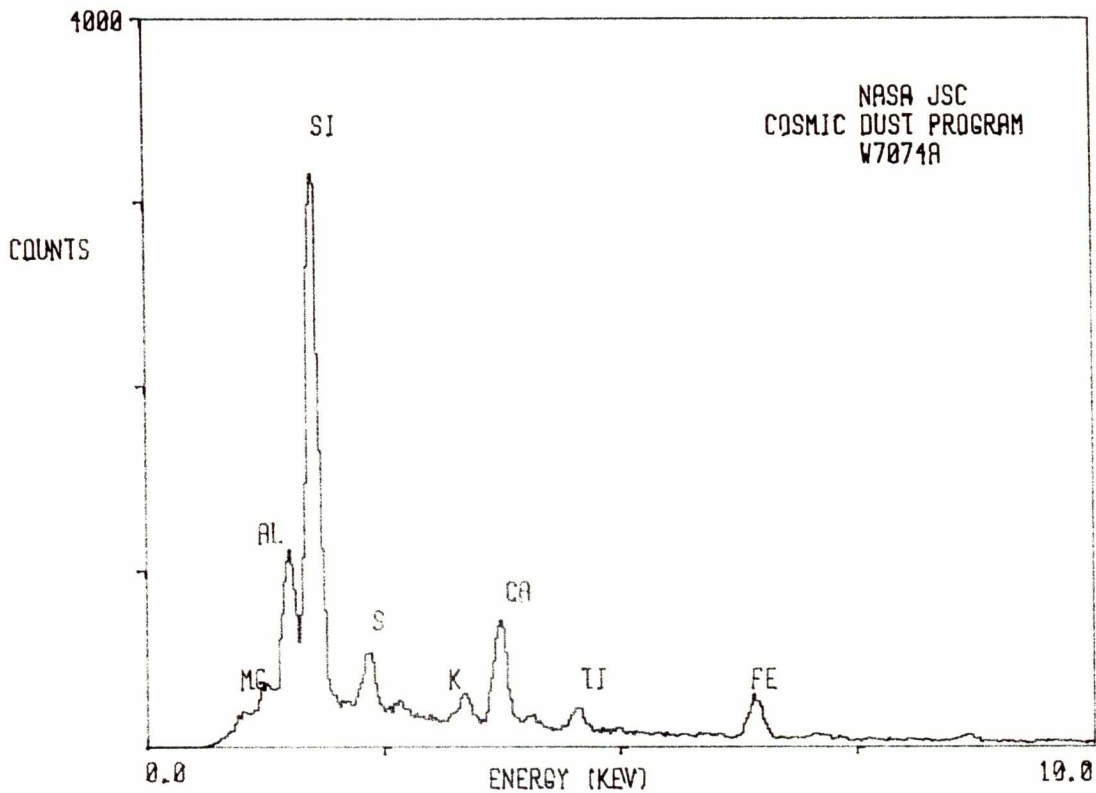
W7074 A 24



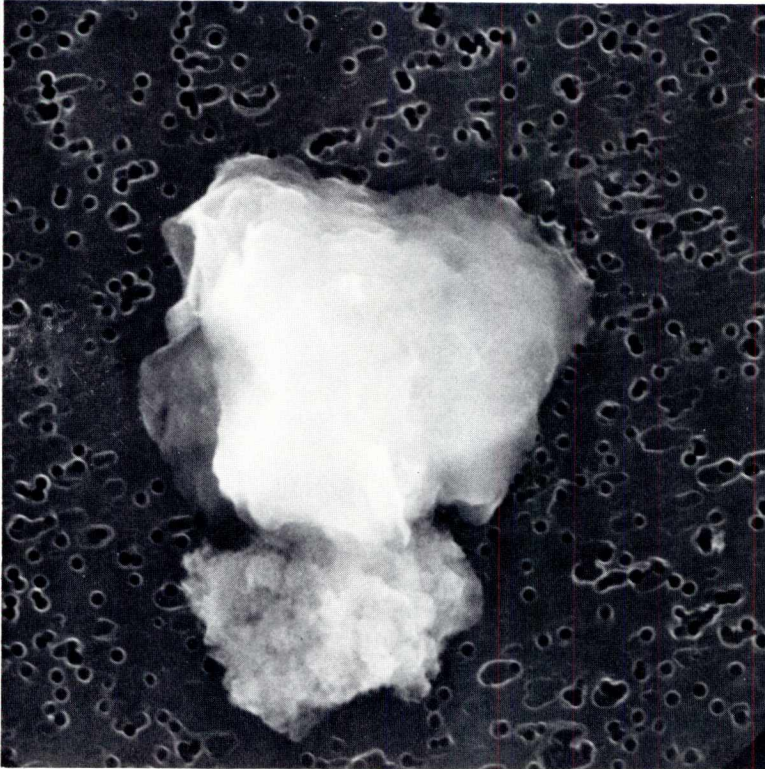
SIZE: 6
SHAPE: I
TRANS.: O
COLOR: Black
LUSTER: D
TYPE: TCN
COMMENTS:

S-88-53266

W7024



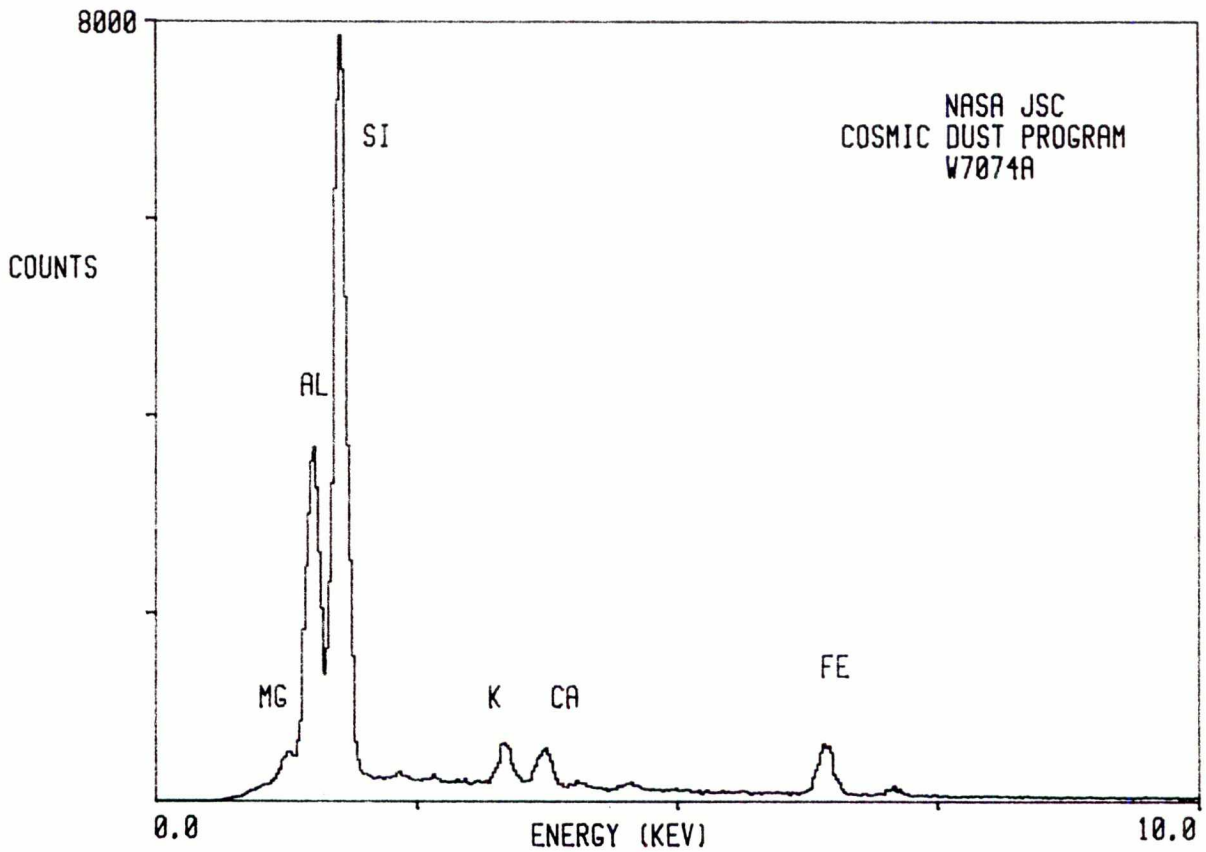
W7074 A 25



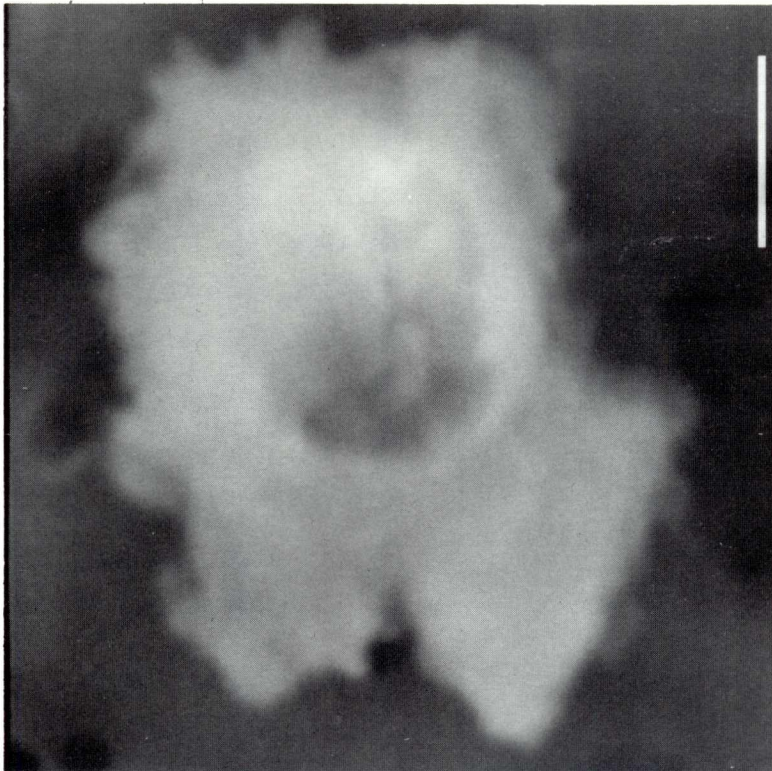
SIZE: 7
SHAPE: I
TRANS.: O
COLOR: Black
LUSTER: D
TYPE: TCN
COMMENTS:

S-88-53267

W7A25



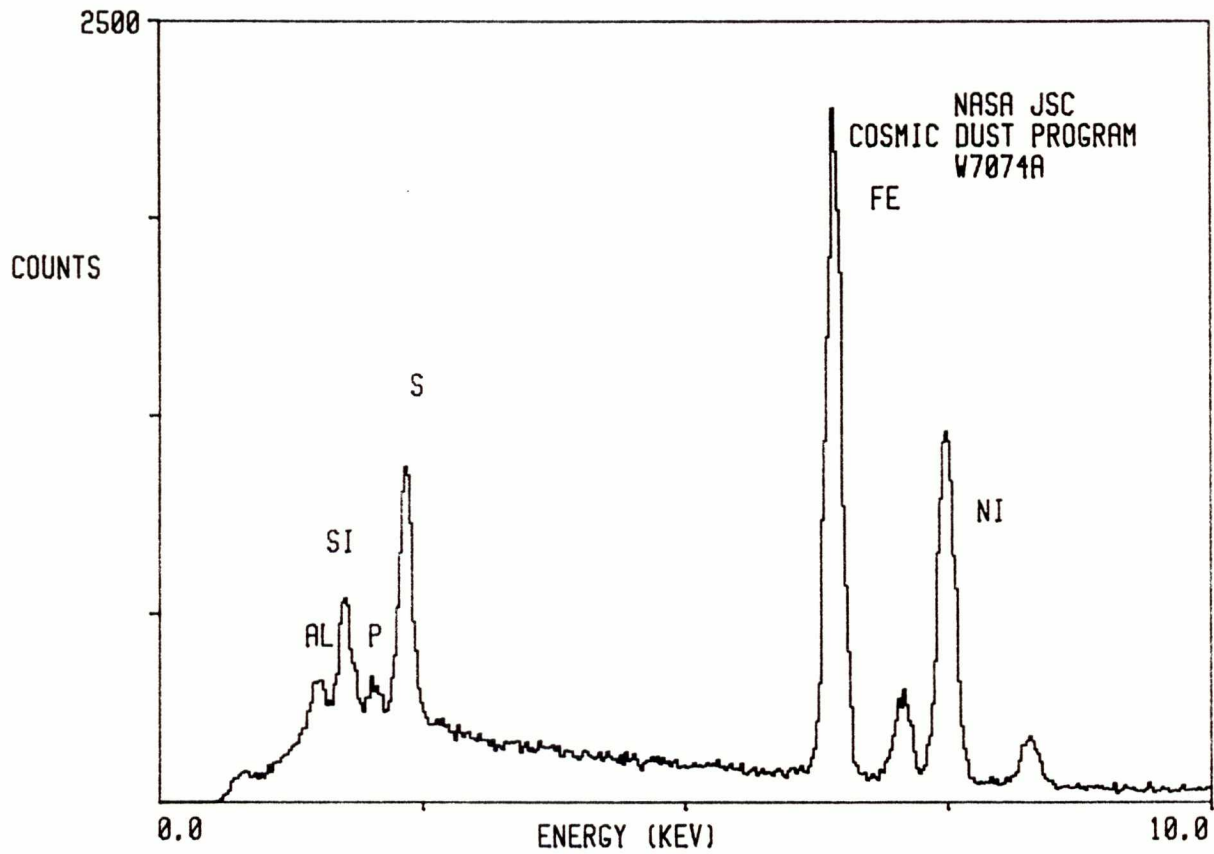
W7074 A 27



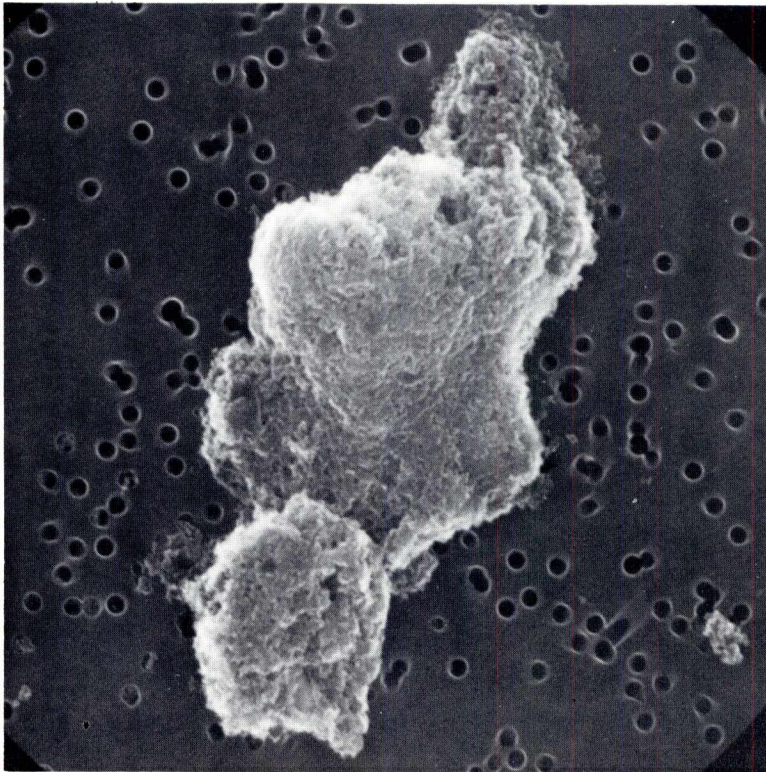
SIZE: 4
SHAPE: I
TRANS.: TL/O
COLOR: Colorless to black
LUSTER: SV/D
TYPE: TCN
COMMENTS:

S-88-53268

W7A 27



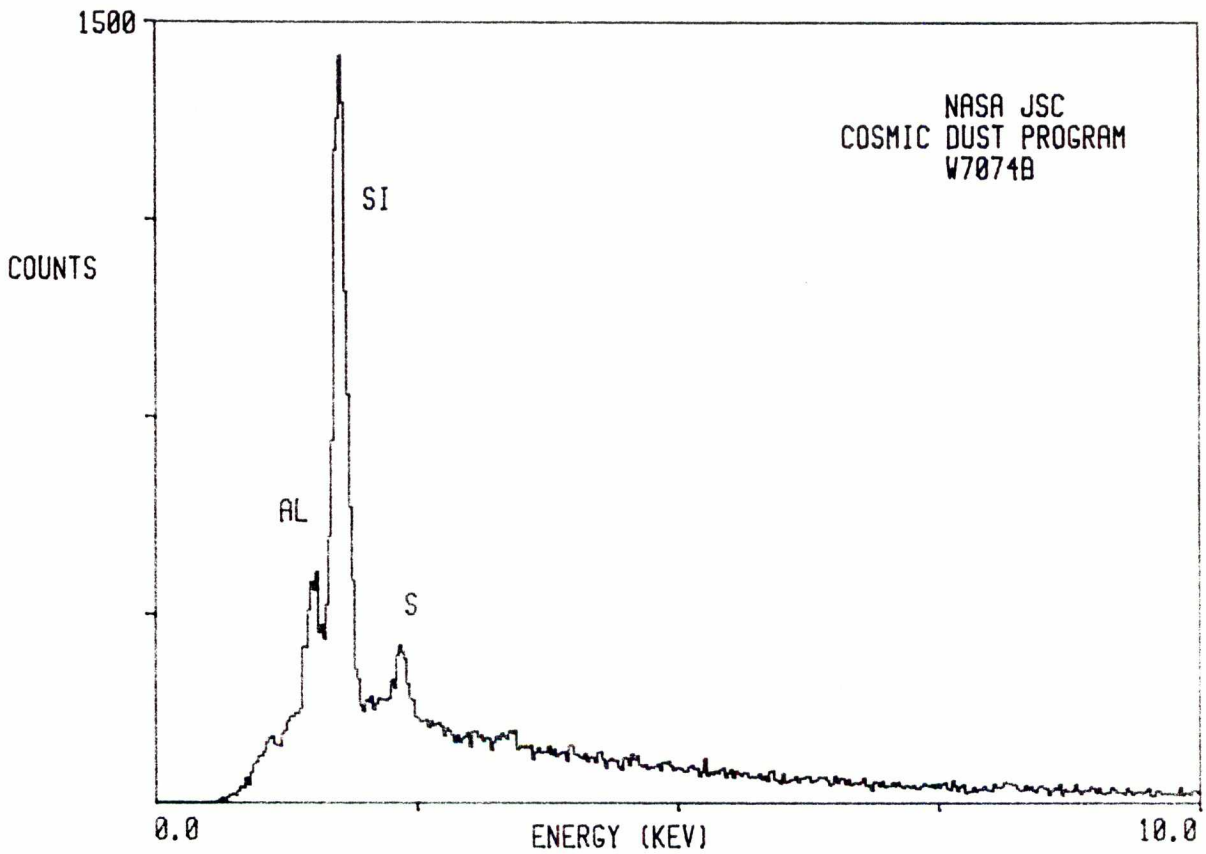
W7074 B 1



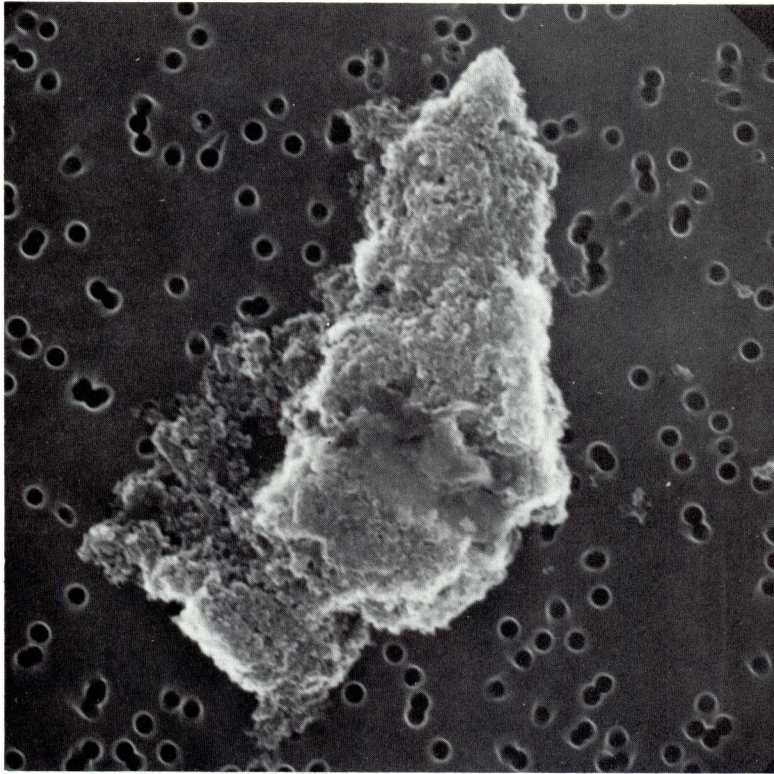
SIZE: 14x7
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SV/D
TYPE: TCN
COMMENTS:

S-88-53269

W7B1



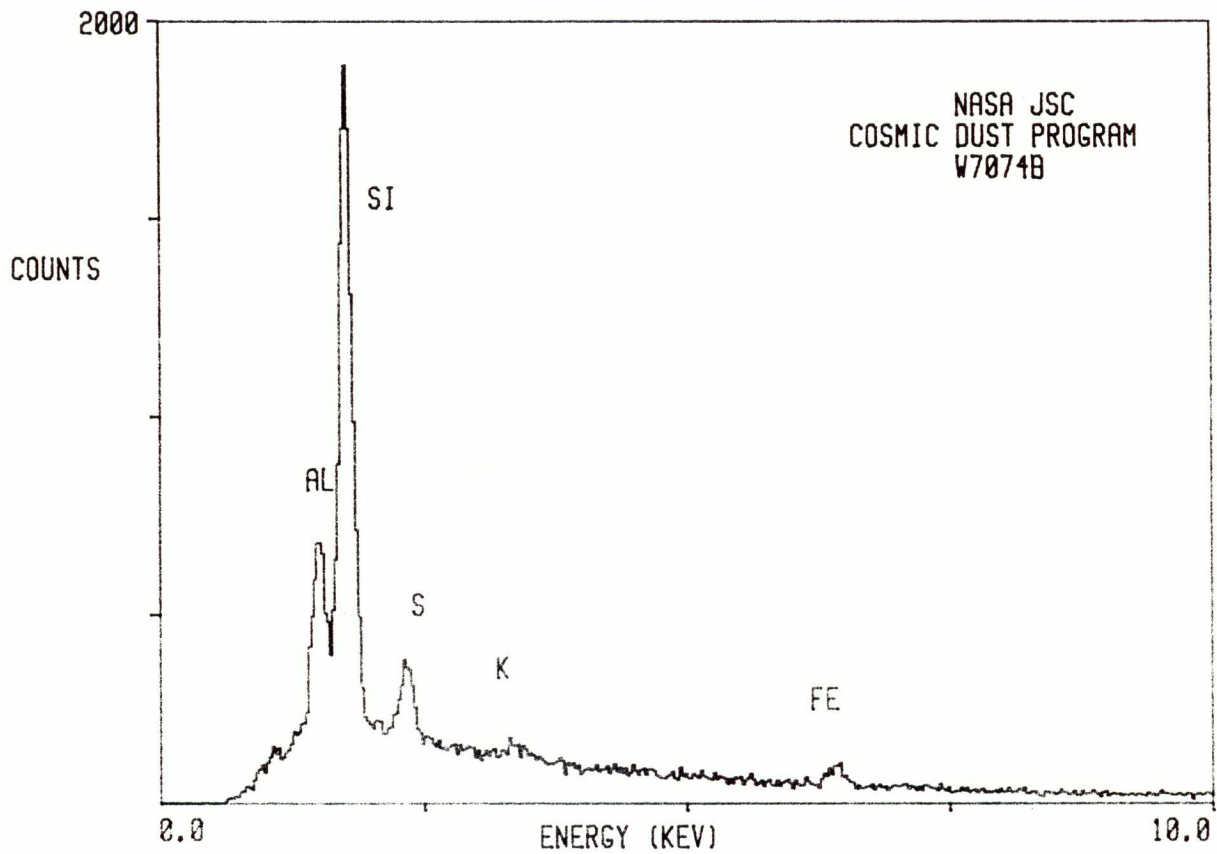
W7074 B 2



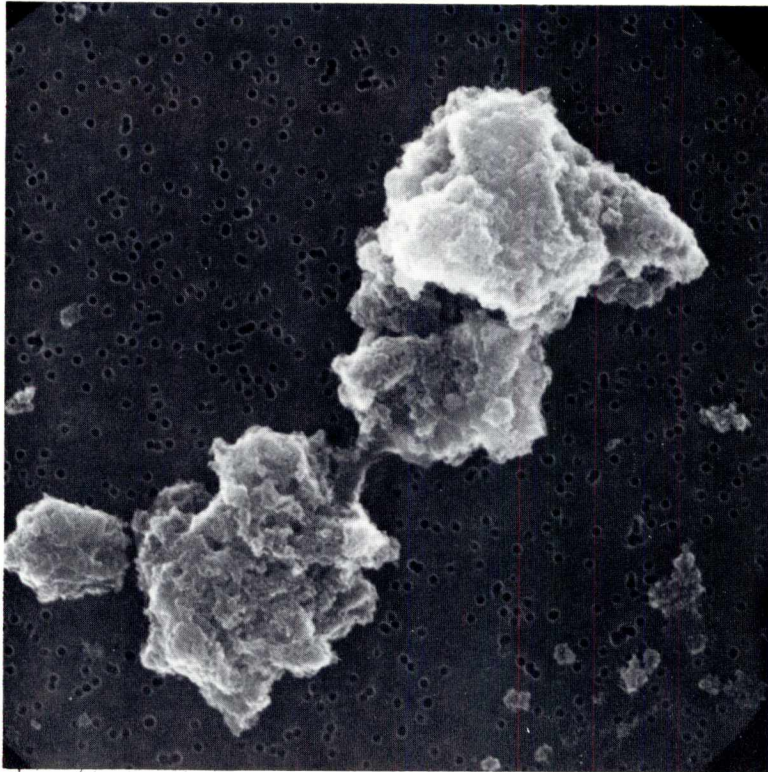
SIZE: 12x8
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: D
TYPE: TCN
COMMENTS:

S-88-53270

W7B2



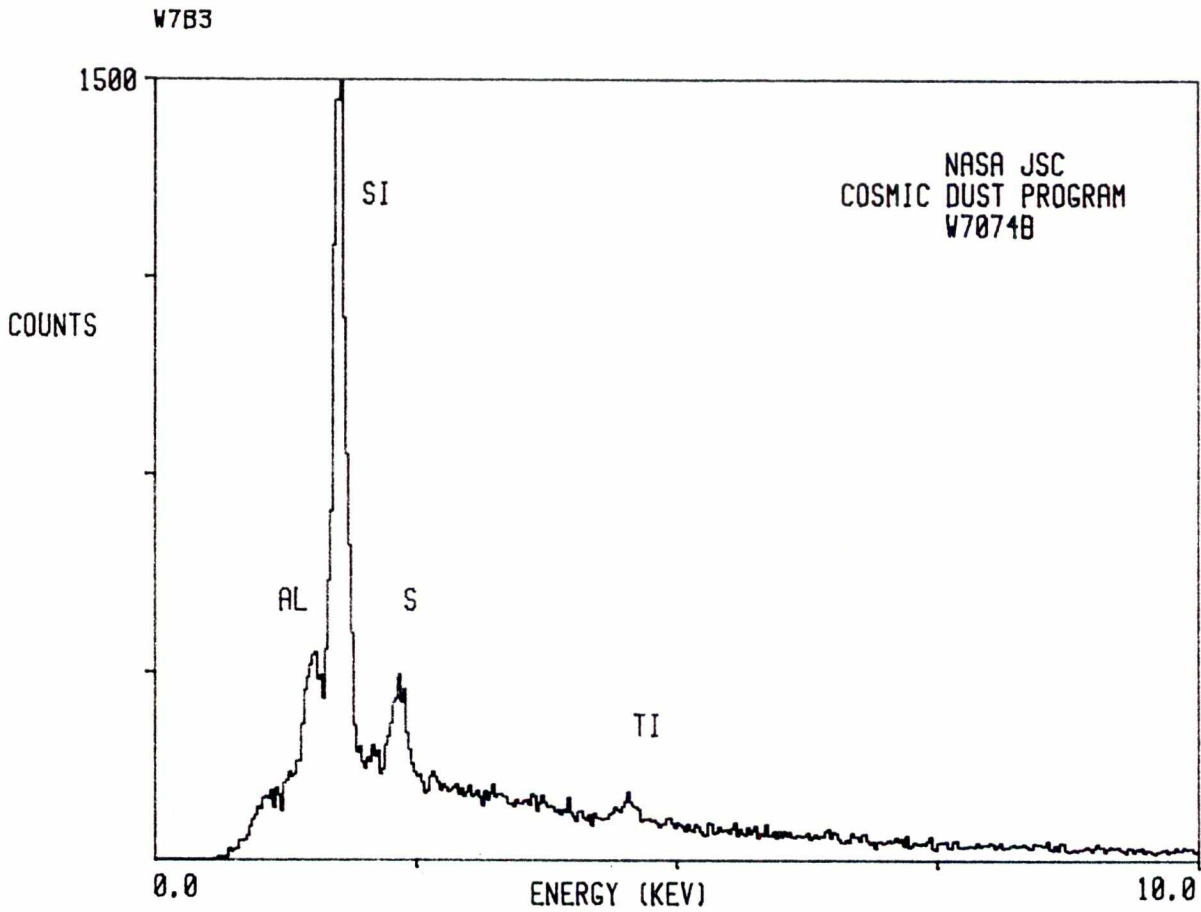
W7074 B 3



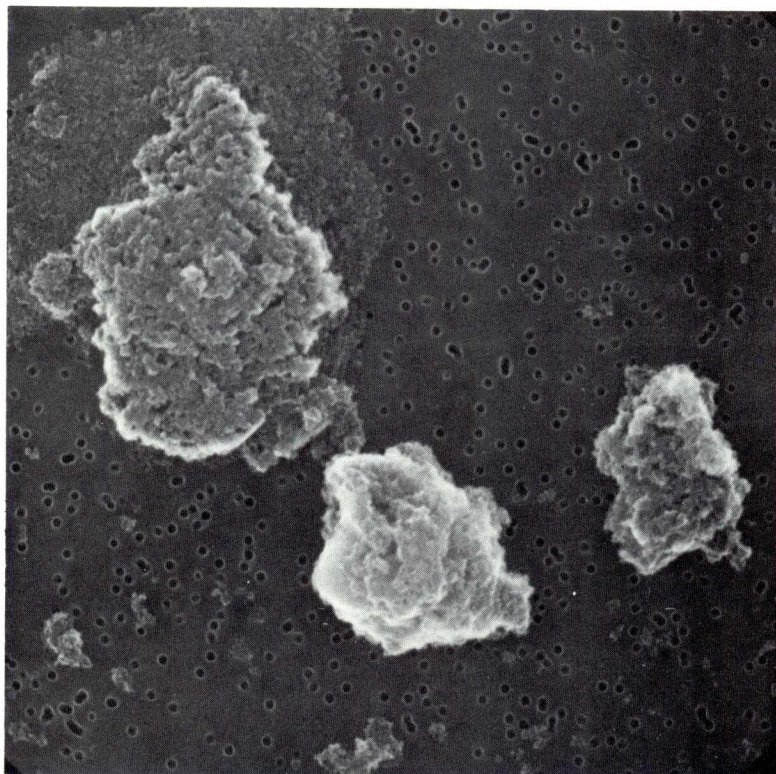
SIZE: 25x11
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SV/D
TYPE: TCN

COMMENTS:
May be related to
W7074B4

S-88-53271



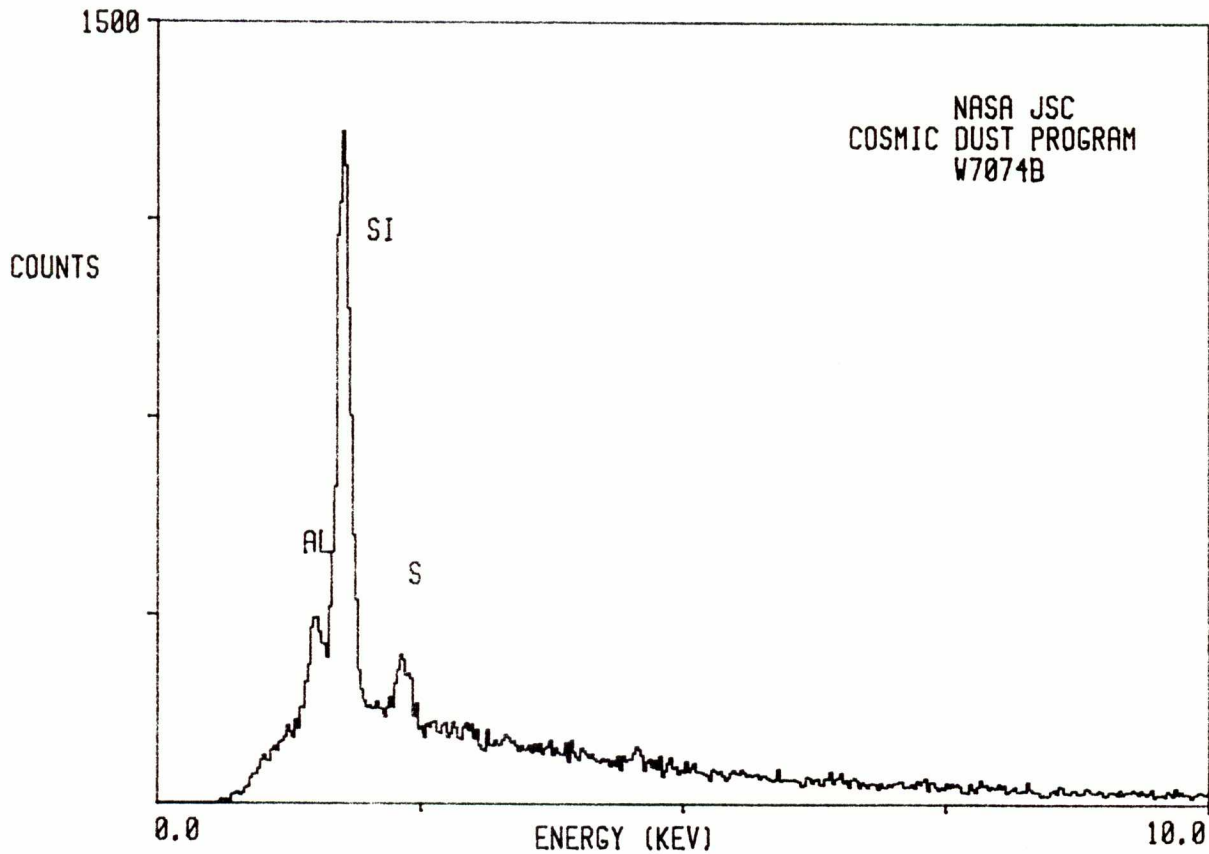
W7074 B 4



SIZE: 12x11
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: D
TYPE: TCN
COMMENTS:
May be related to
W7074B3

S-88-53272

W7B4



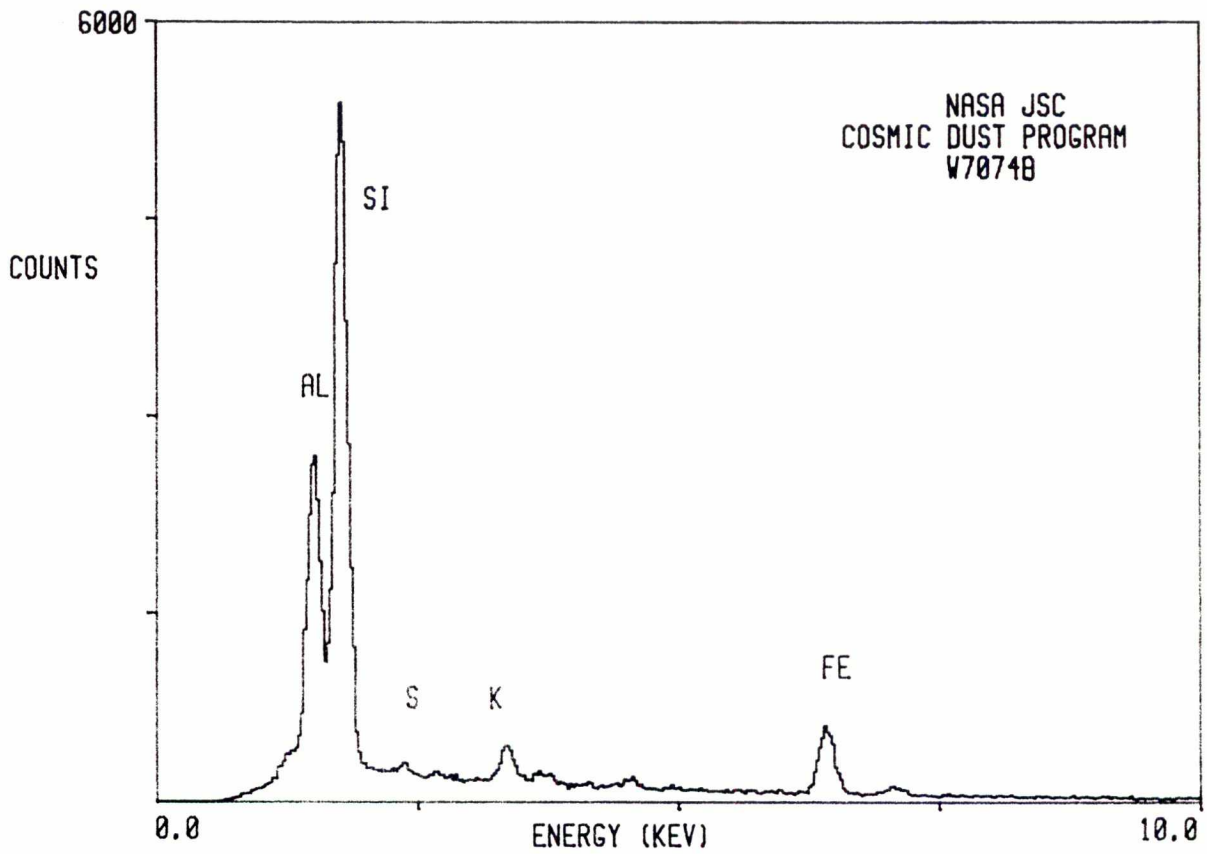
W7074 B 6



SIZE: 27x19
SHAPE: I
TRANS.: TL
COLOR: Yellow to orange
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53273

W7B6



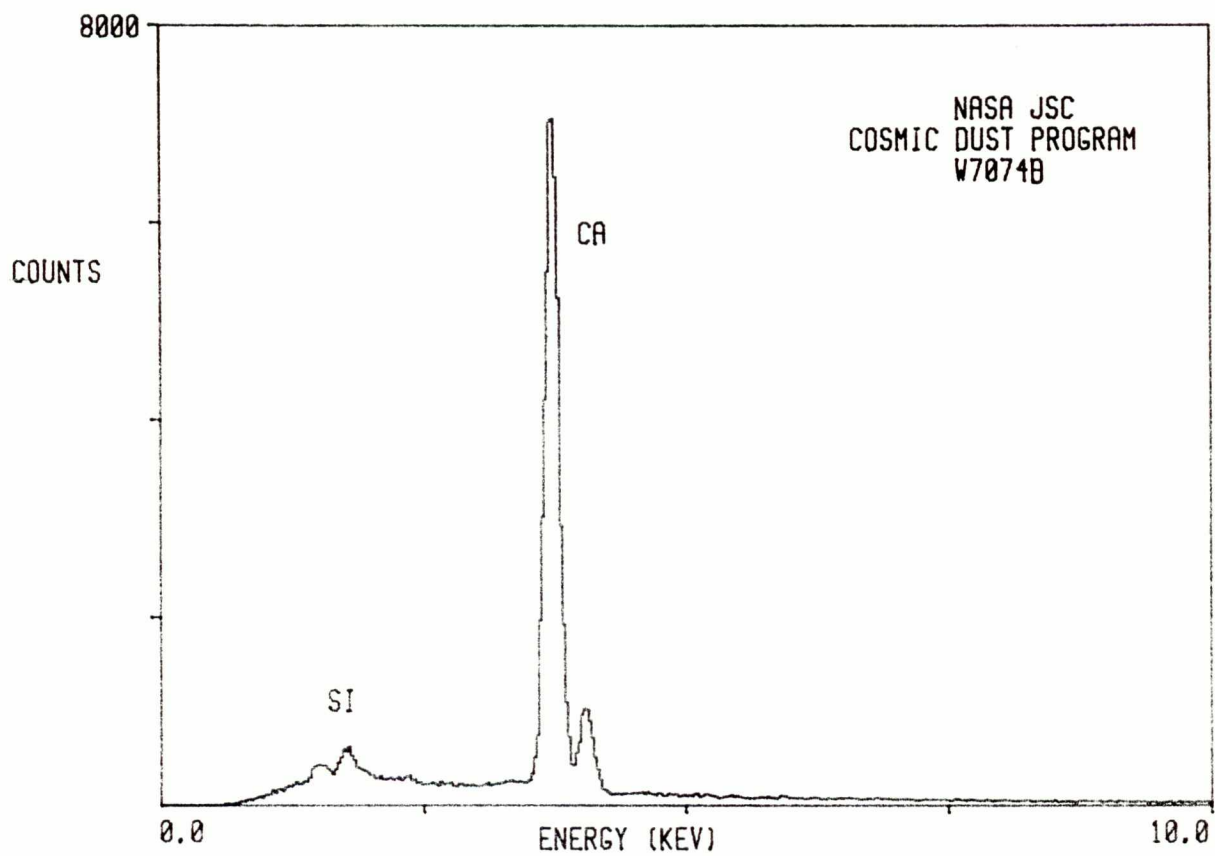
W7074 B 7



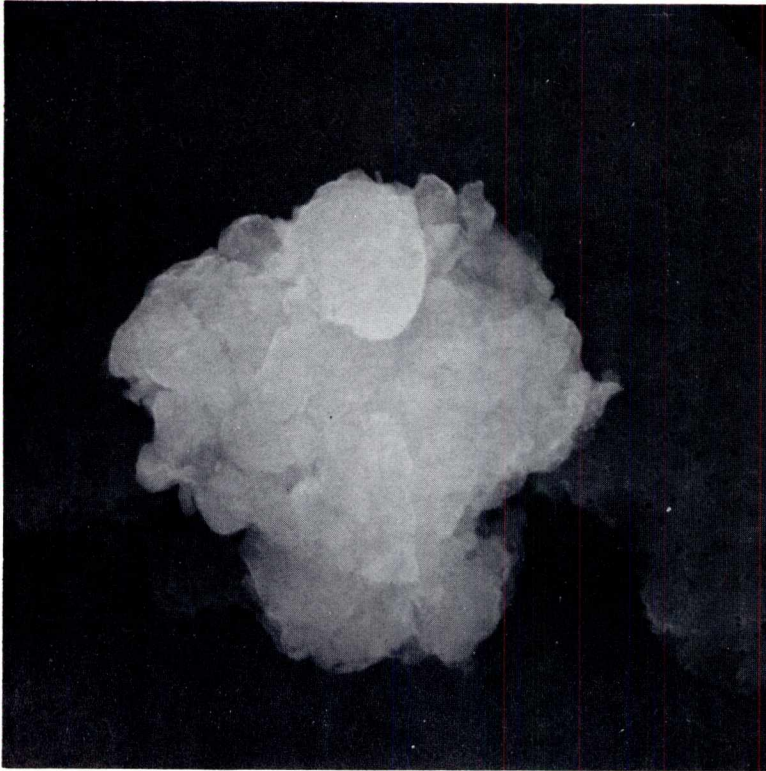
SIZE: 19
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53274

W7B7



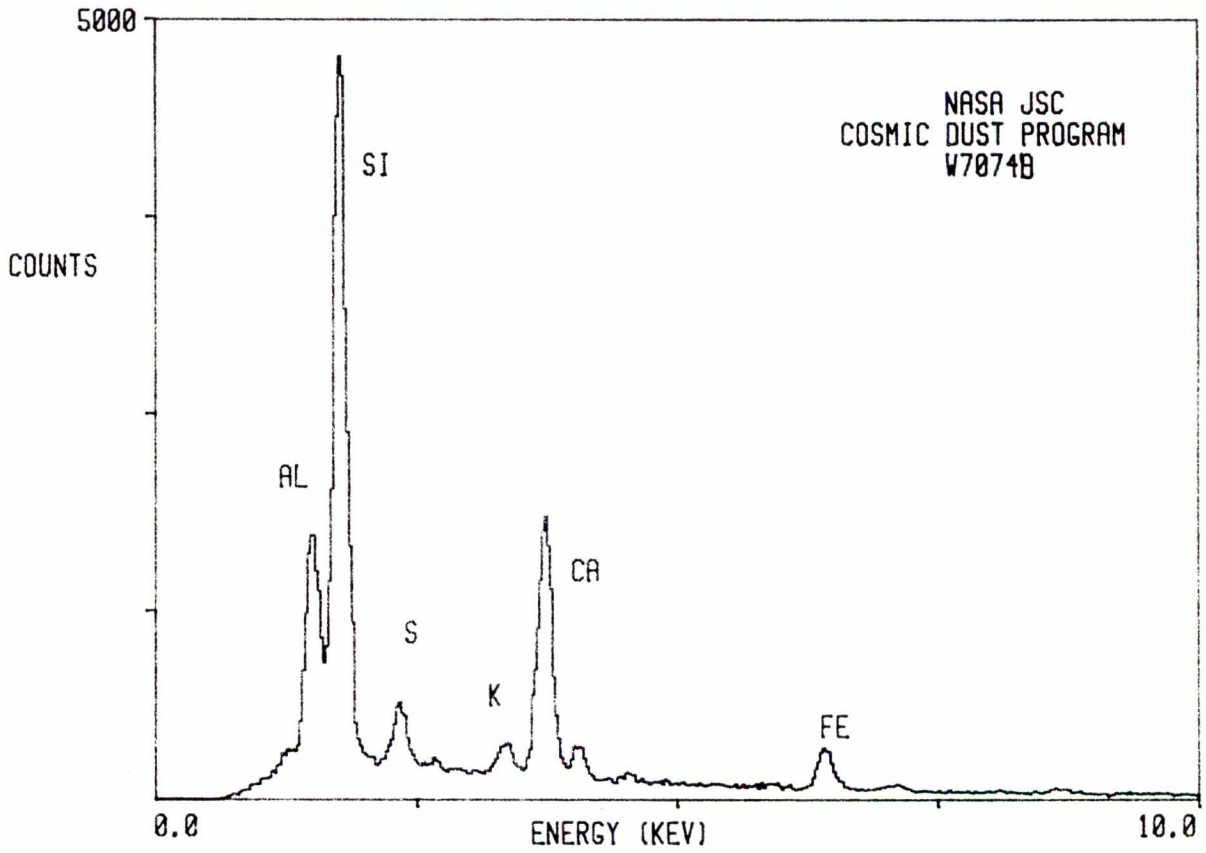
W7074 B 12



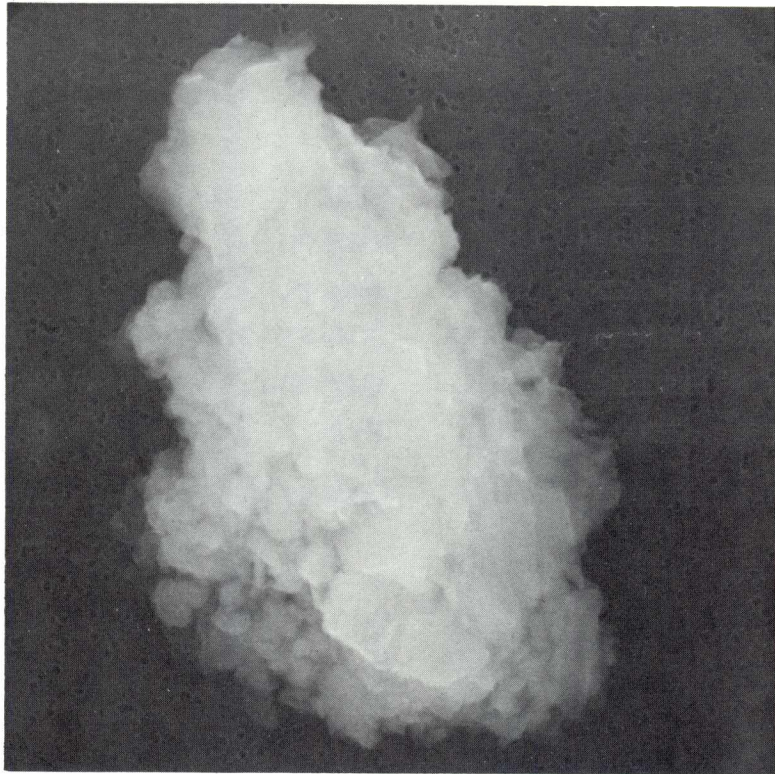
SIZE: 28x22
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: R/M
TYPE: TCN
COMMENTS:

S-88-53277

W7B12



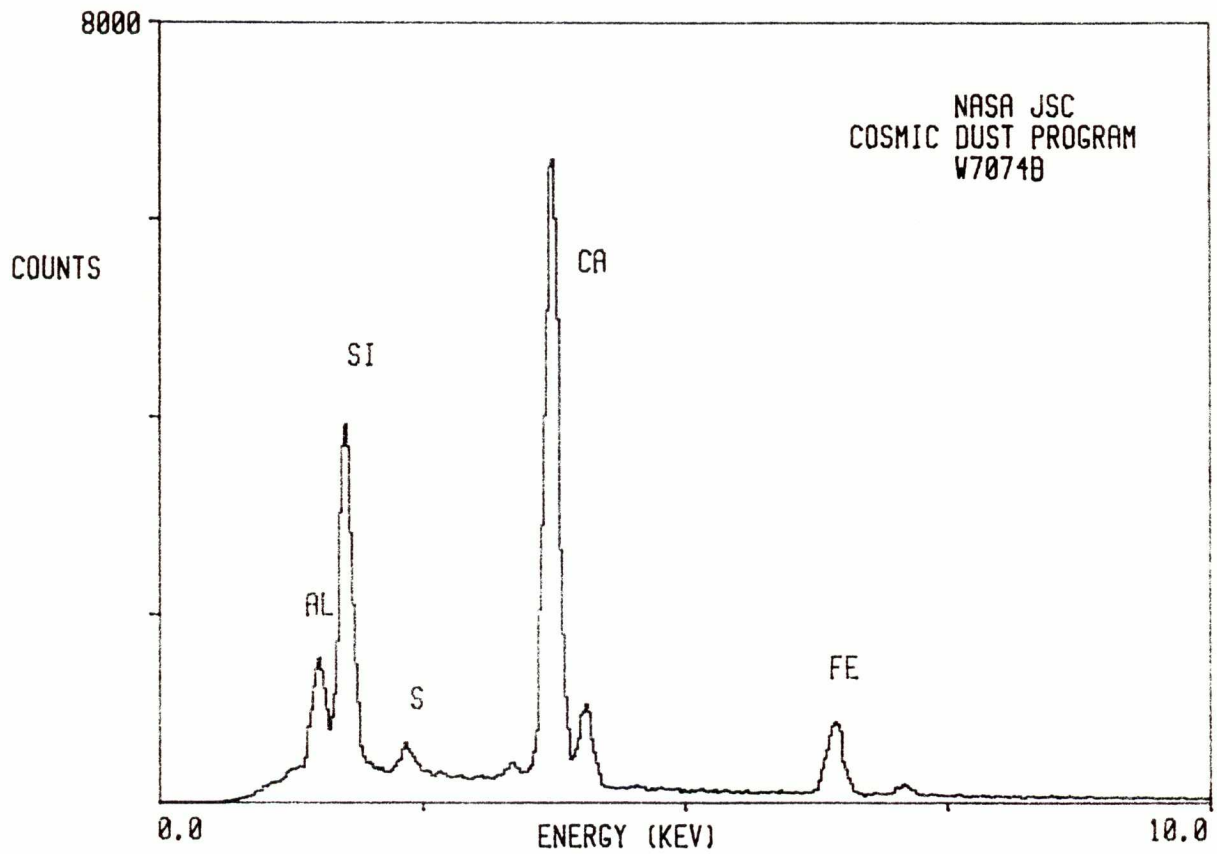
W7074 B 15



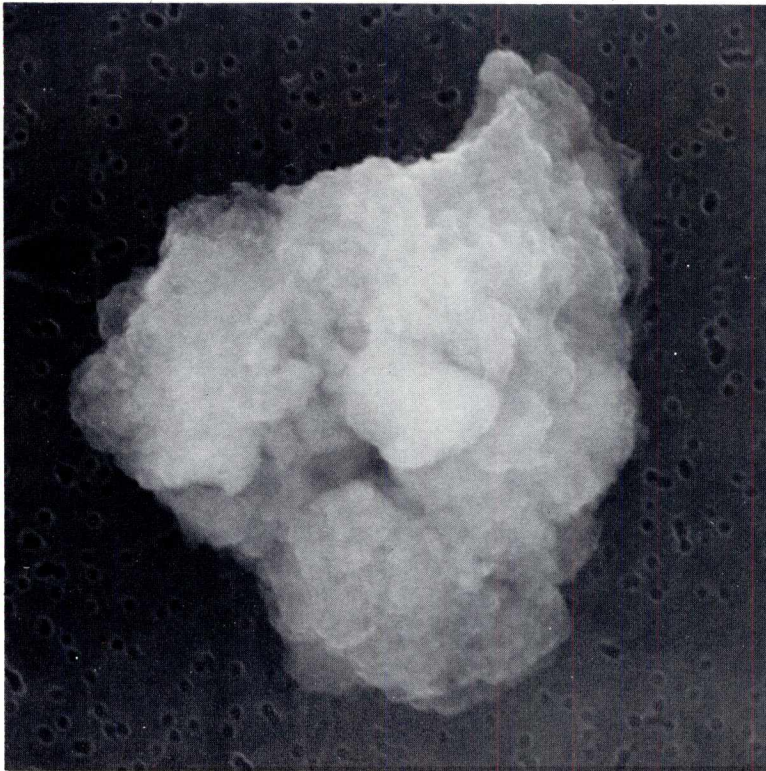
SIZE: 28x15
SHAPE: I
TRANS.: TL
COLOR: Yellow to red
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53280

W7B15



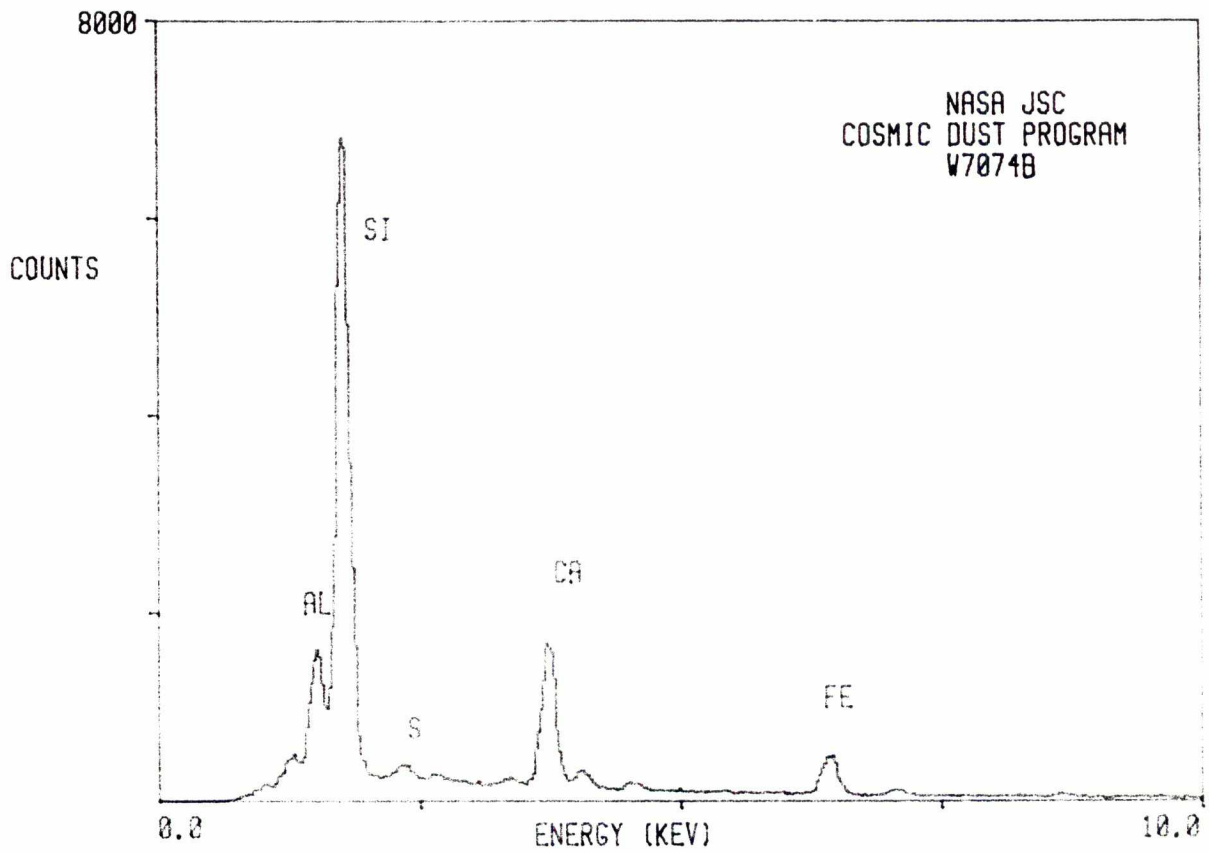
W7074 B 16



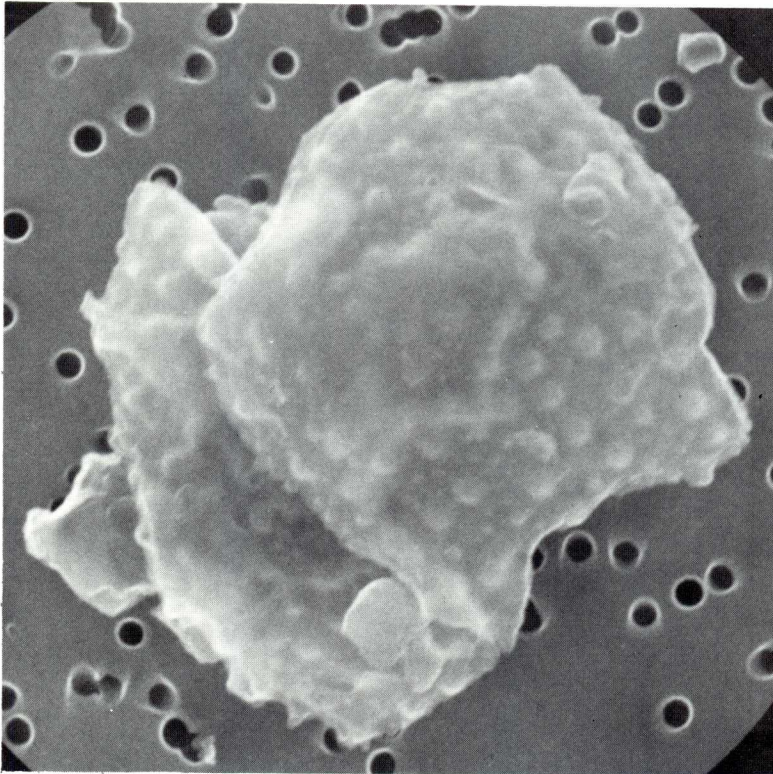
SIZE: 16
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SV/D
TYPE: TCN
COMMENTS:

S-88-53281

W7B16



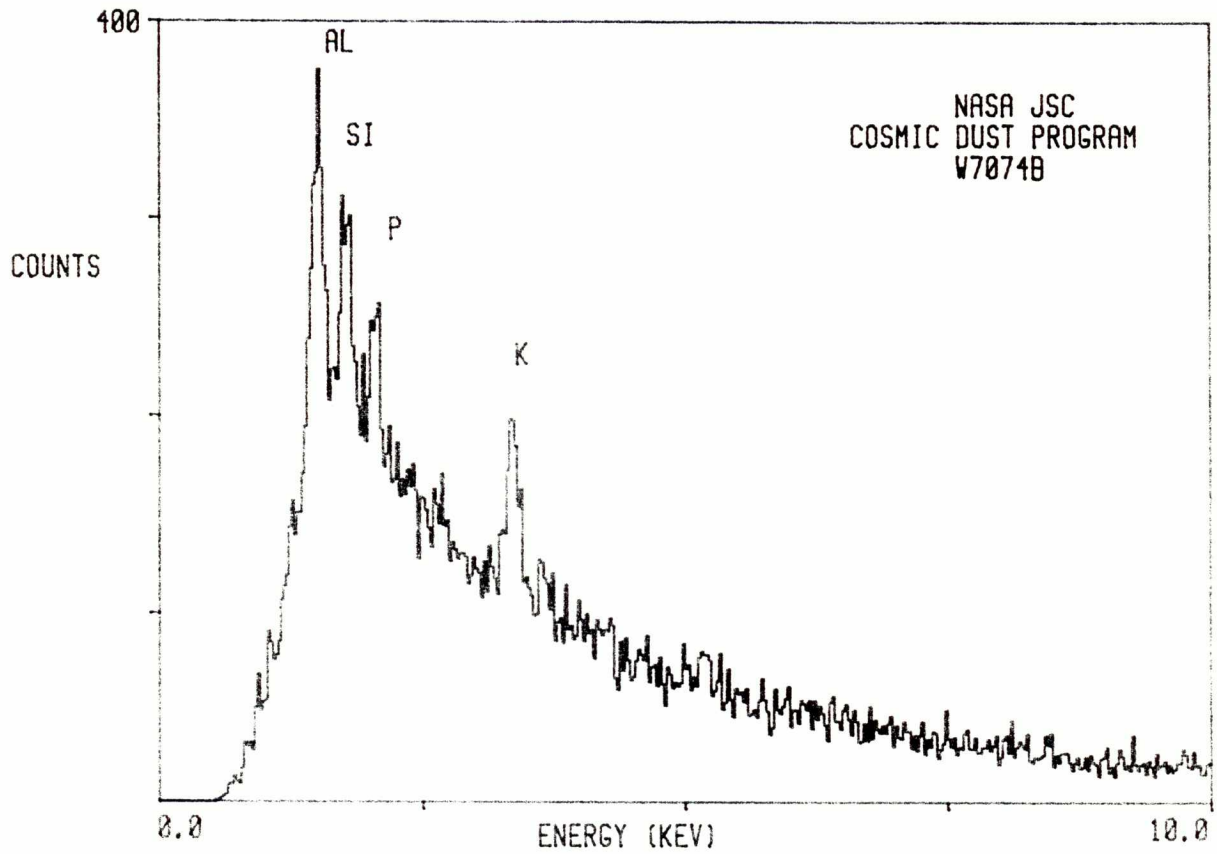
W7074 B 19



SIZE: 8x7
SHAPE: I
TRANS.: O
COLOR: Brown
LUSTER: SM
TYPE: TCN
COMMENTS:

S-88-53284

W7B19



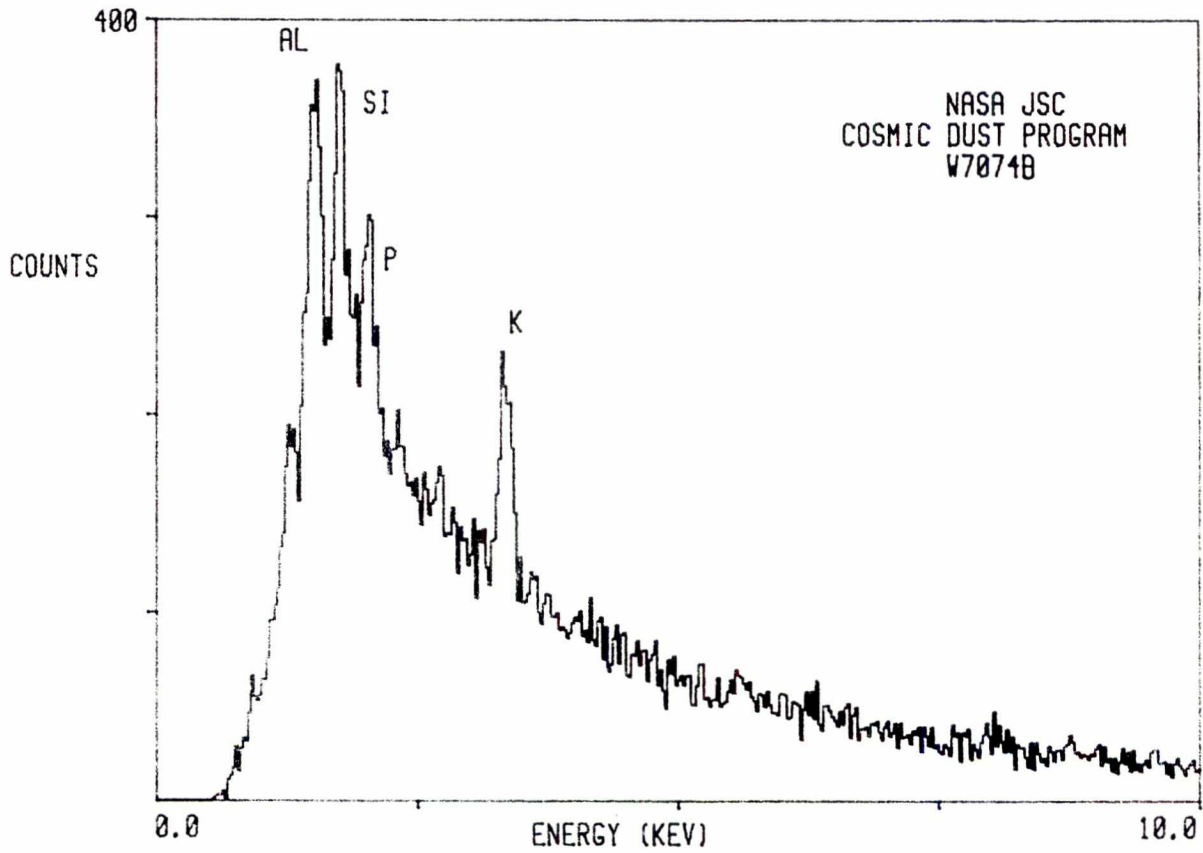
W7074 B 20



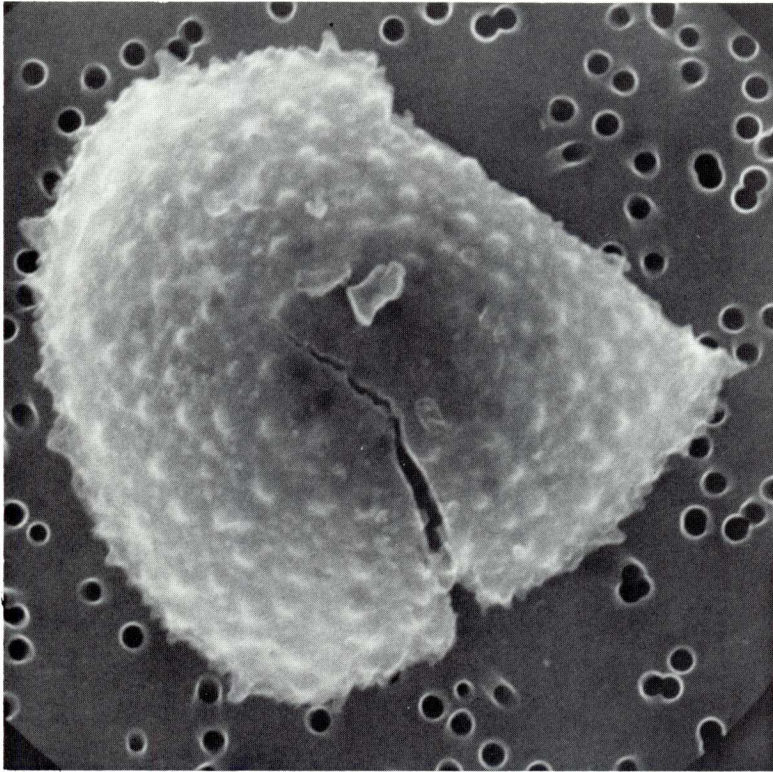
SIZE: 15x12
SHAPE: I
TRANS.: O
COLOR: Brown
LUSTER: D
TYPE: TCN
COMMENTS:

S-88-53285

W7B20



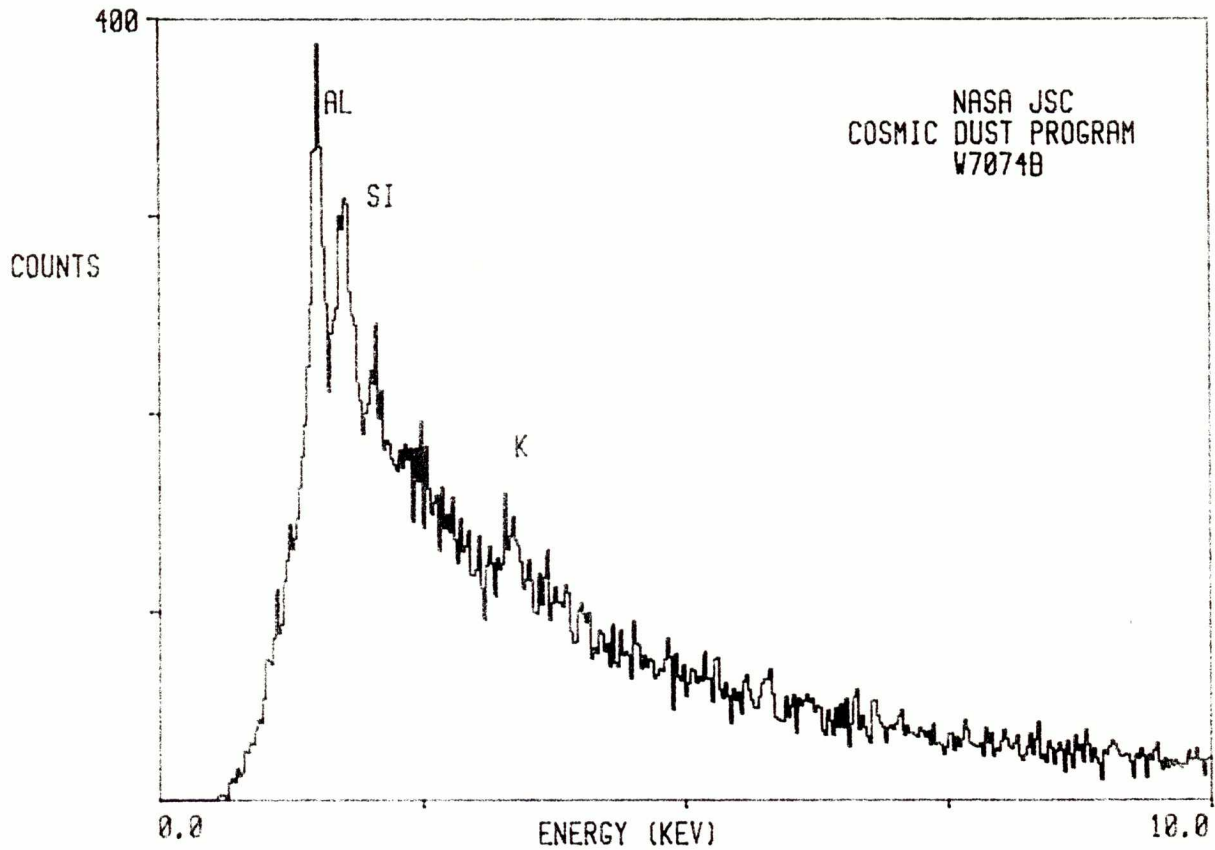
W7074 B 21



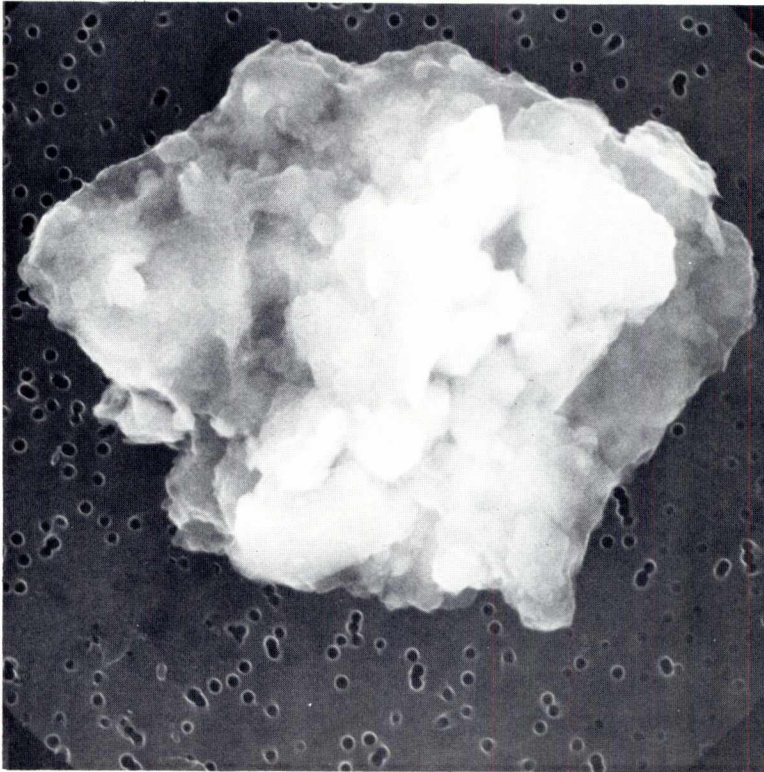
SIZE: 10x9
SHAPE: I
TRANS.: TL/O
COLOR: Brown
LUSTER: SM
TYPE: TCN
COMMENTS:

S-88-53286

W7B21



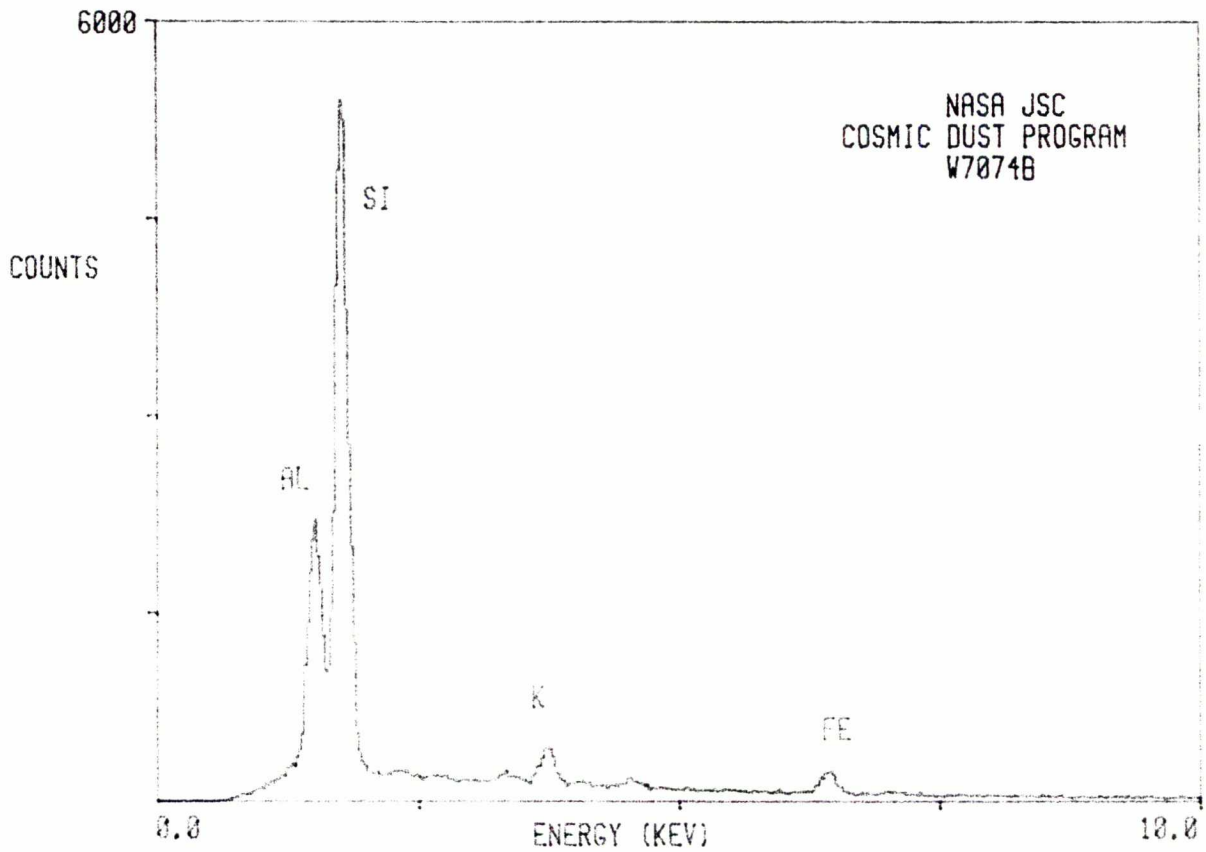
W7074 B 22



SIZE: 20x16
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: R/D
TYPE: TCN
COMMENTS:

S-88-53287

W7B22



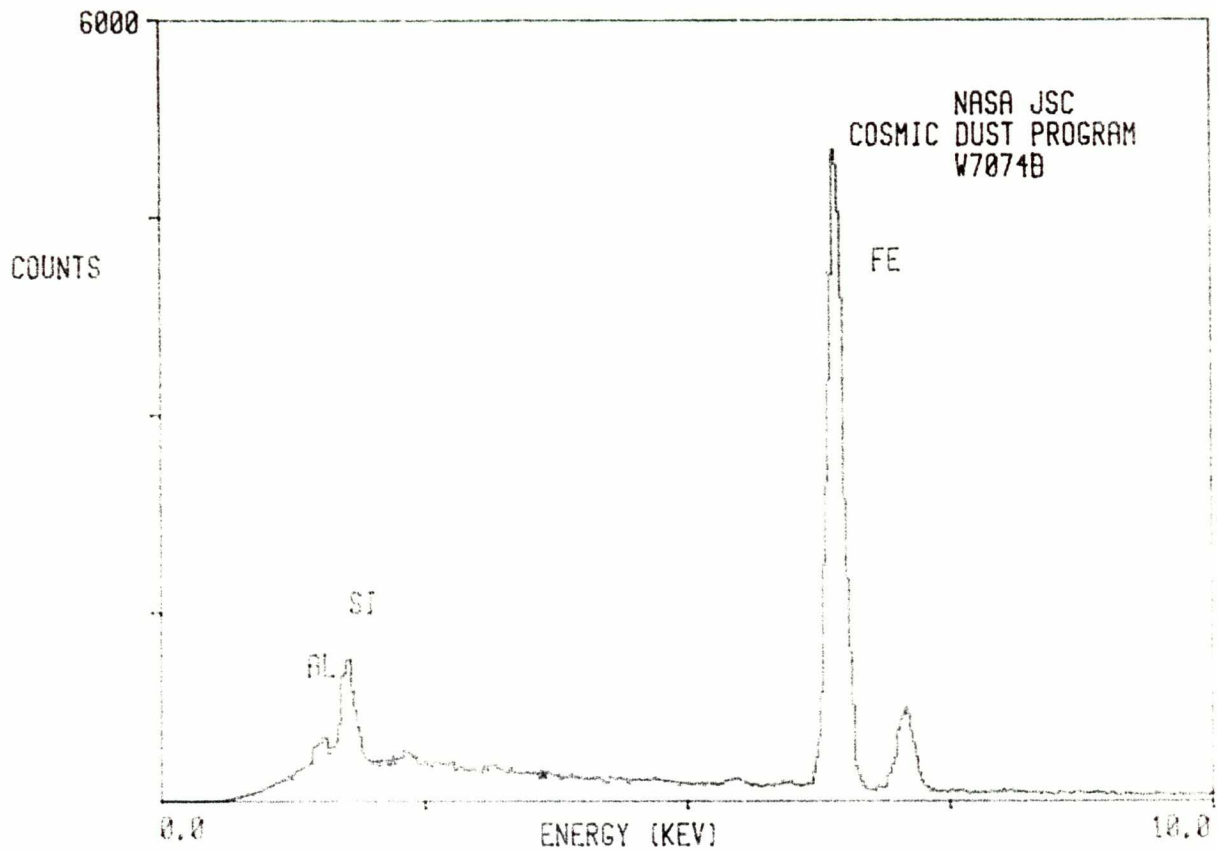
W7074 B 23



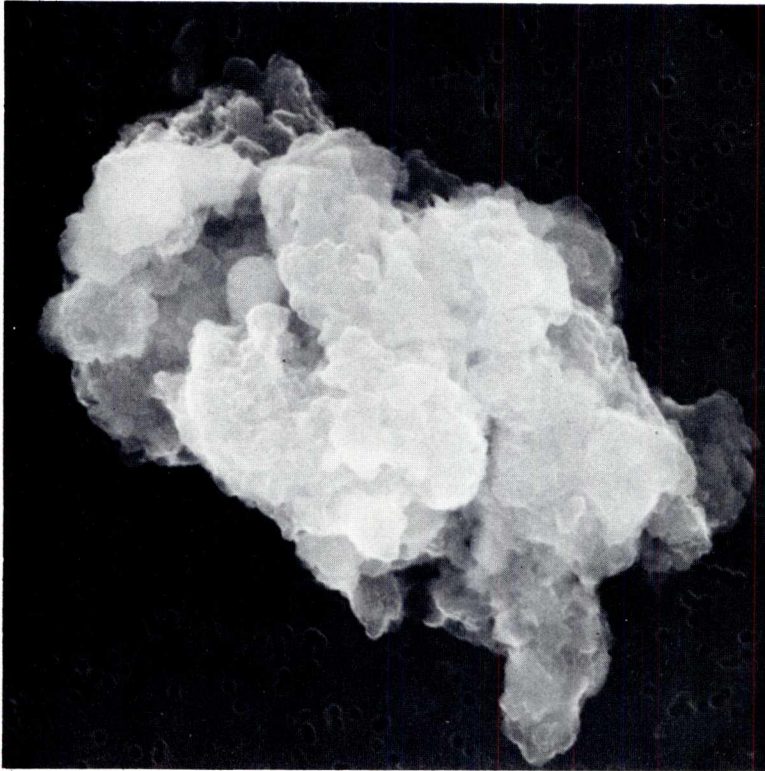
SIZE: 10
SHAPE: I
TRANS.: TL
COLOR: Orange
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53288

W7B23

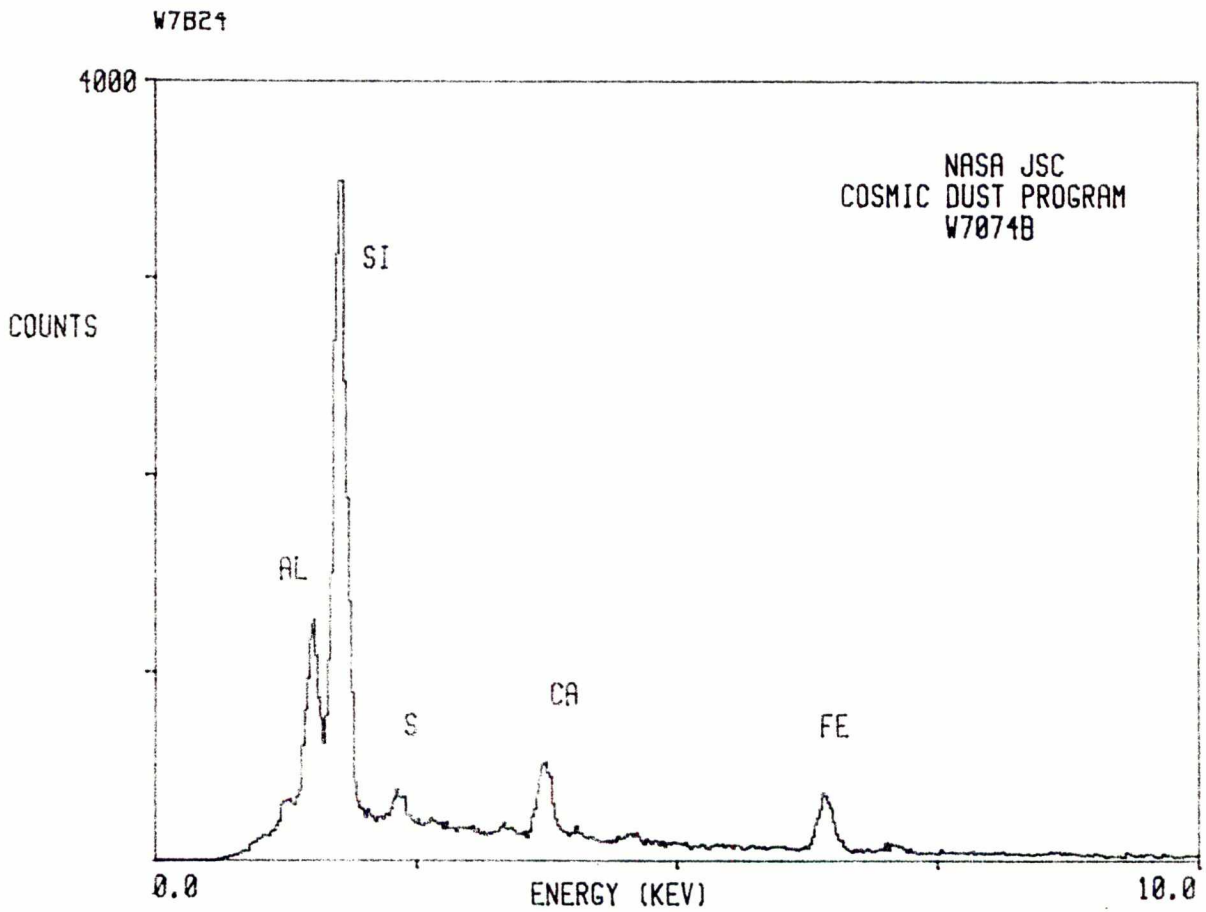


W7074 B 24

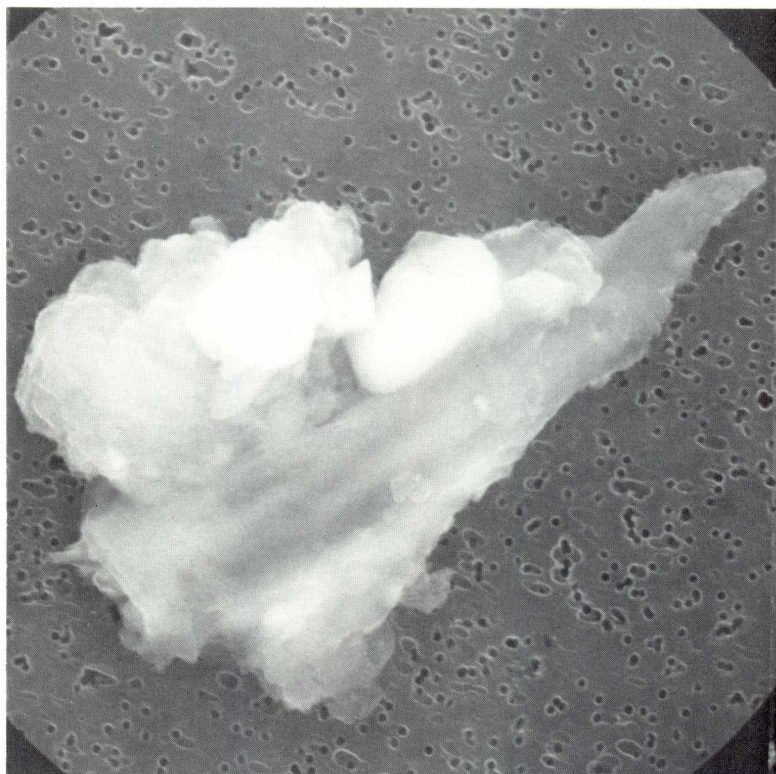


SIZE: 20x16
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: D
TYPE: TCN
COMMENTS:

S-88-53289

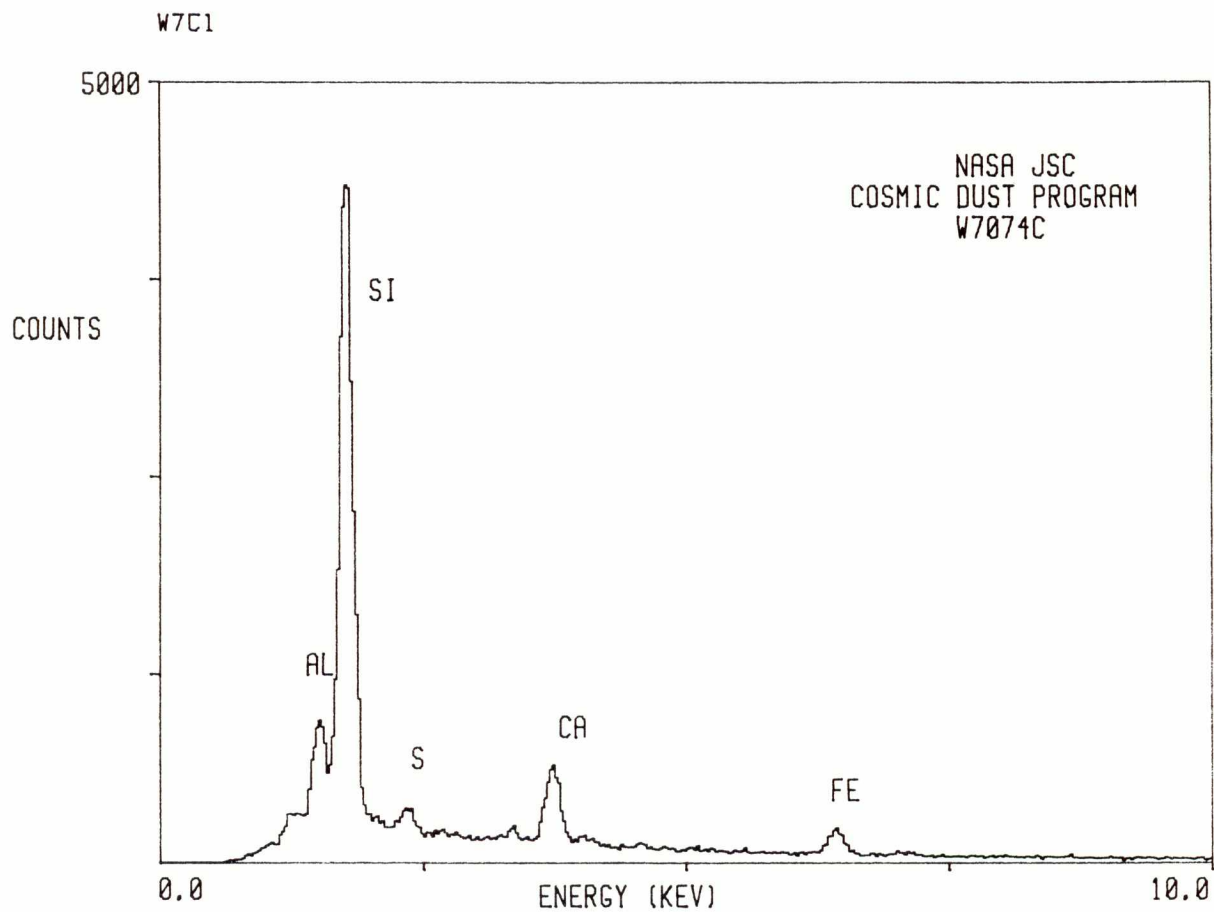


W7074 C 1

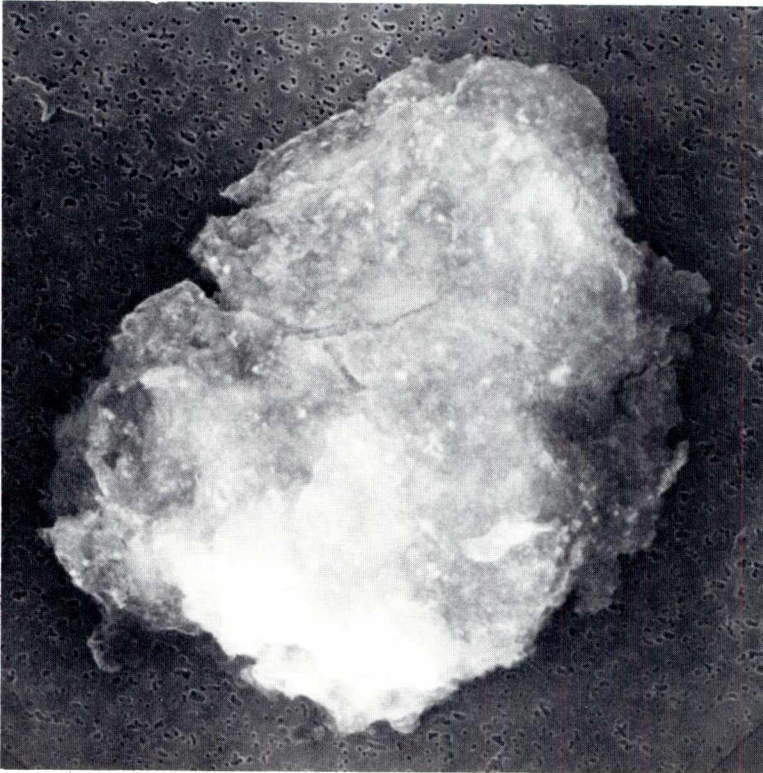


SIZE: 30x18
SHAPE: I
TRANS.: TL/O
COLOR: Yellow to black
LUSTER: R/M
TYPE: TCN
COMMENTS:

S-88-53290



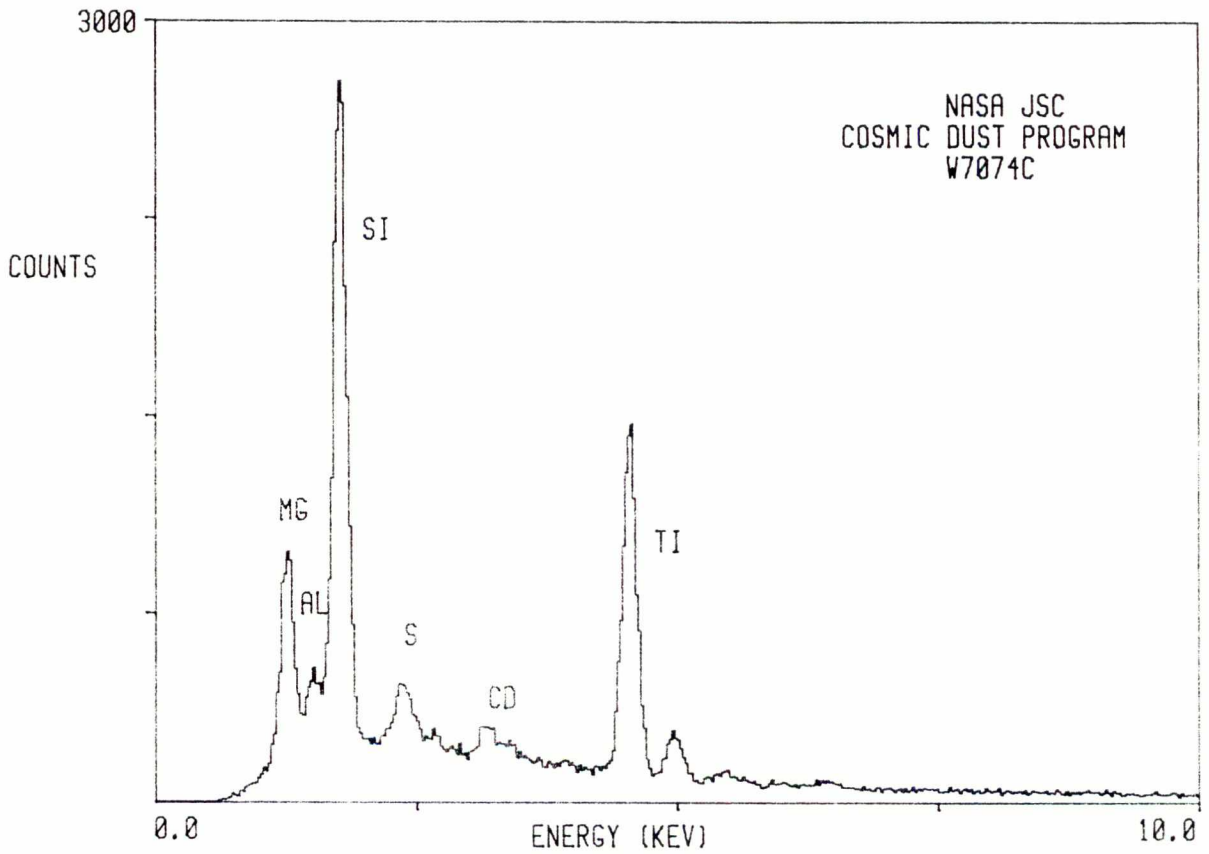
W7074 C 5



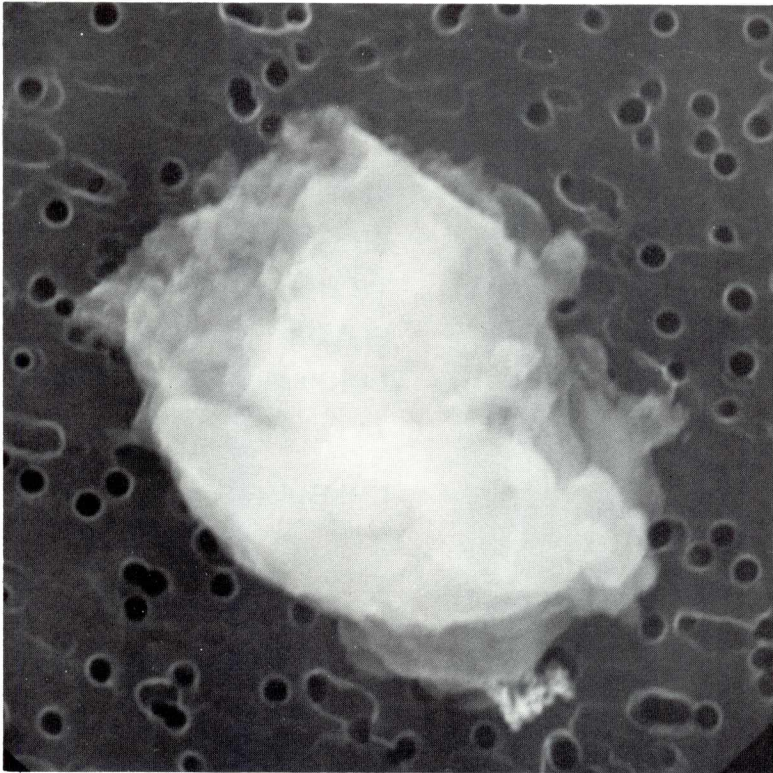
SIZE: 50x45
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53294

W7C5



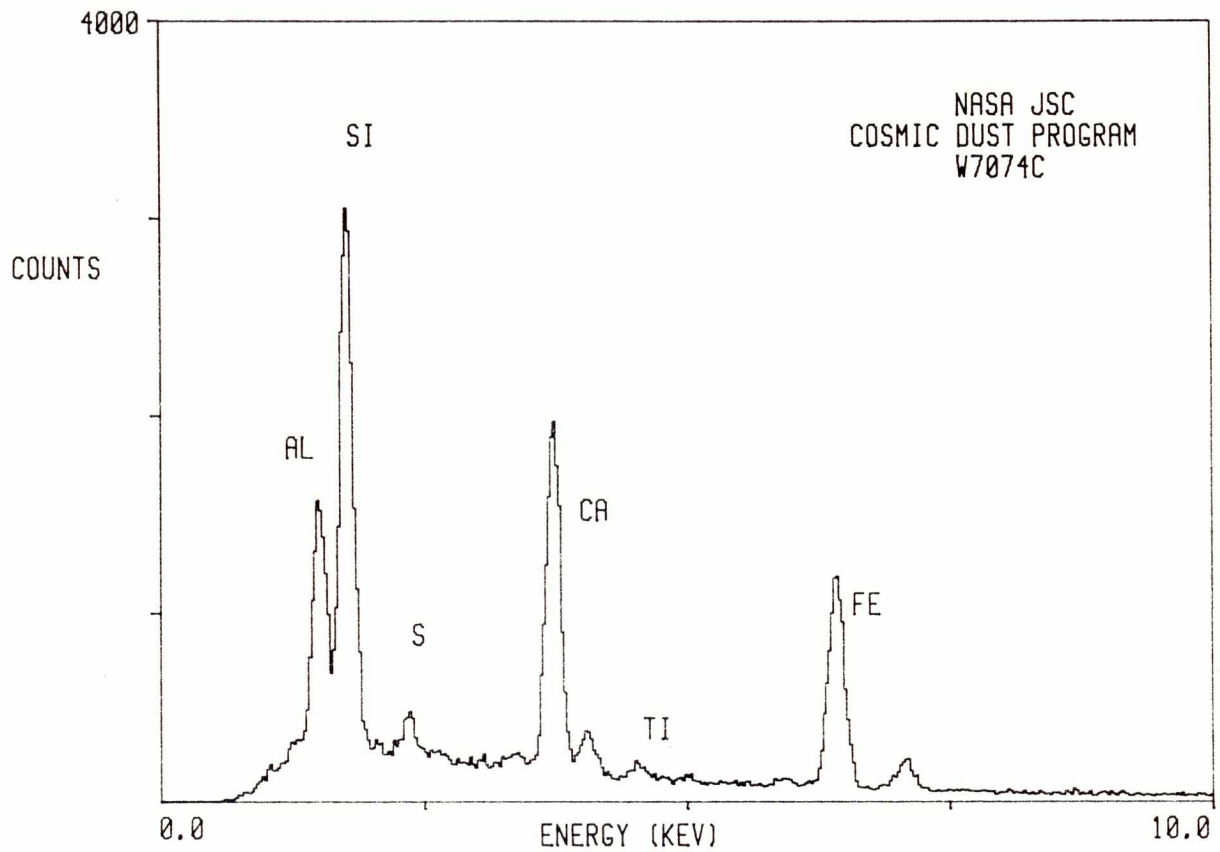
W7074 C 11



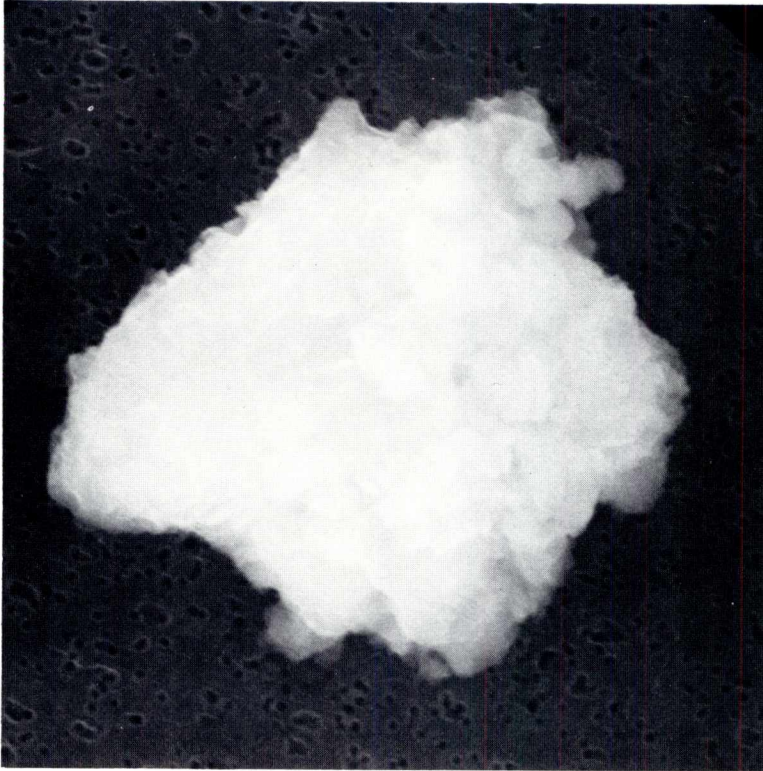
SIZE: 6
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R/SV
TYPE: TCN
COMMENTS:

S-88-53298

W7C11



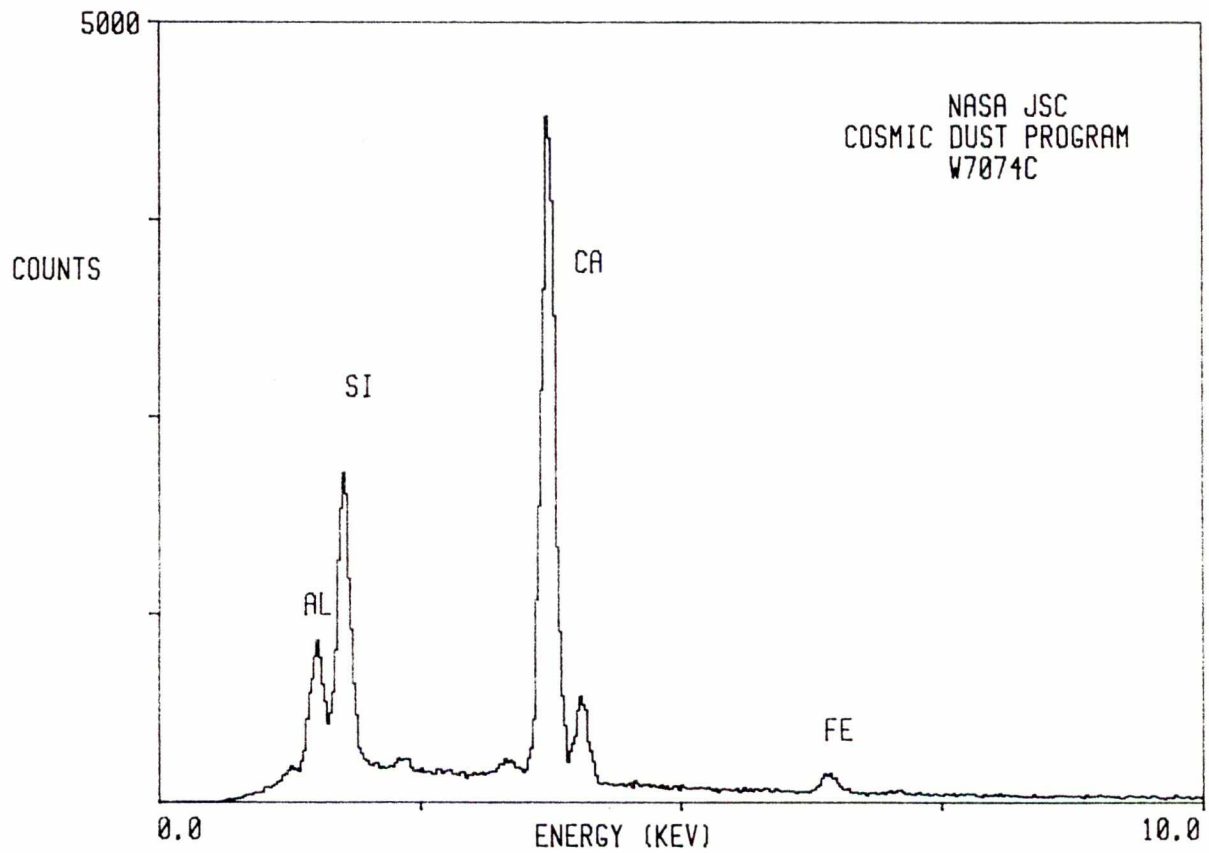
W7074 C 16



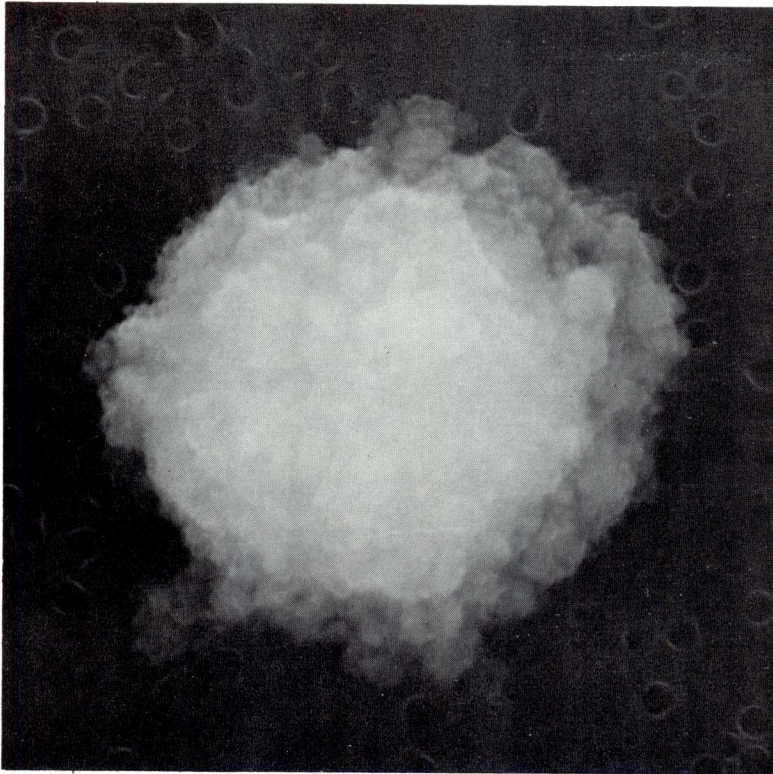
SIZE: 20
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R/D
TYPE: TCN
COMMENTS:

S-88-53303

W7C16



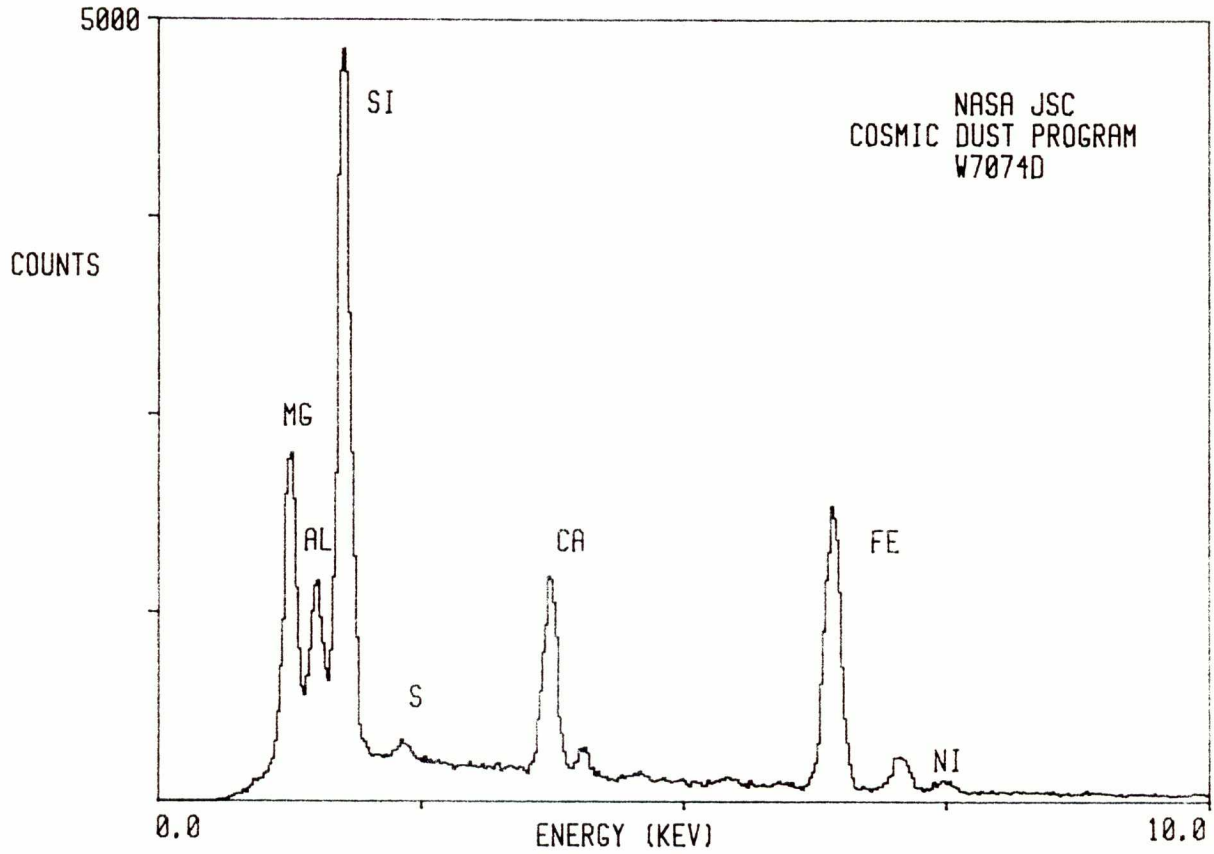
W7074 D 2



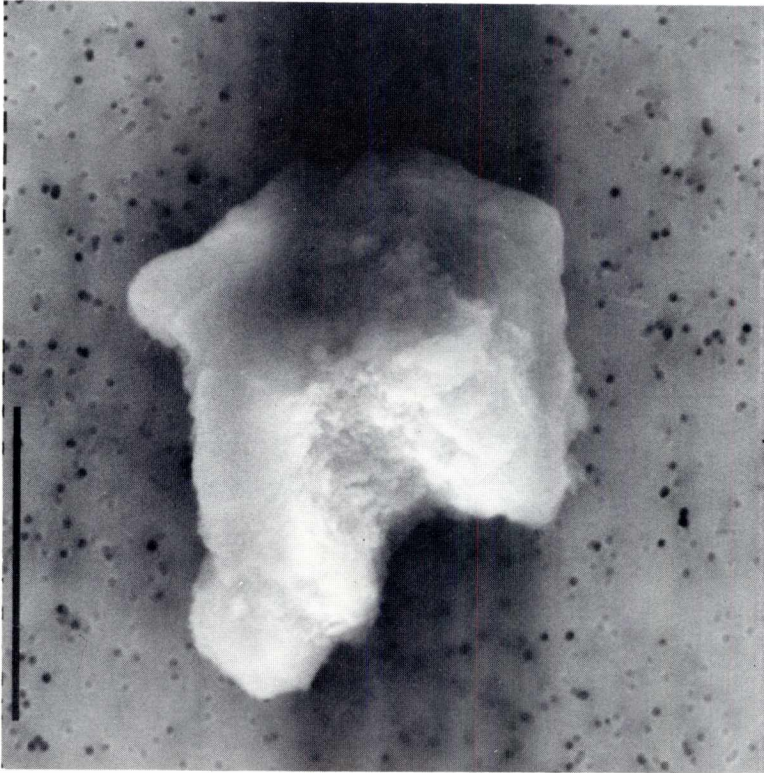
SIZE: 6
SHAPE: I
TRANS.: O
COLOR: Black
LUSTER: R/D
TYPE: TCN
COMMENTS:

S-88-53312

W702



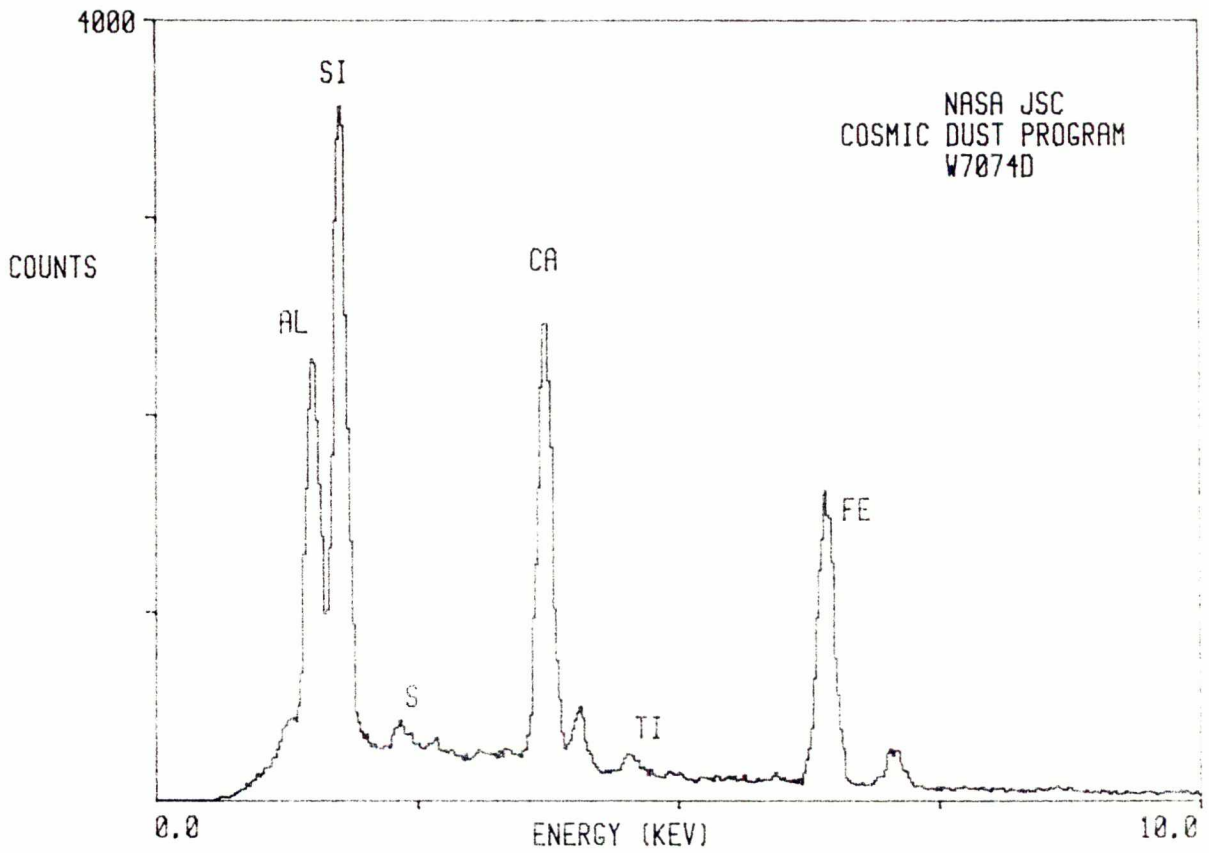
W7074 D 6



SIZE: 15
SHAPE: I
TRANS.: TL/O
COLOR: Yellow to black
LUSTER: R/D
TYPE: TCN
COMMENTS:

S-88-53315

W706



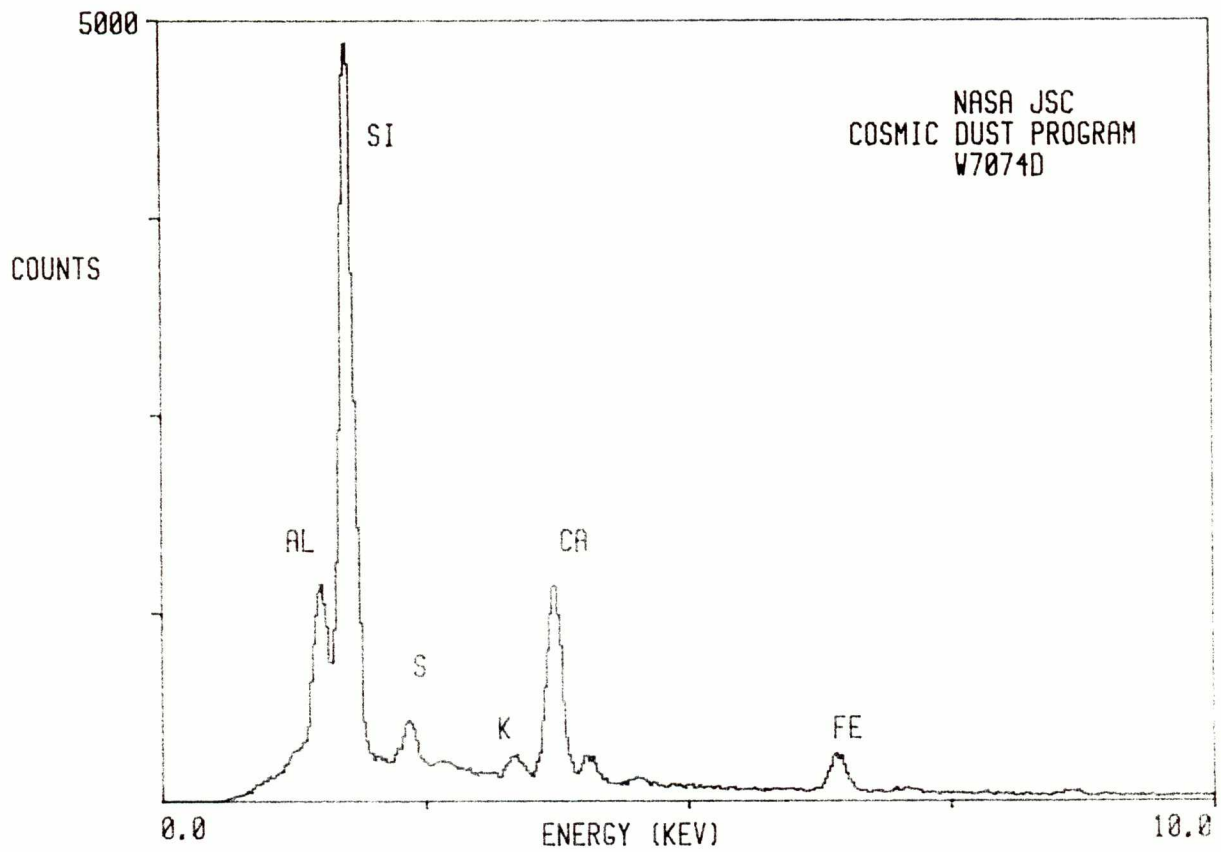
W7074 D 14



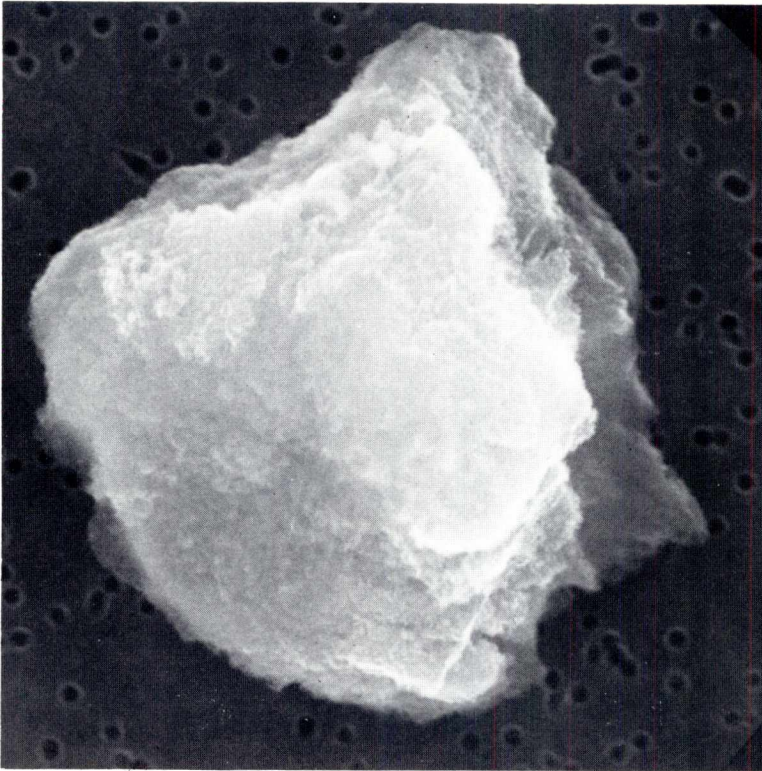
SIZE: 20x7
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCN
COMMENTS:

S-88-53322

W7D14



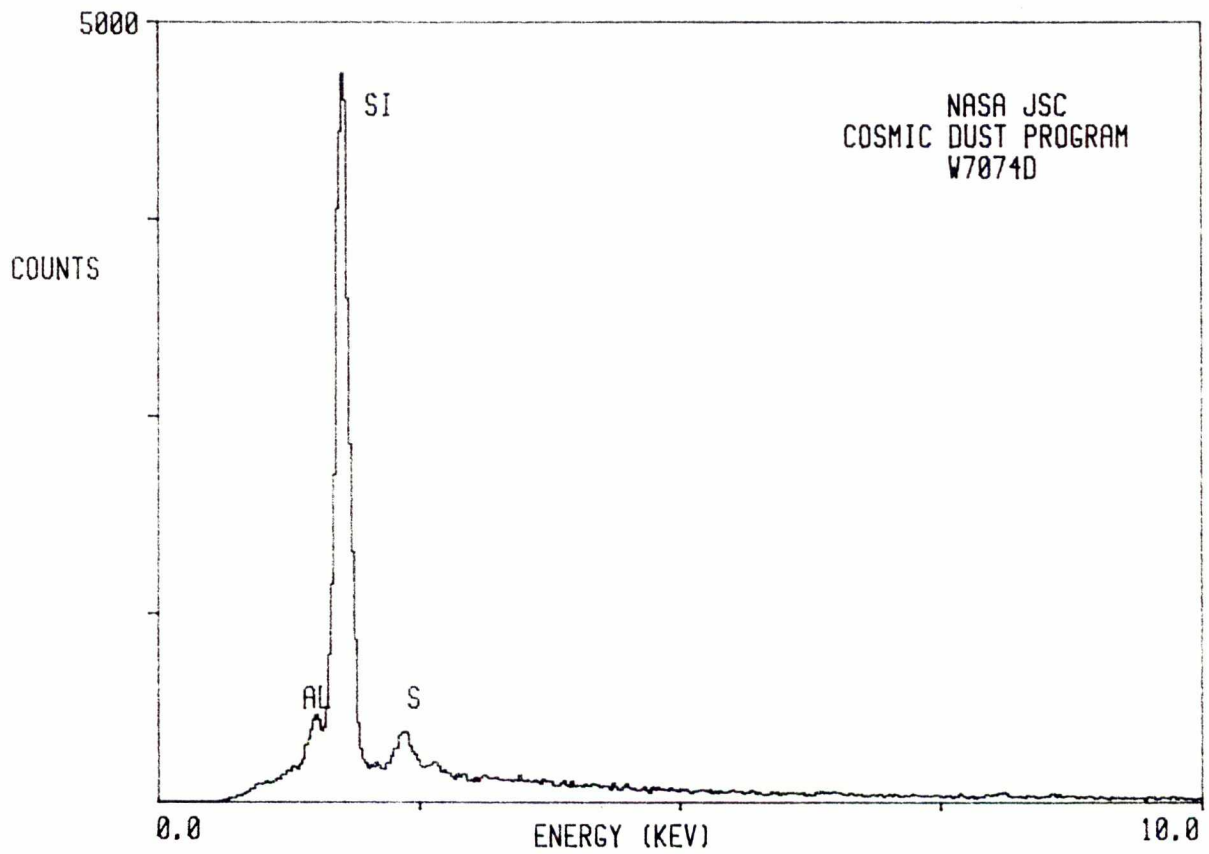
W7074 D 19



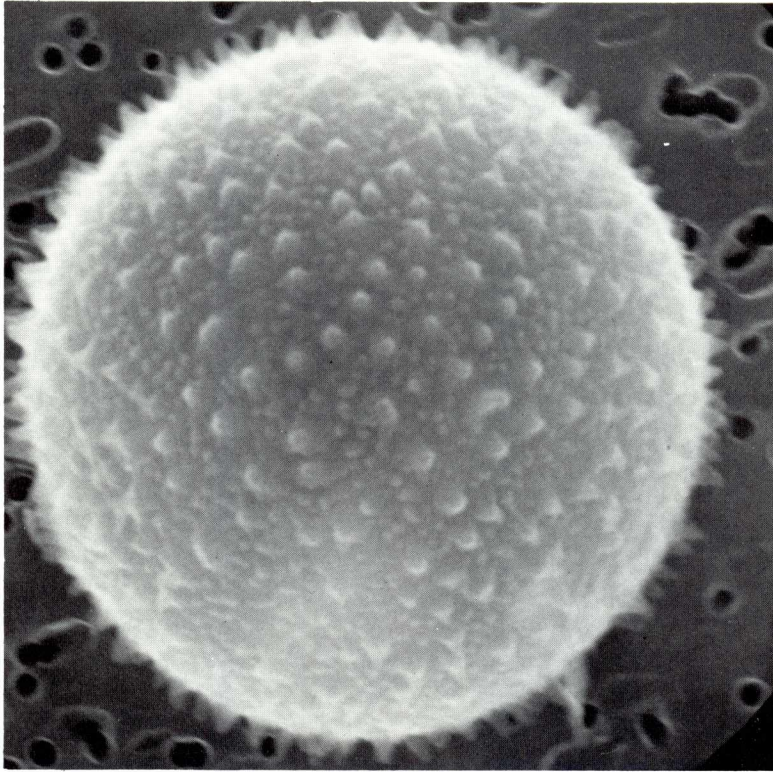
SIZE: 12
SHAPE: I
TRANS.: TL/O
COLOR: Colorless to black
LUSTER: SV/D
TYPE: TCN
COMMENTS:

S-88-53325

W7019



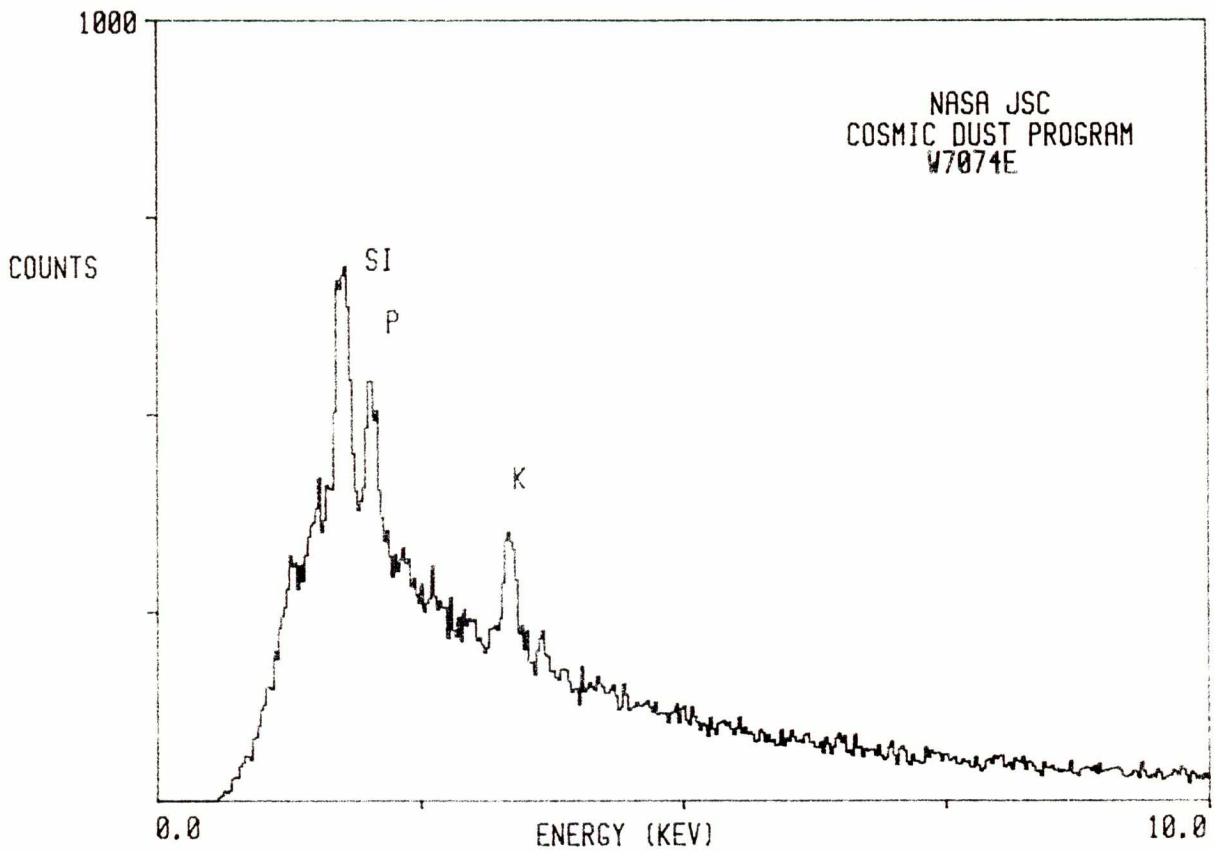
W7074 E 3



SIZE: 11
SHAPE: S
TRANS.: O
COLOR: Black
LUSTER: SV
TYPE: TCN
COMMENTS:
Pollen grain?

S-88-53327

W7E3



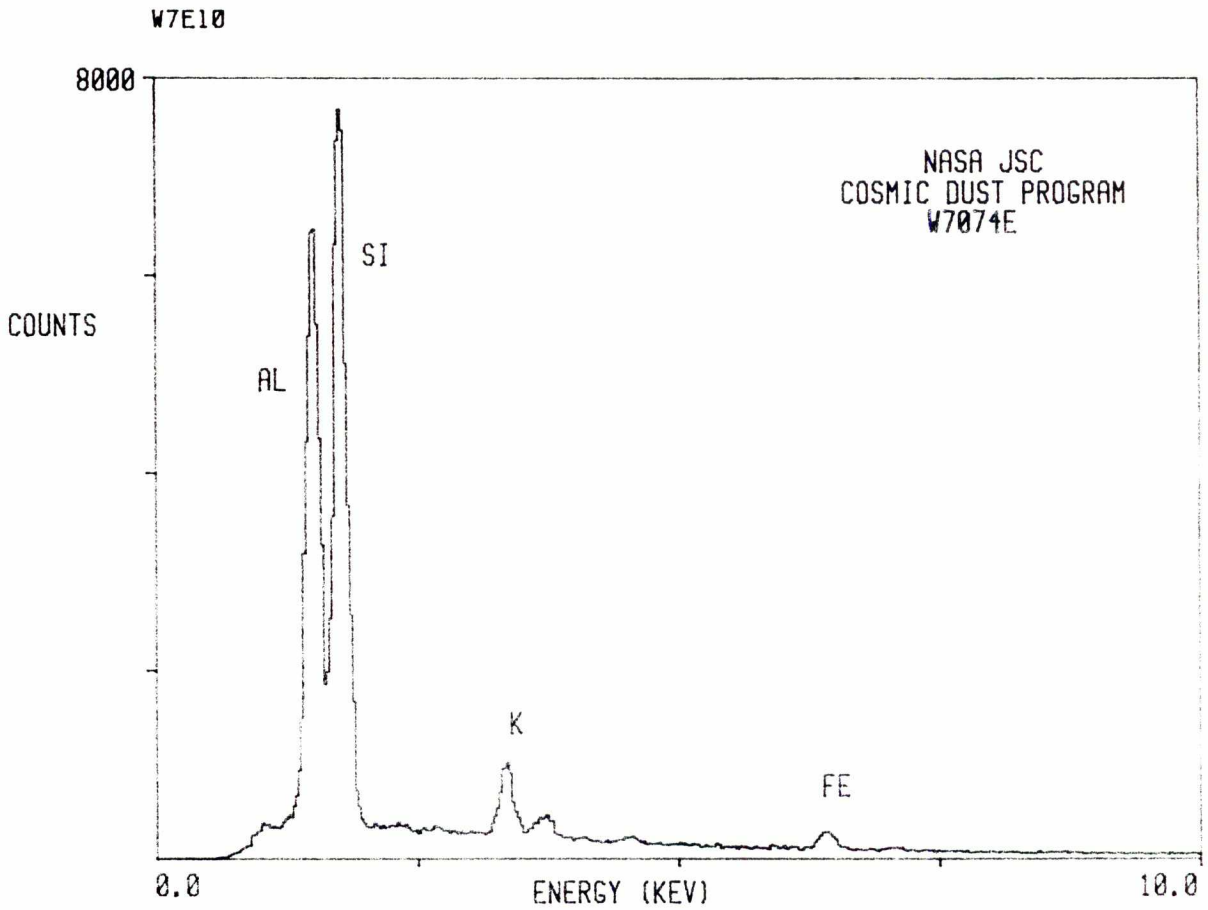
W7074 E 10



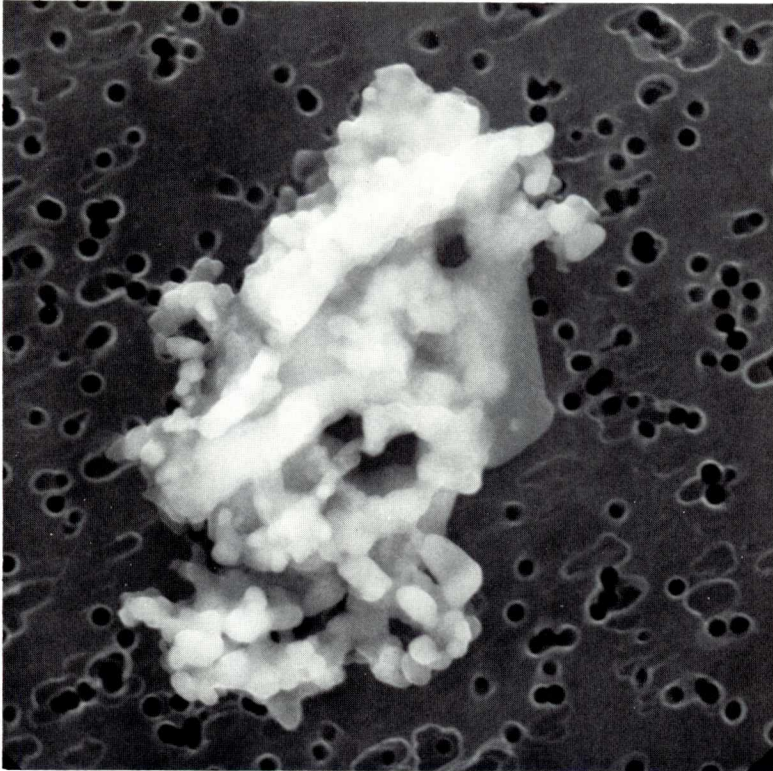
SIZE: 30x20
SHAPE: I
TRANS.: TL
COLOR: Orange
LUSTER: R
TYPE: TCN

COMMENTS:
Related to
W7074E11

S-88-53331



W7074 E 11

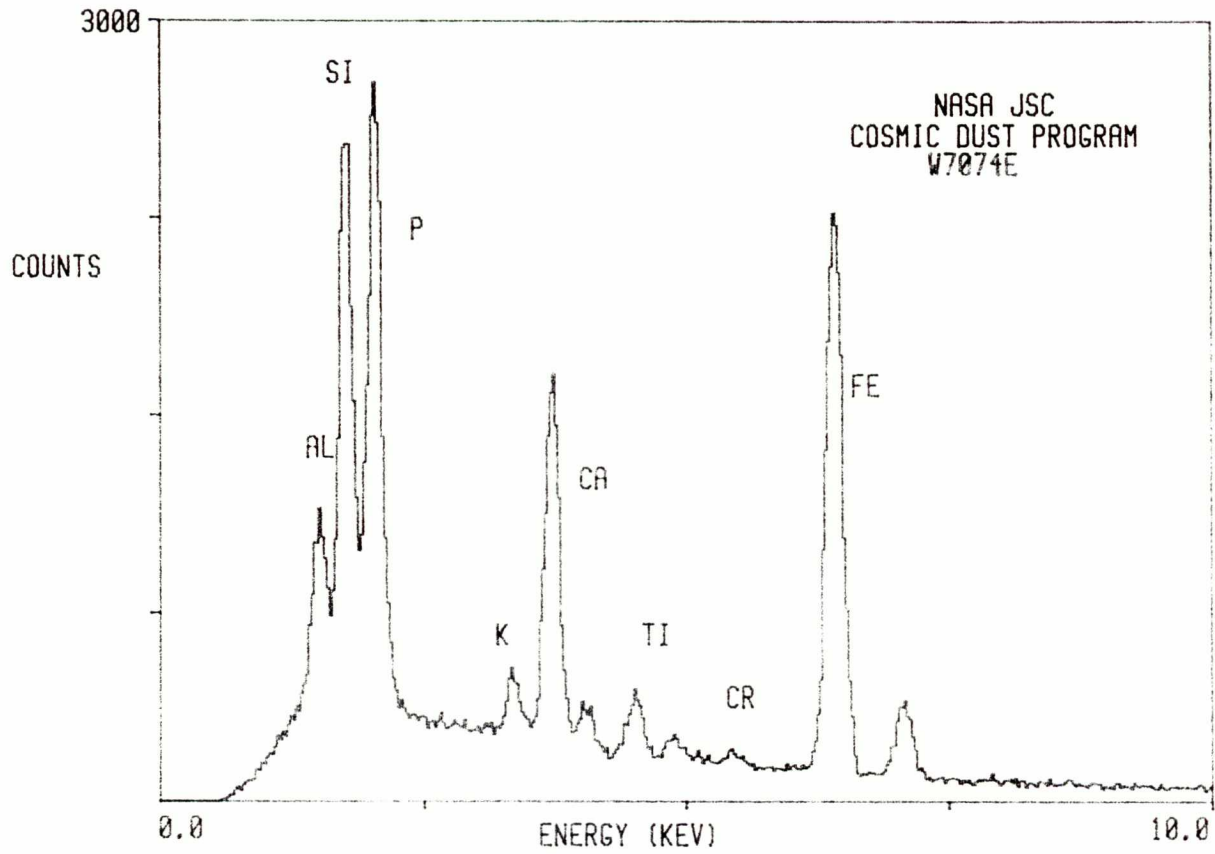


SIZE: 10
SHAPE: I
TRANS.: TL
COLOR: Orange
LUSTER: R
TYPE: TCN

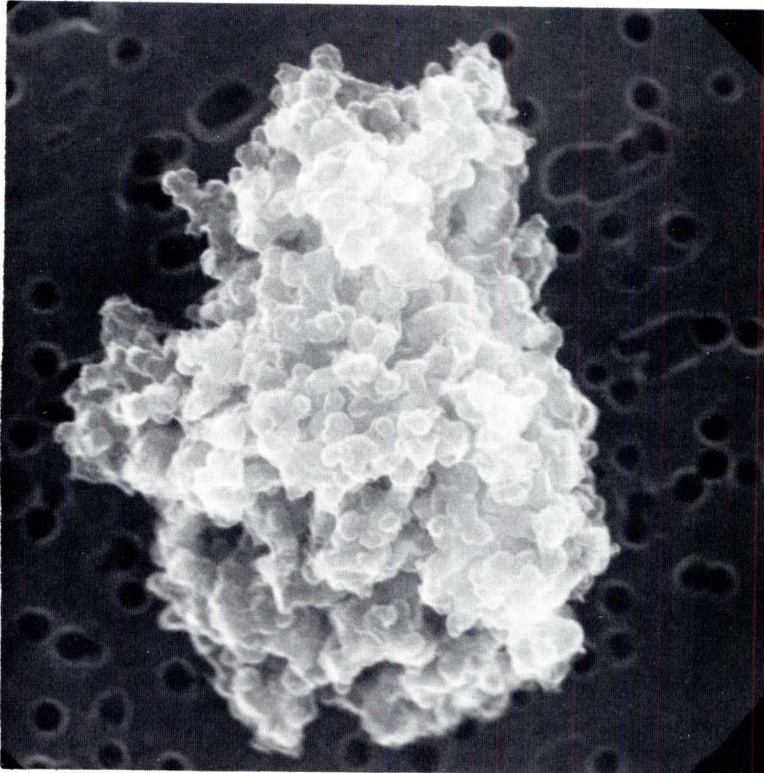
COMMENTS:
Largest particle
in a field of
particles.
Related to
W7074E10

S-88-53332

W7E11



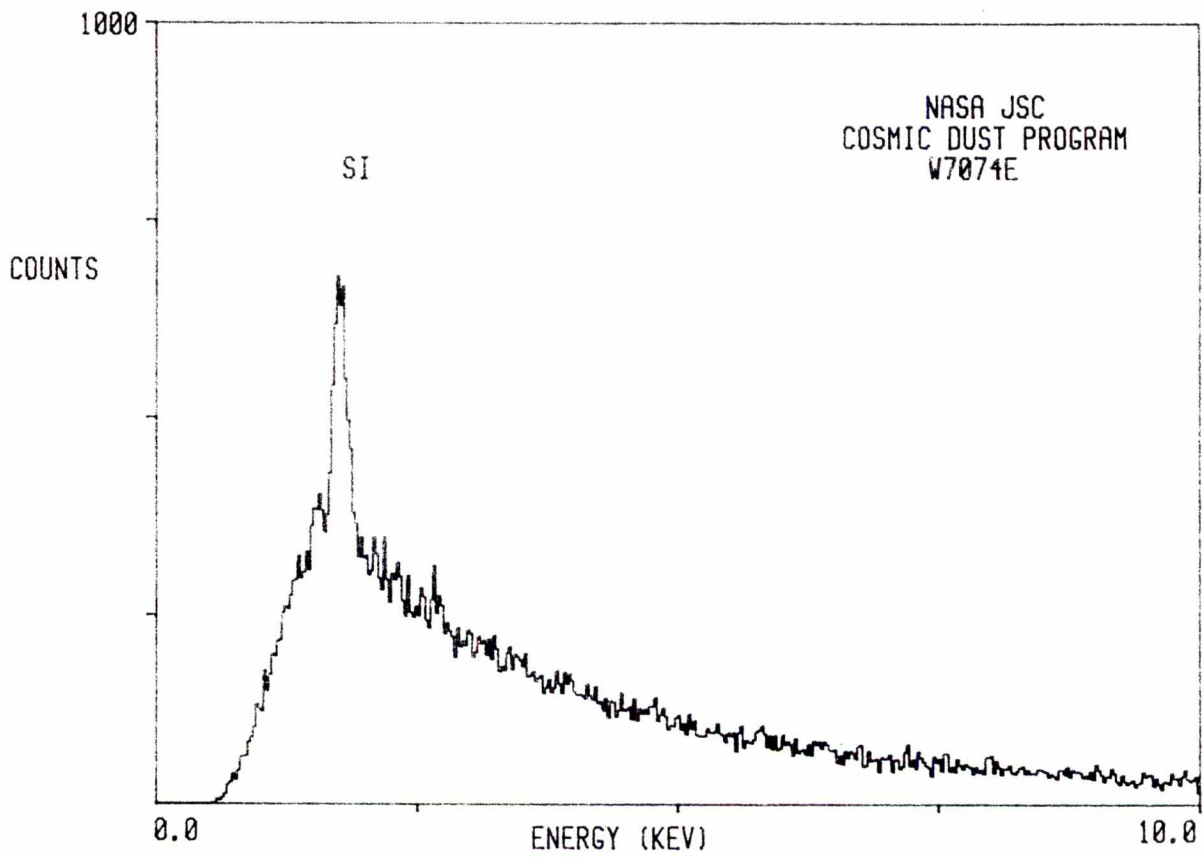
W7074 E 15



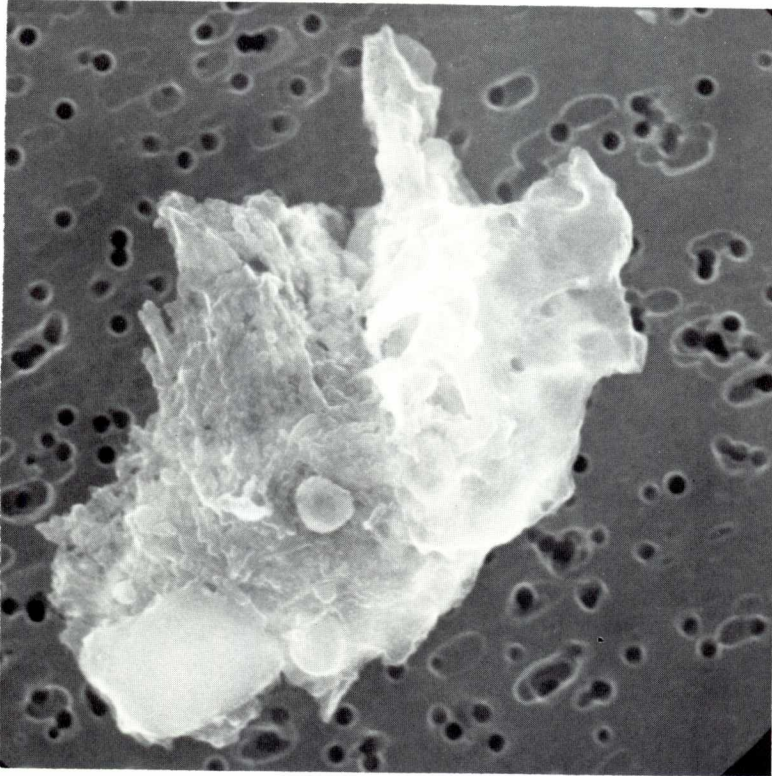
SIZE: 10x7
SHAPE: I
TRANS.: O
COLOR: Black
LUSTER: D
TYPE: TCN
COMMENTS:

S-88-53334

W7E15

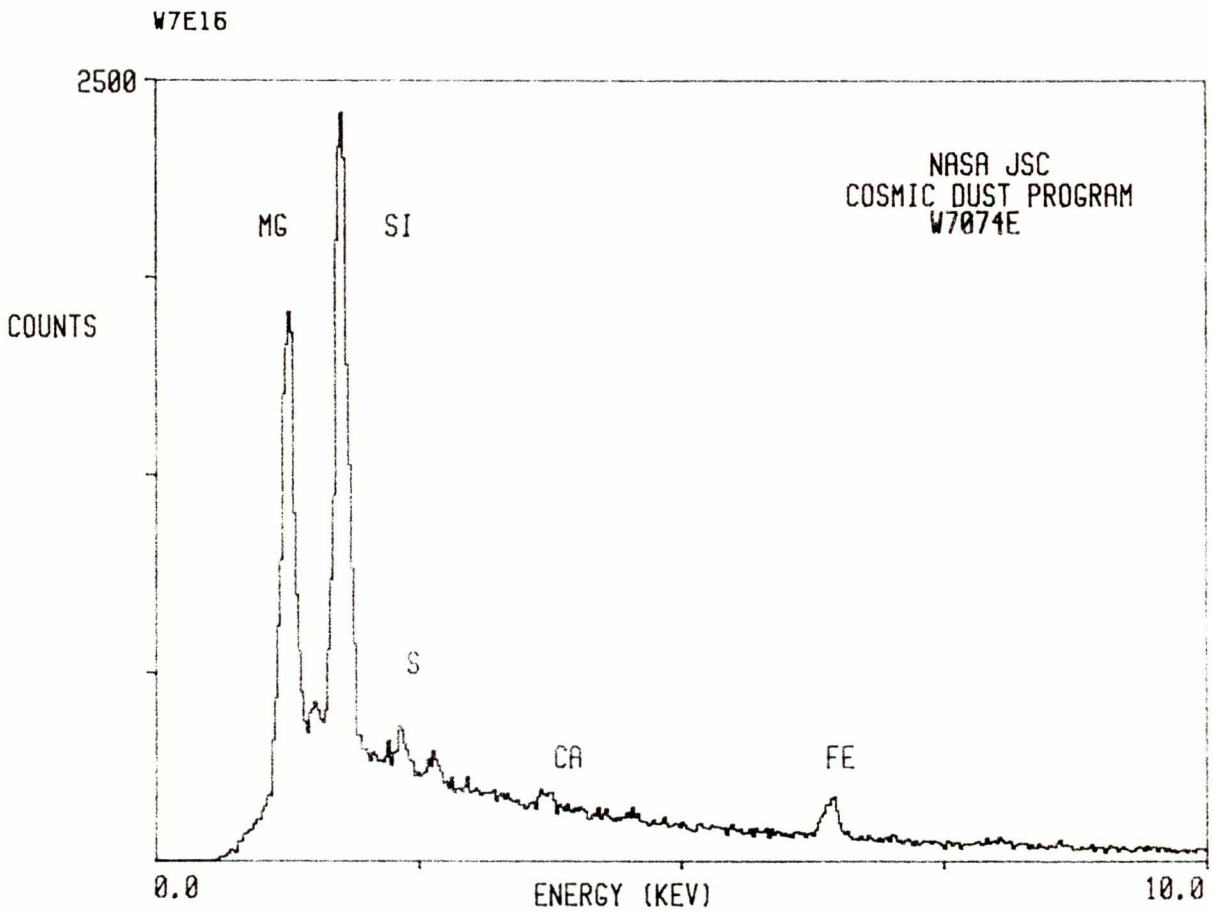


W7074 E 16

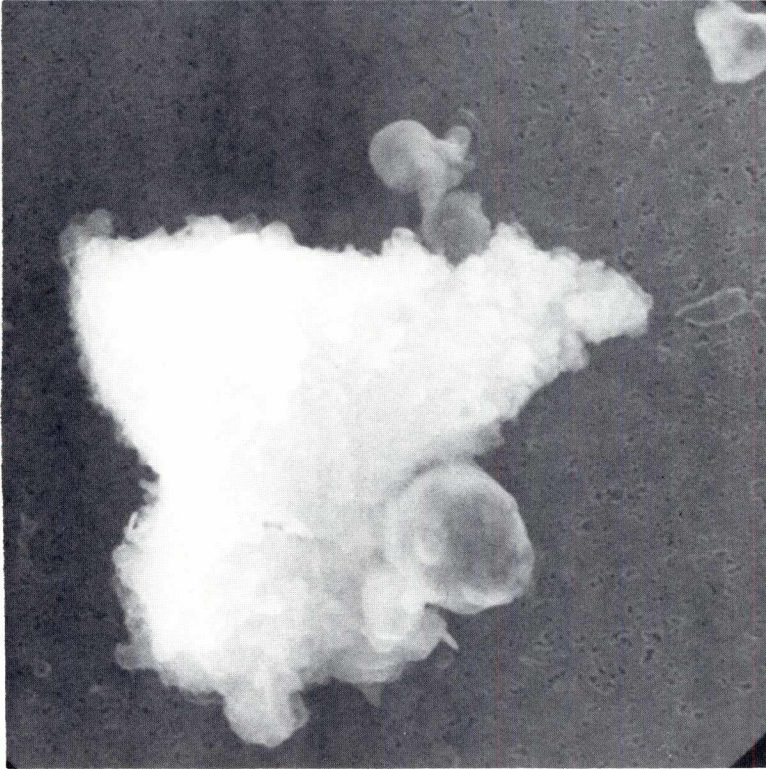


SIZE: 12x8
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCN
COMMENTS:

S-88-53335



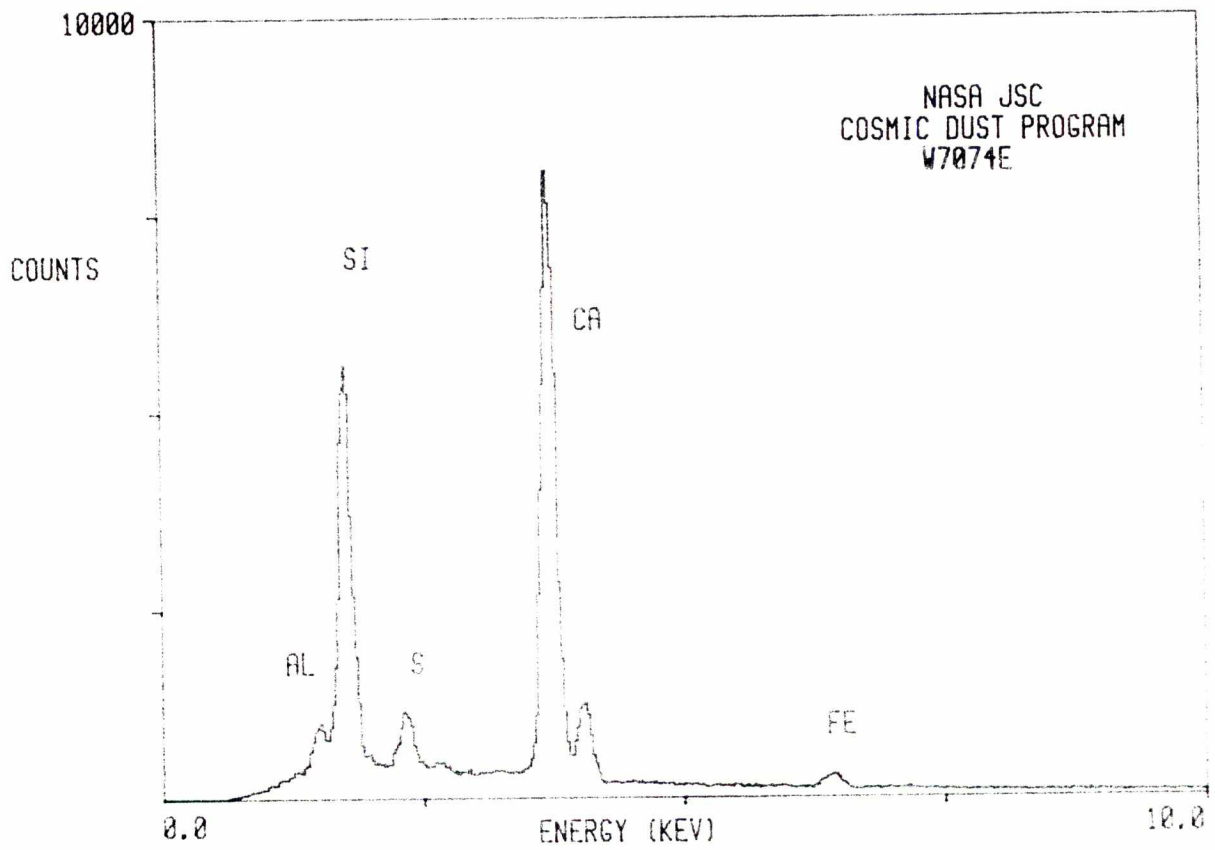
W7074 E 18



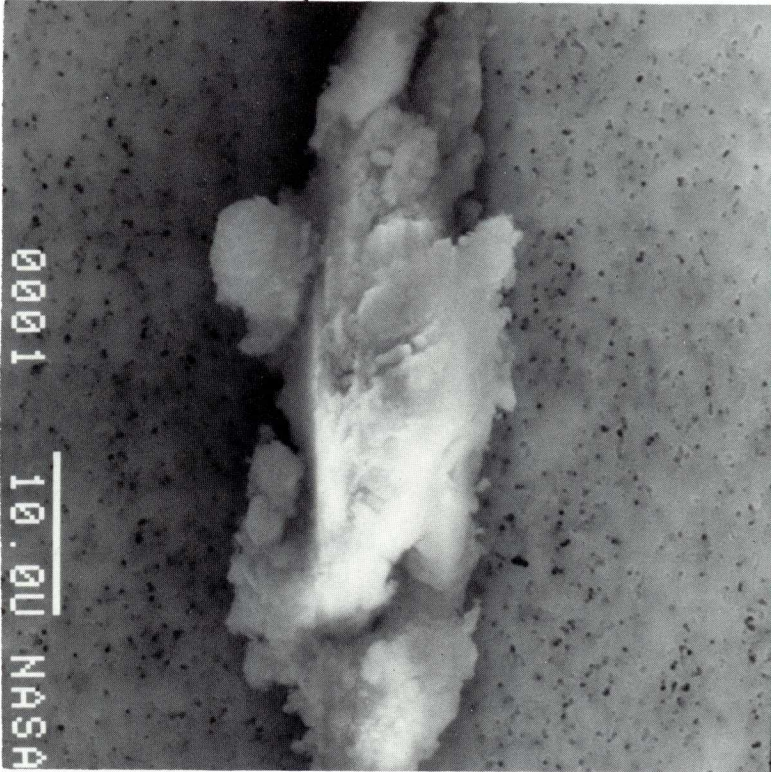
SIZE: 40x35
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53336

W7E18



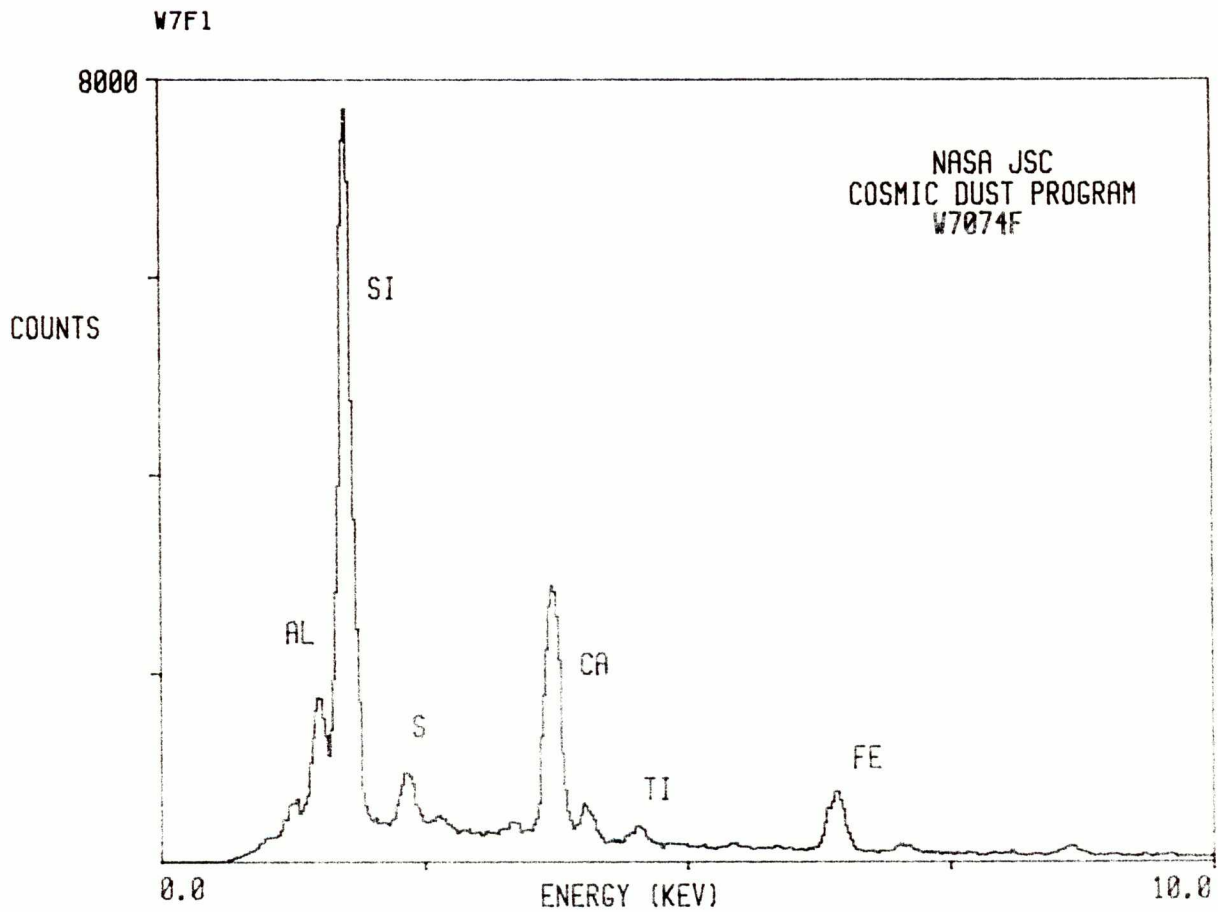
W7074 F 1



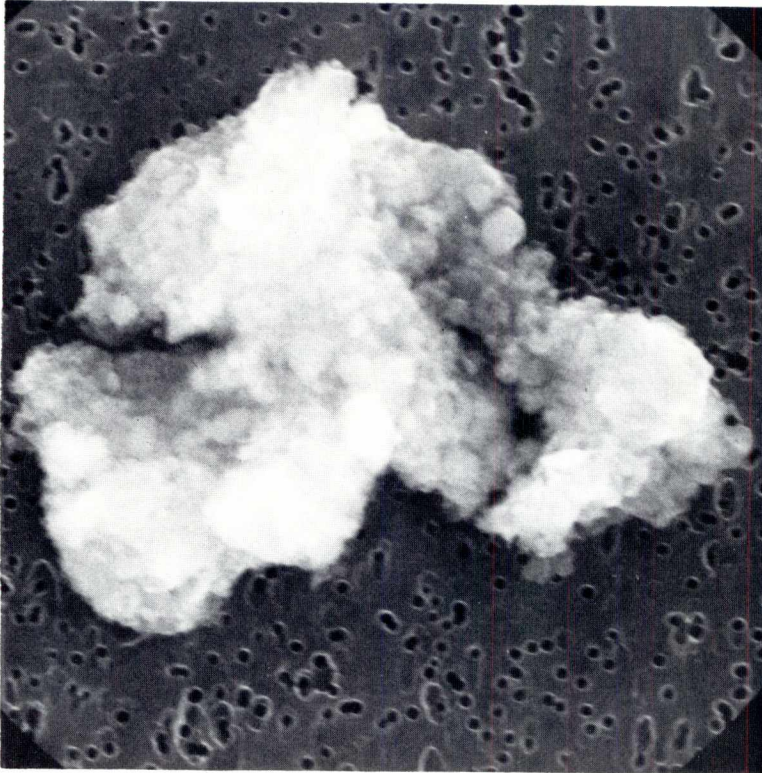
SIZE: 65x20
SHAPE: I
TRANS.: TL/O
COLOR: Colorless to black
LUSTER: SV/D
TYPE: TCN

COMMENTS:
May be related to
W7074F2 and F3

S-88-53337



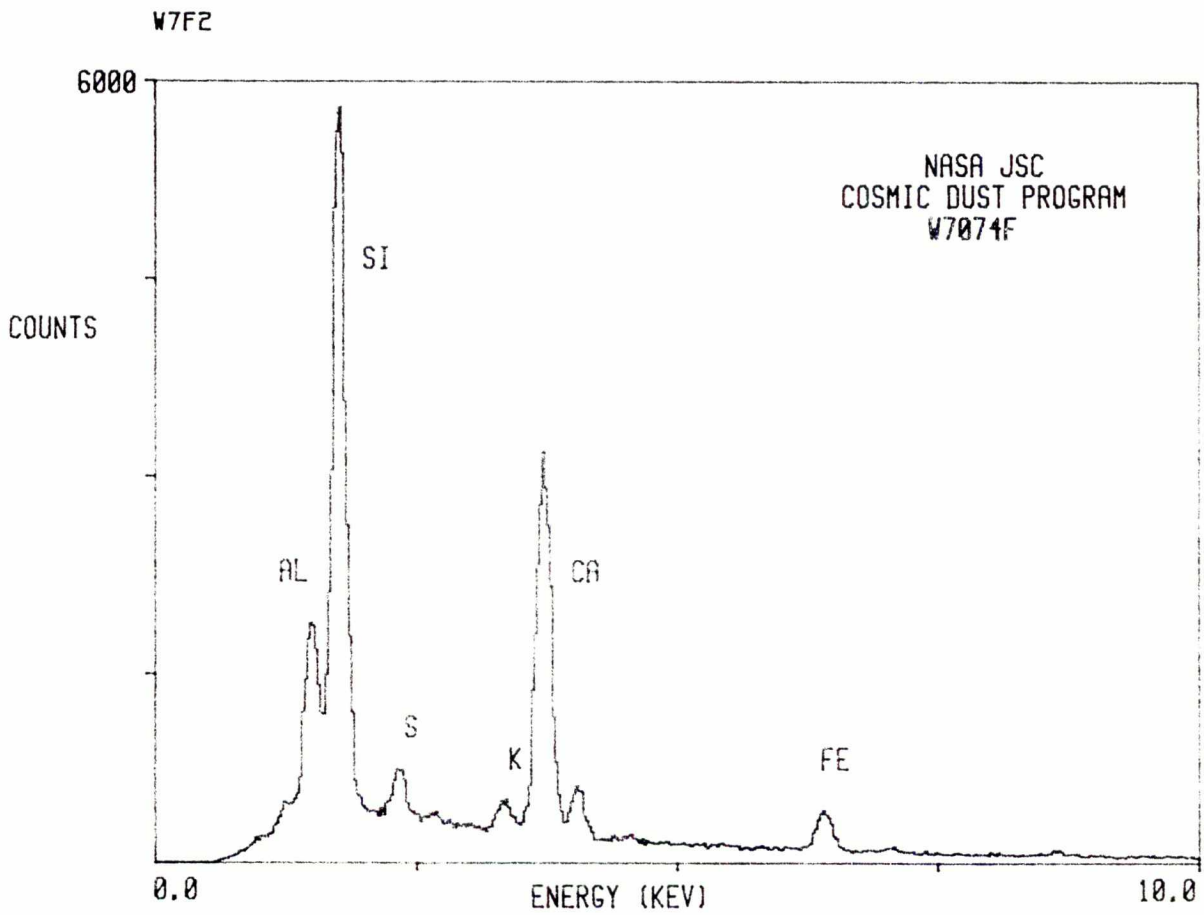
W7074 F 2



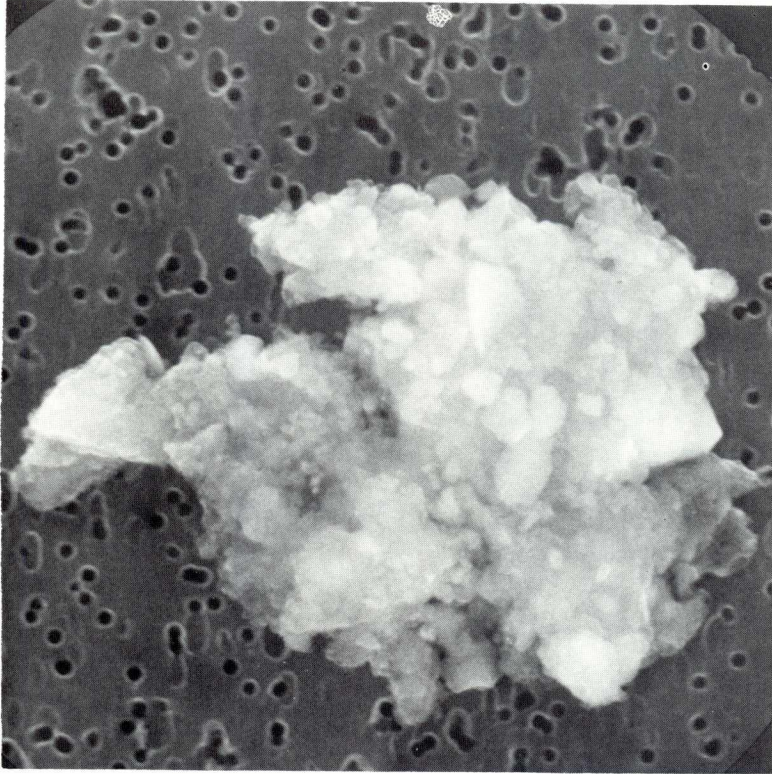
SIZE: 20x15
SHAPE: I
TRANS.: TL/O
COLOR: Colorless to black
LUSTER: SV/D
TYPE: TCN

COMMENTS:
May be related to
W7074F1 and F3

S-88-53338



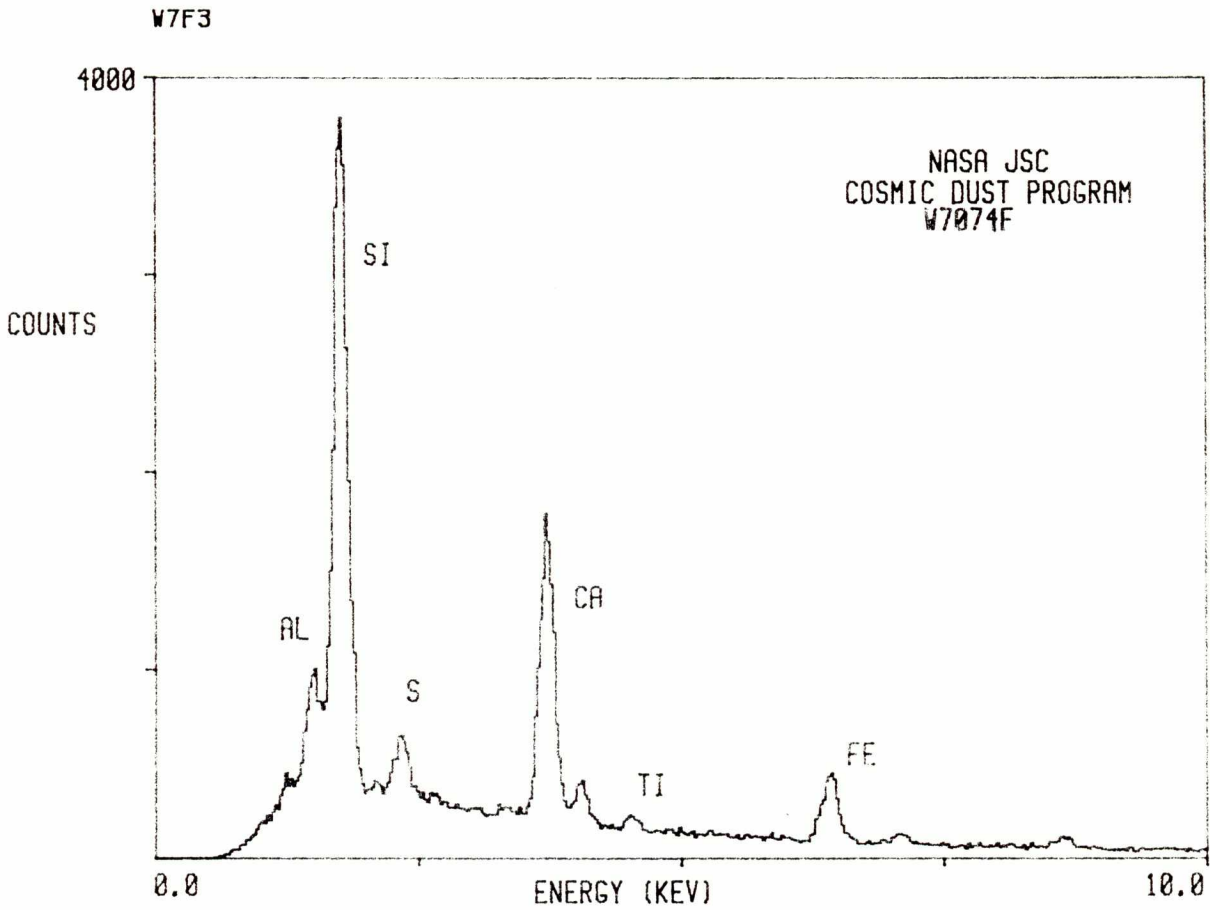
W7074 F 3



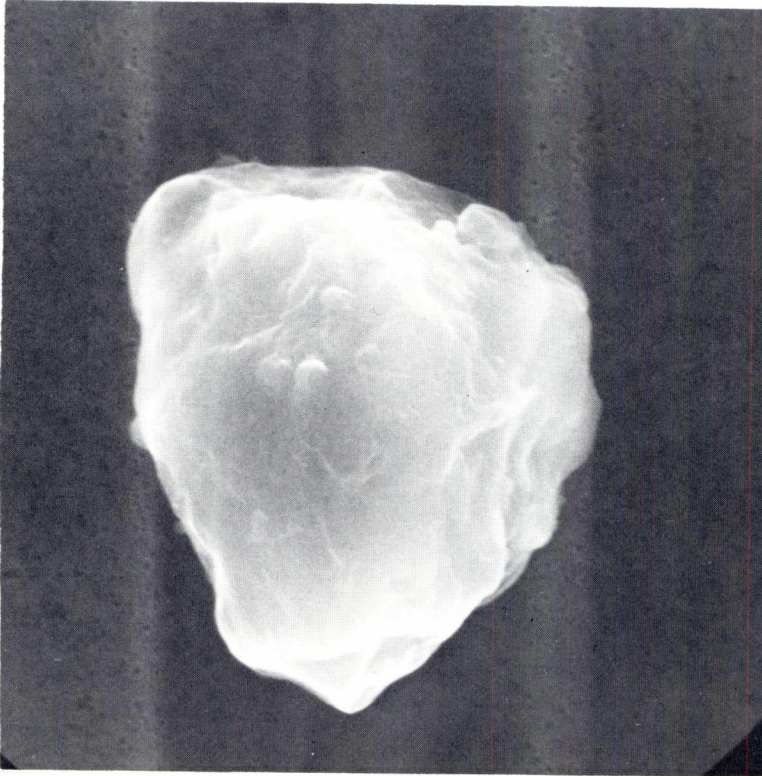
SIZE: 12
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCN

COMMENTS:
May be related to
W7074F1 and F2

S-88-53339

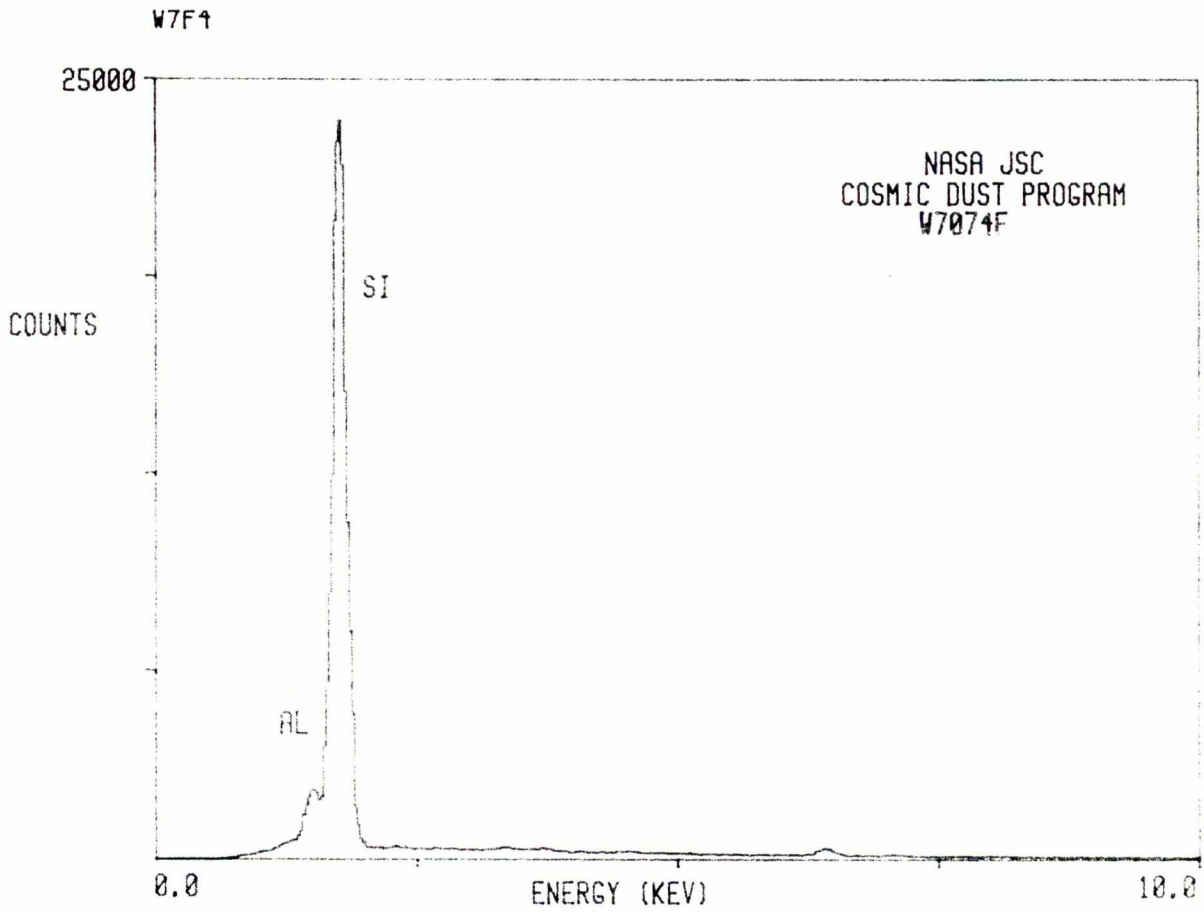


W7074 F 4

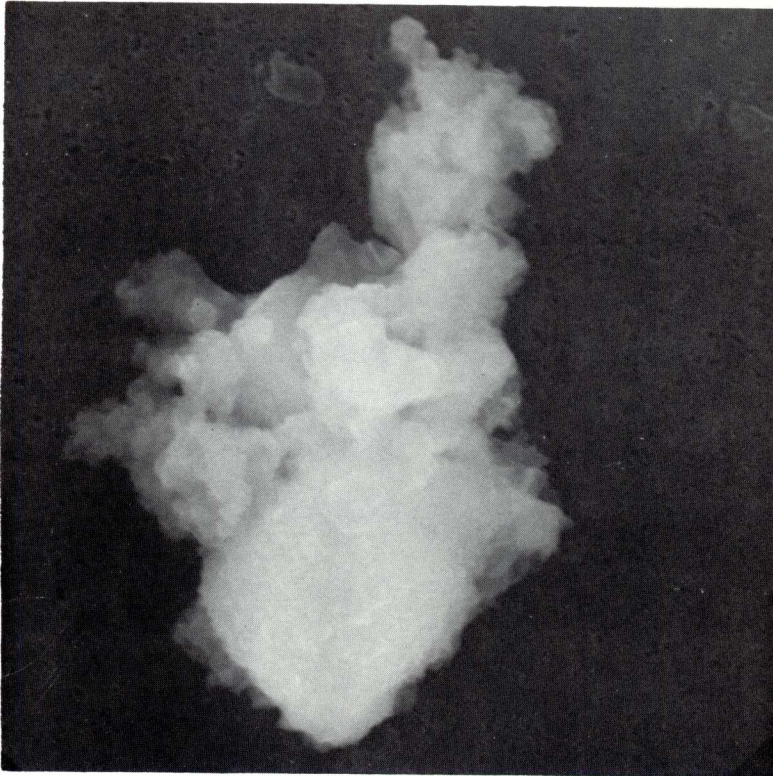


SIZE: 30x25
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53340

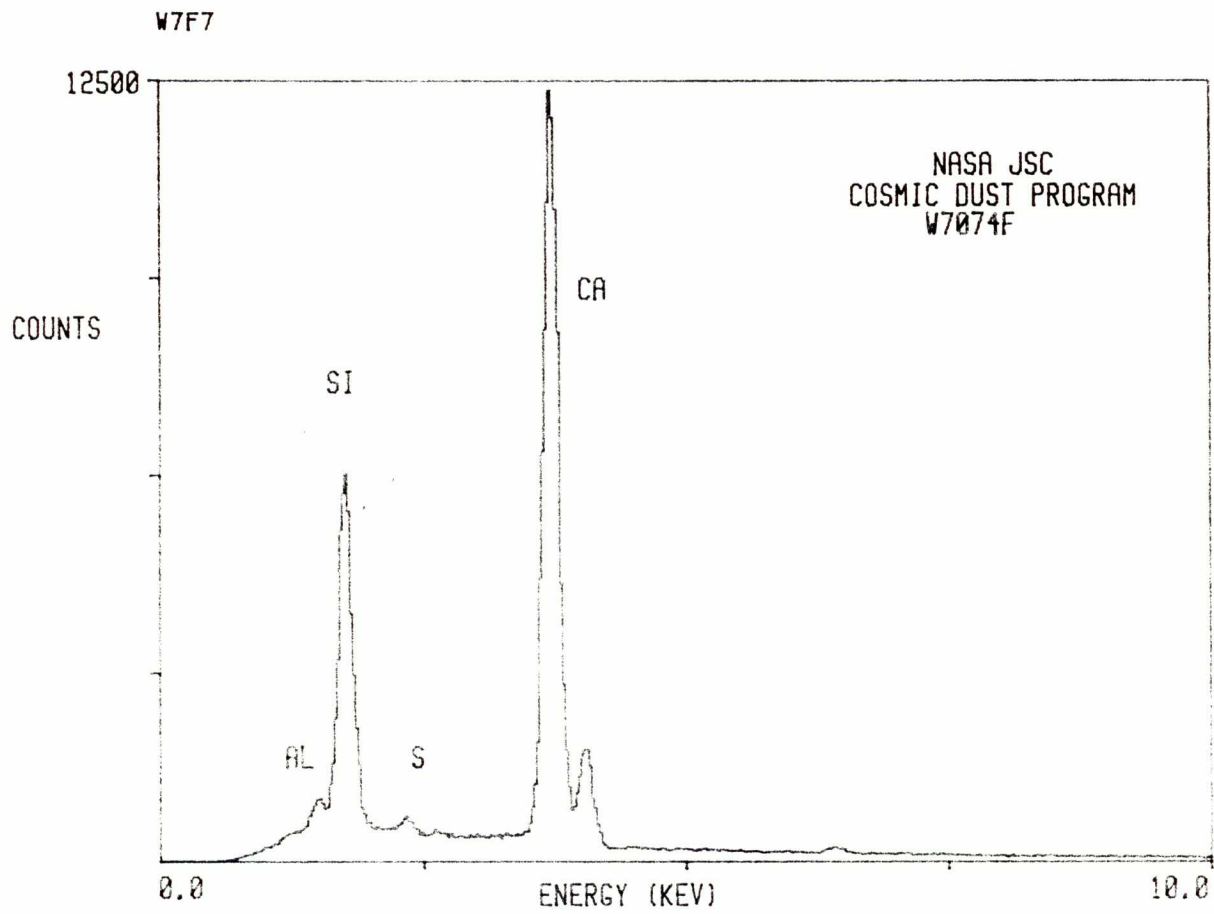


W7074 F 7



SIZE: 35x22
SHAPE: I
TRANS.: TL
COLOR: White to yellow
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53343

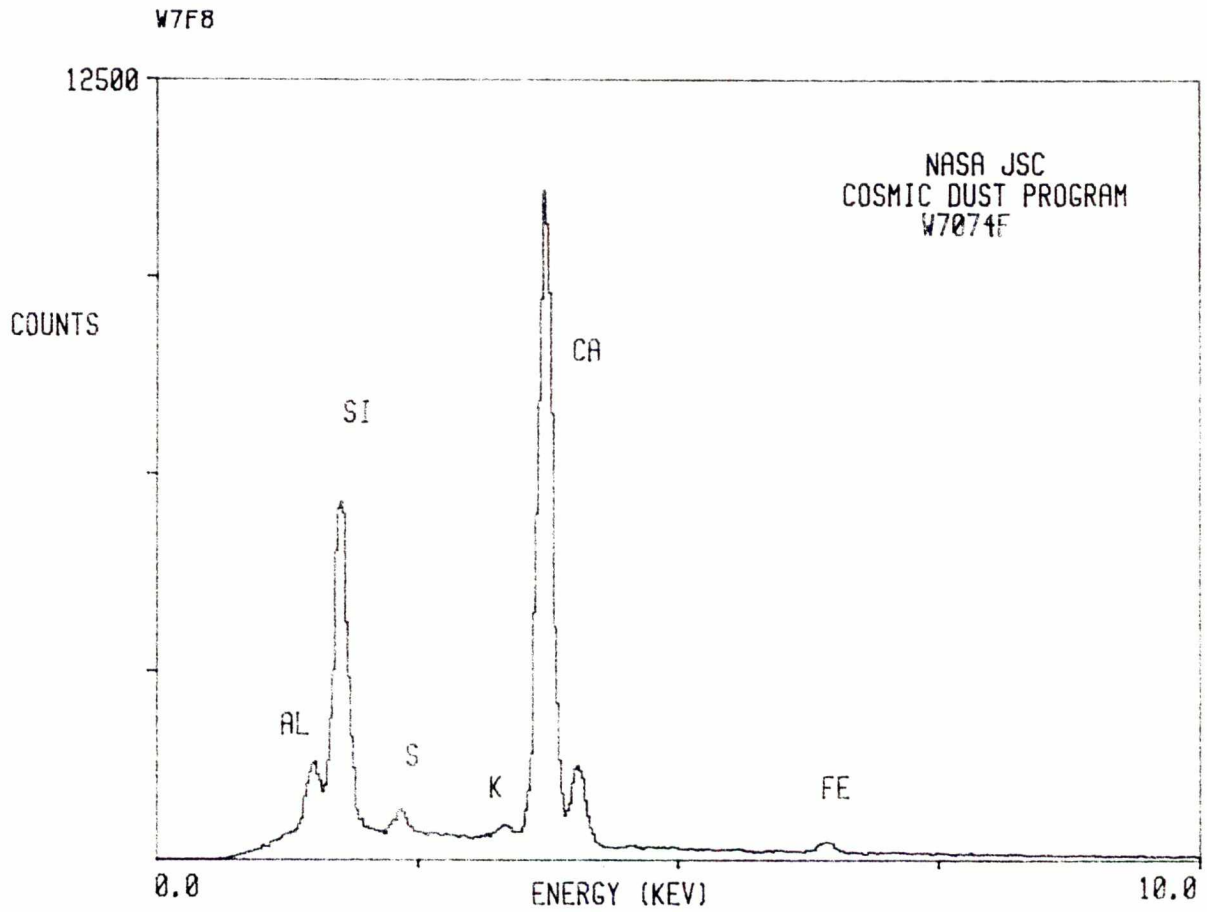


W7074 F 8

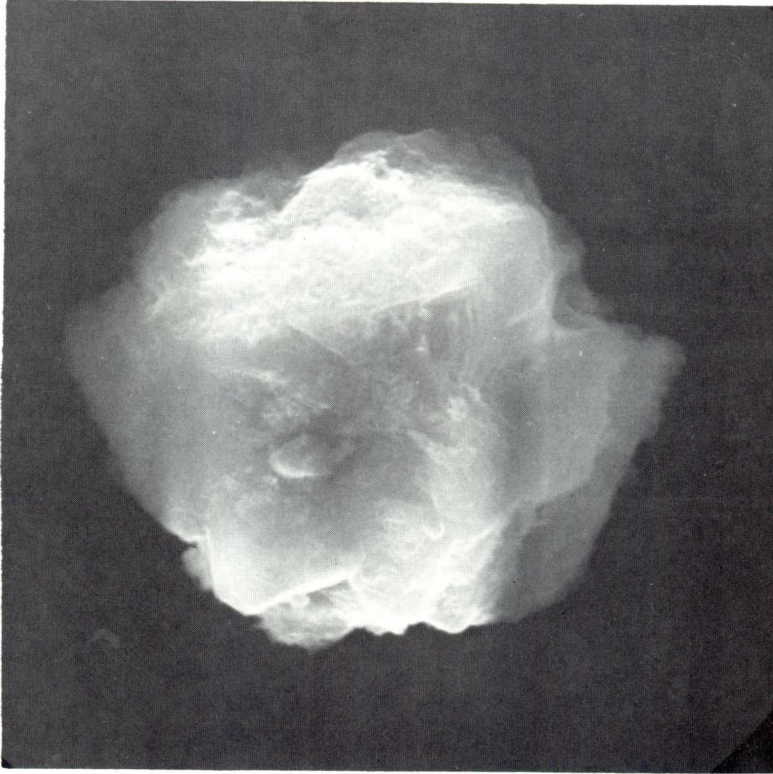


SIZE: 18
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53344

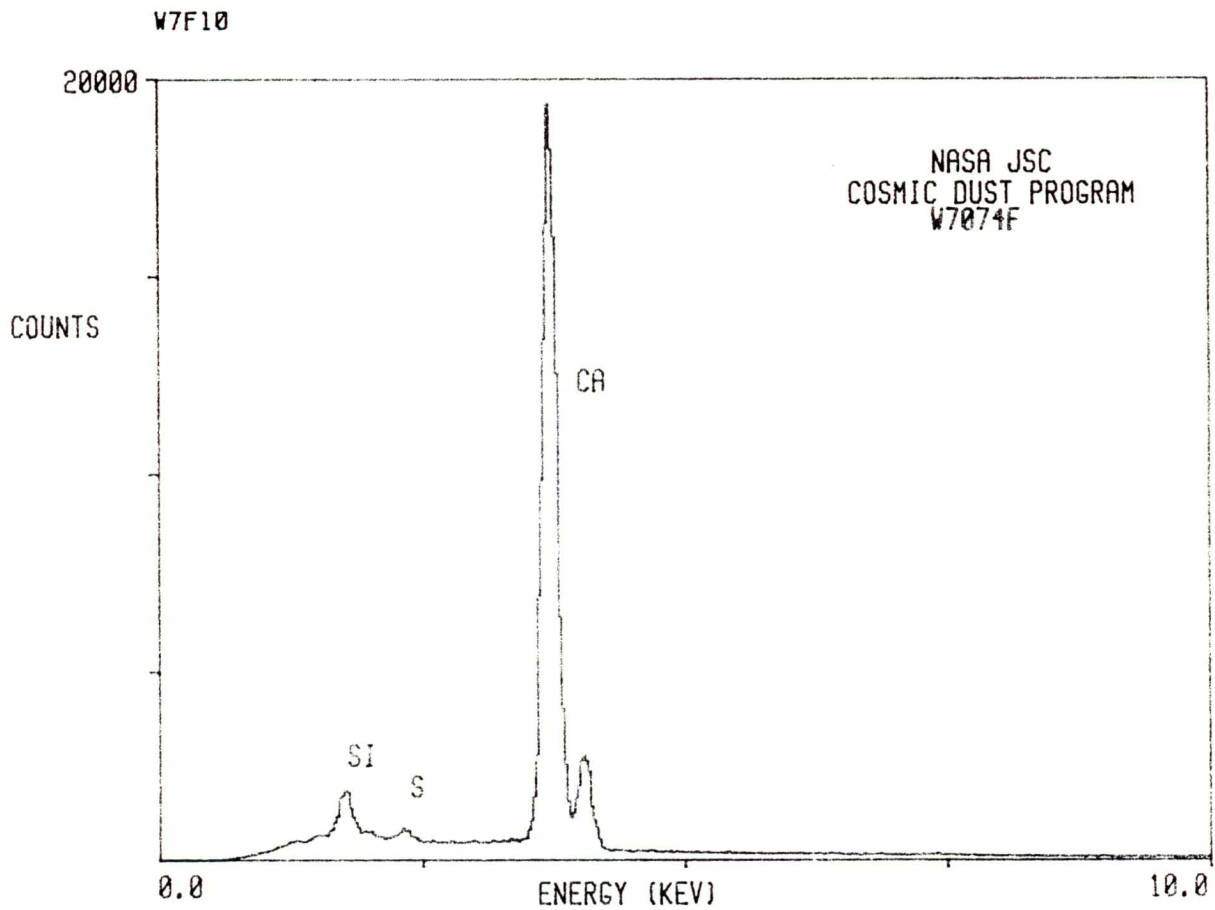


W7074 F 10

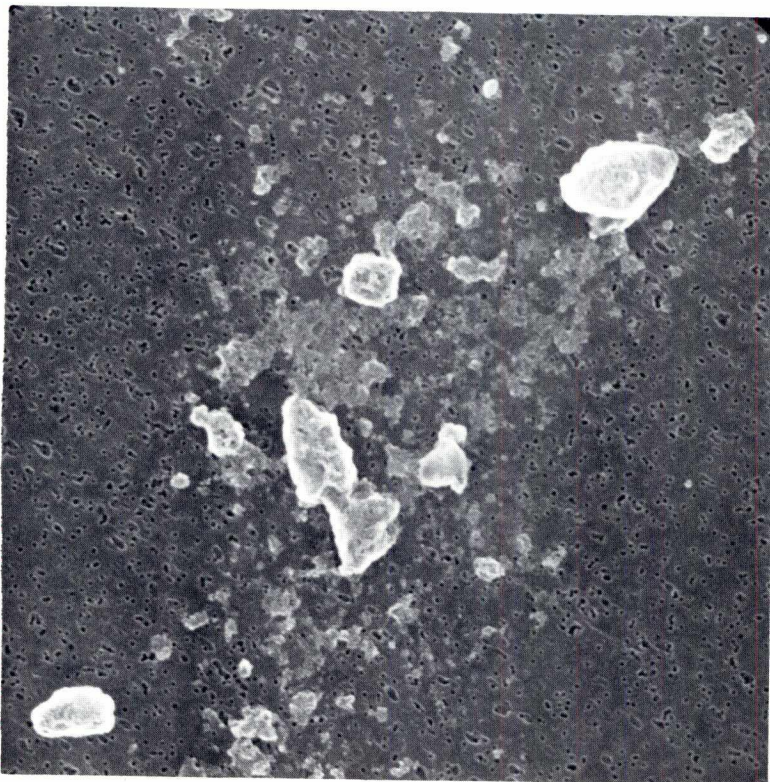


SIZE: 30
SHAPE: I
TRANS.: TL
COLOR: White to yellow
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53346

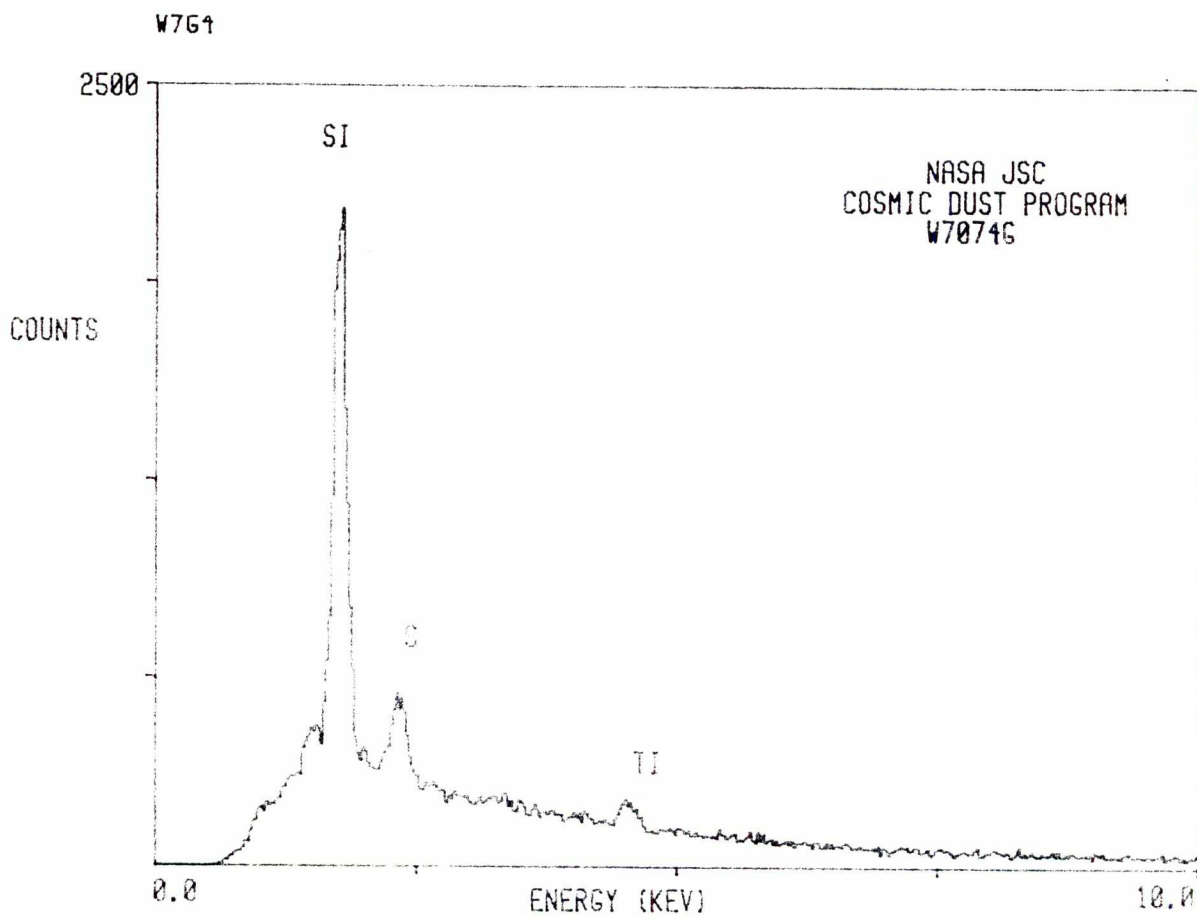


W7074 G 4

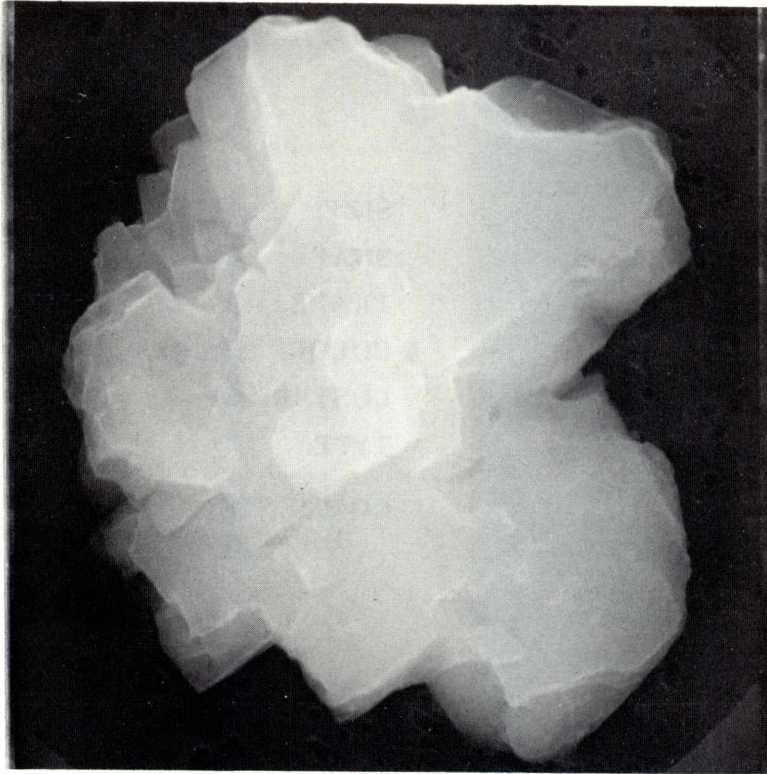


SIZE: 60x20
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCN
COMMENTS:
Field of particles

S-88-53356



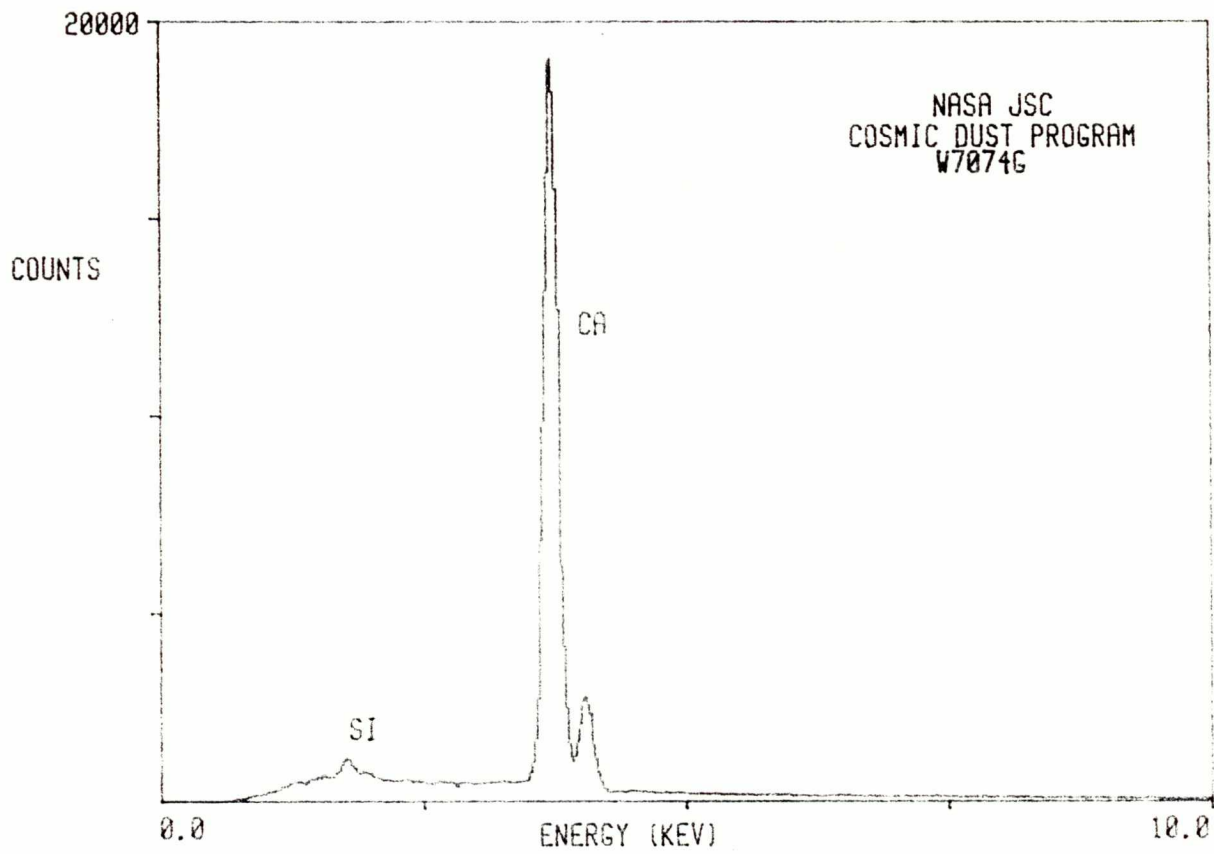
W7074 G 6



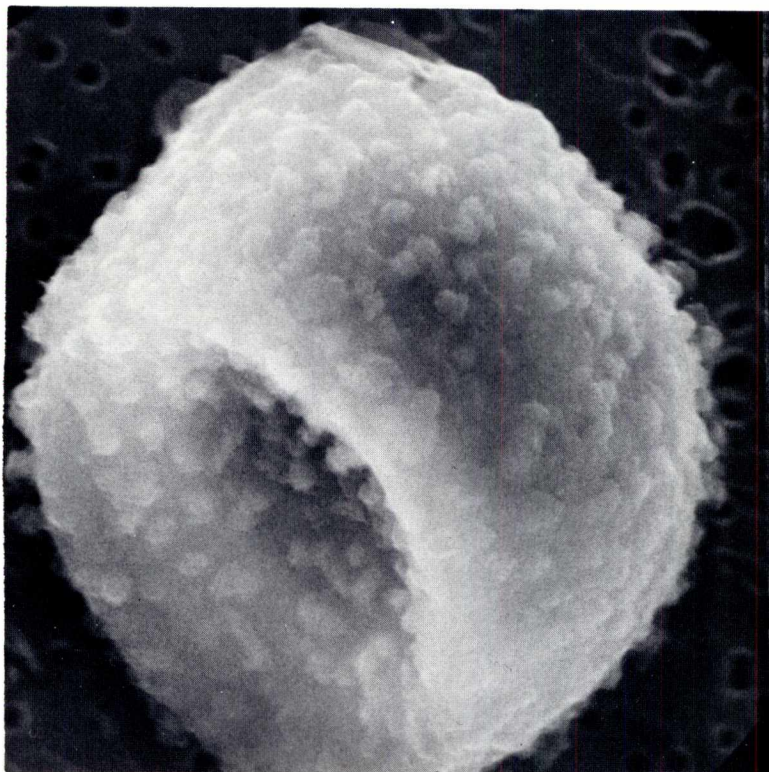
SIZE: 14
SHAPE: I
TRANS.: TL
COLOR: White to yellow
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53358

W766



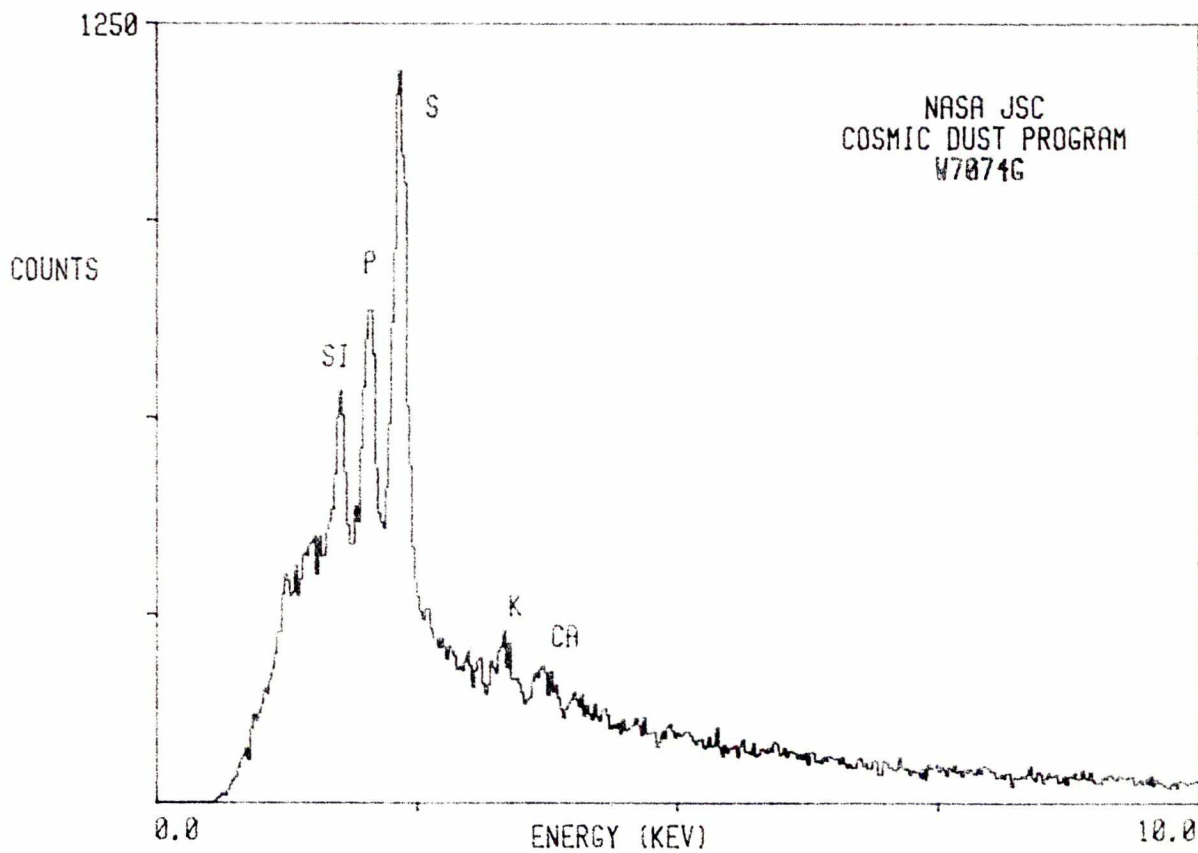
W7074 G 7



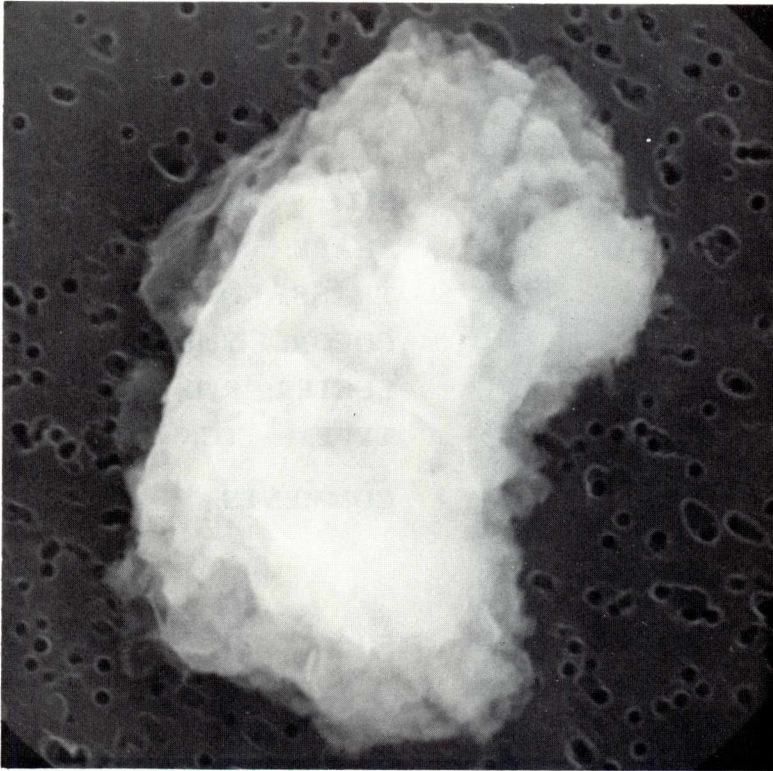
SIZE: 12
SHAPE: S
TRANS.: T/TL
COLOR: Brown
LUSTER: SV
TYPE: TCN
COMMENTS:
Pollen grain?

S-88-53359

W767



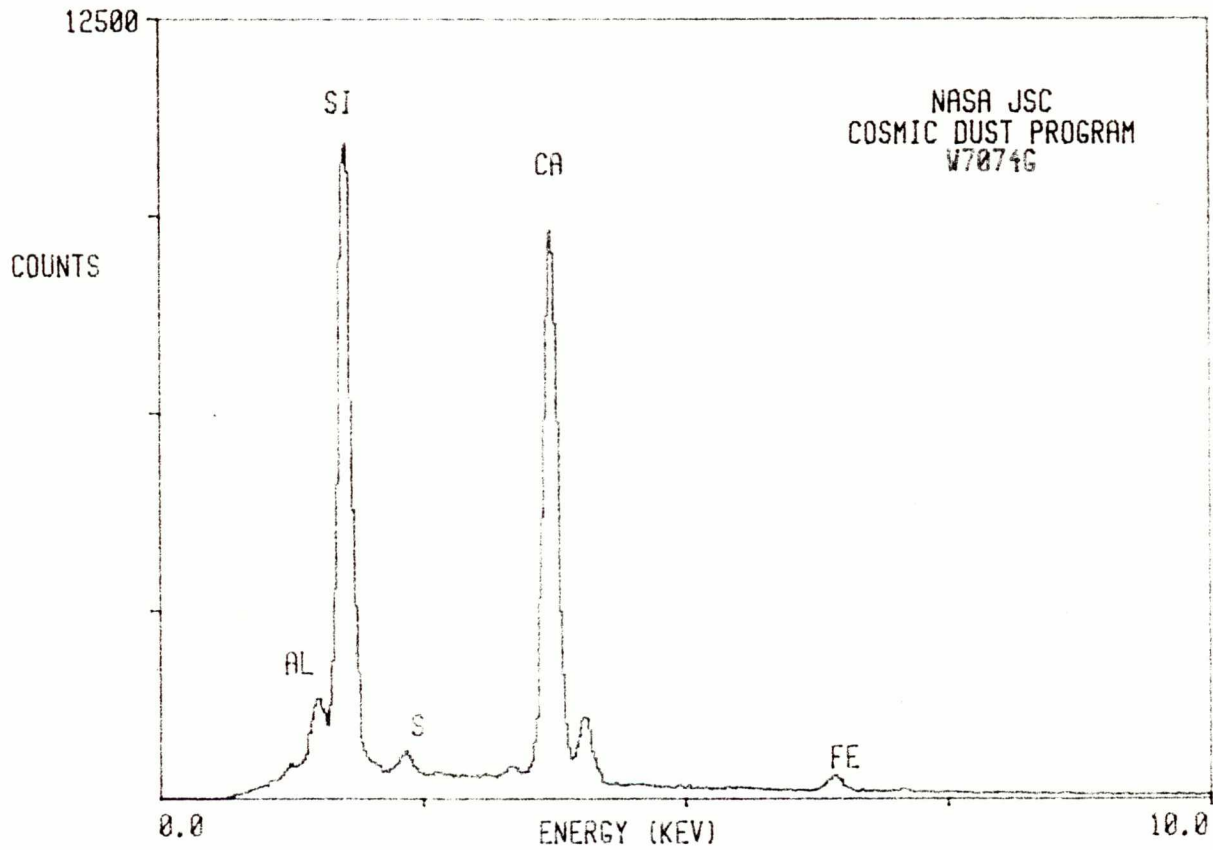
W7074 G 11



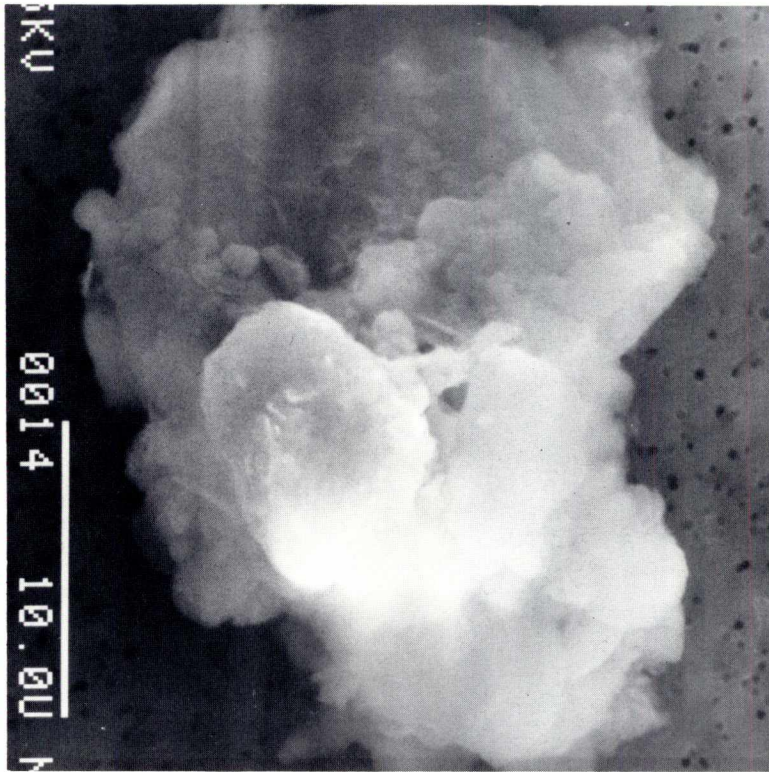
SIZE: 14x12
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCN
COMMENTS:

S-88-53362

W7611

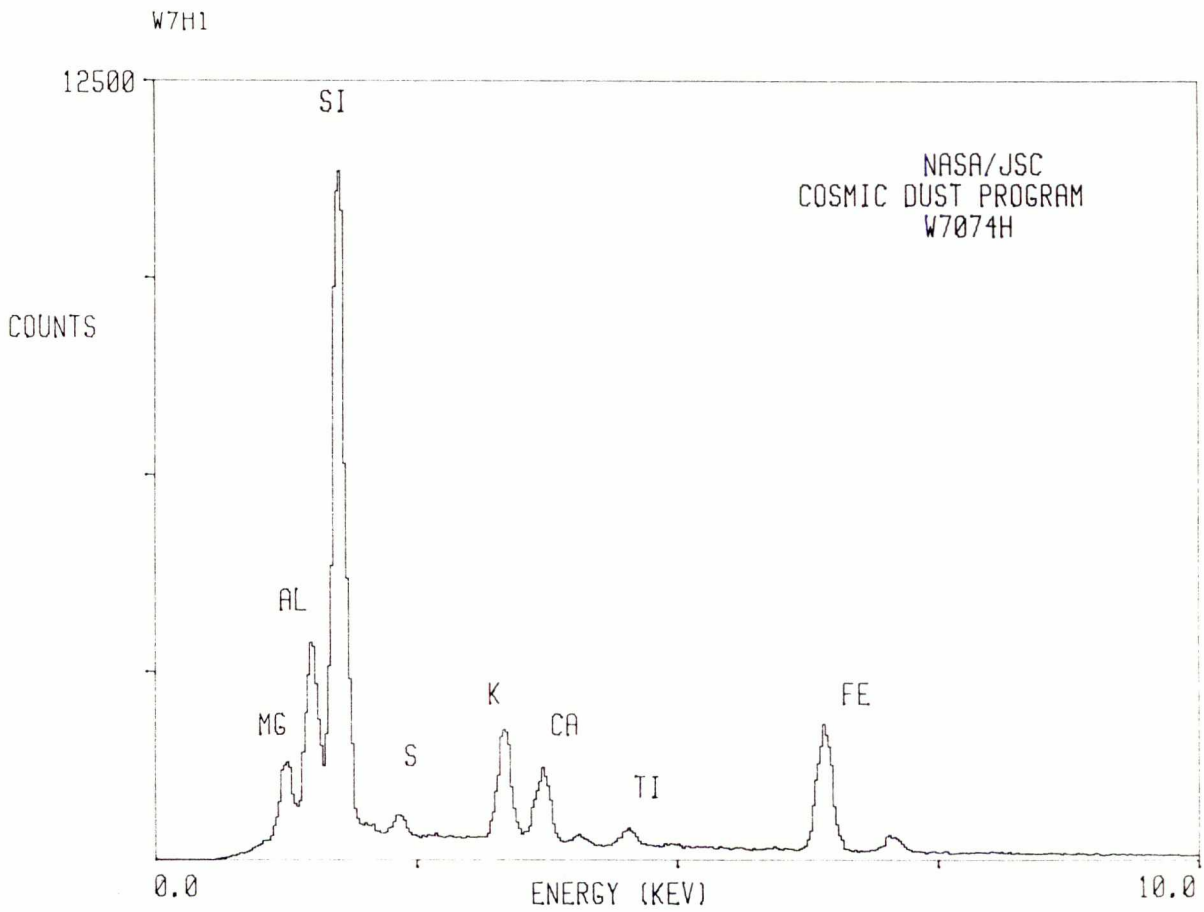


W7074 H 1

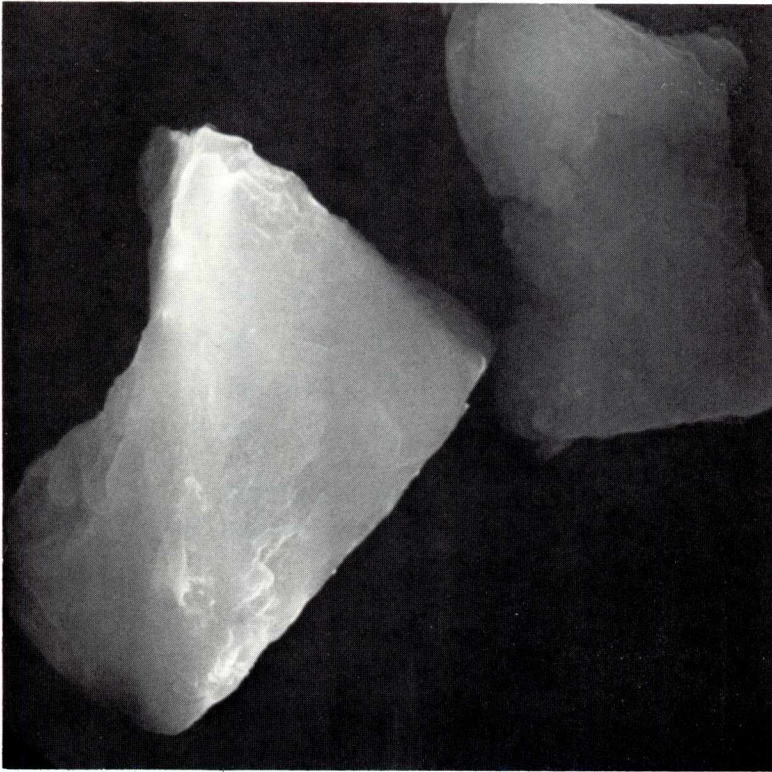


SIZE: 28x20
SHAPE: I
TRANS.: O/TL
COLOR: Yellow to black
LUSTER: R/D
TYPE: TCN
COMMENTS:

S-88-53370



W7074 H 3

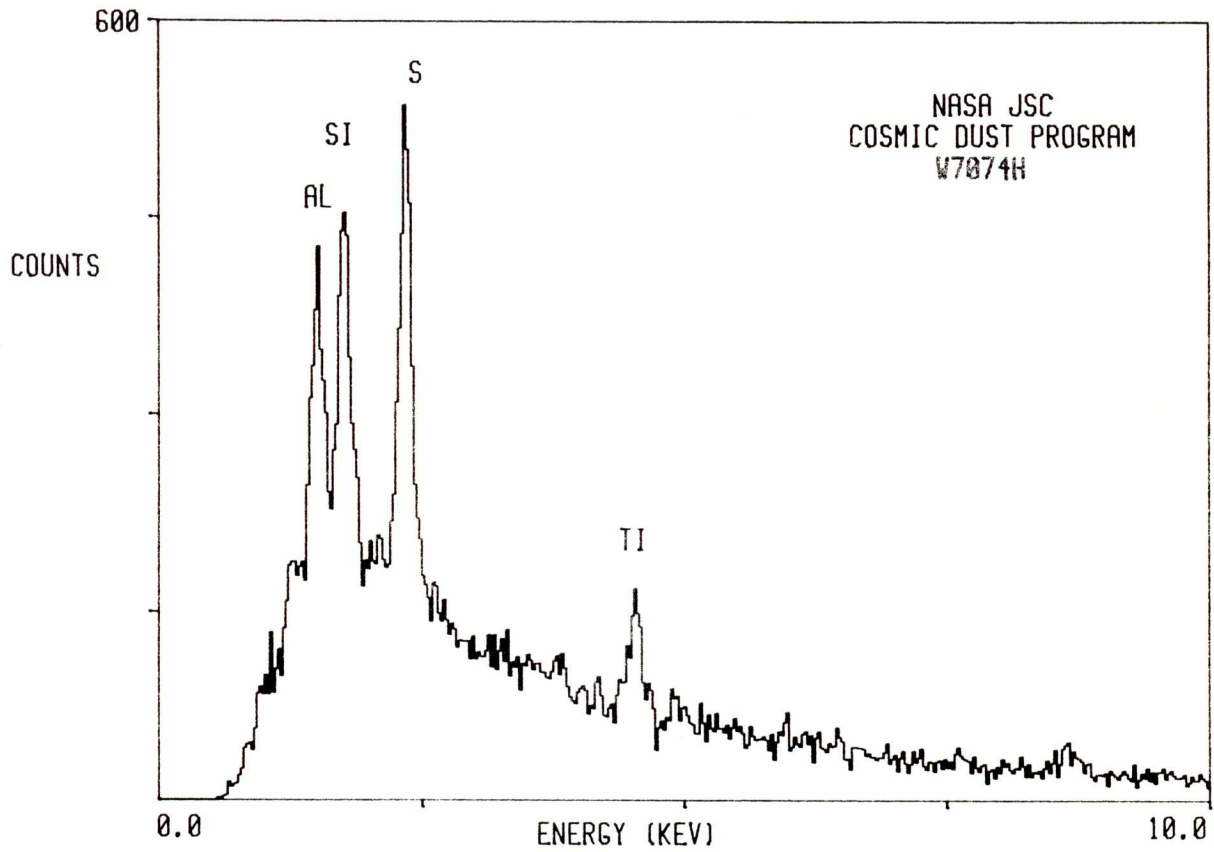


SIZE: 35x25
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCN

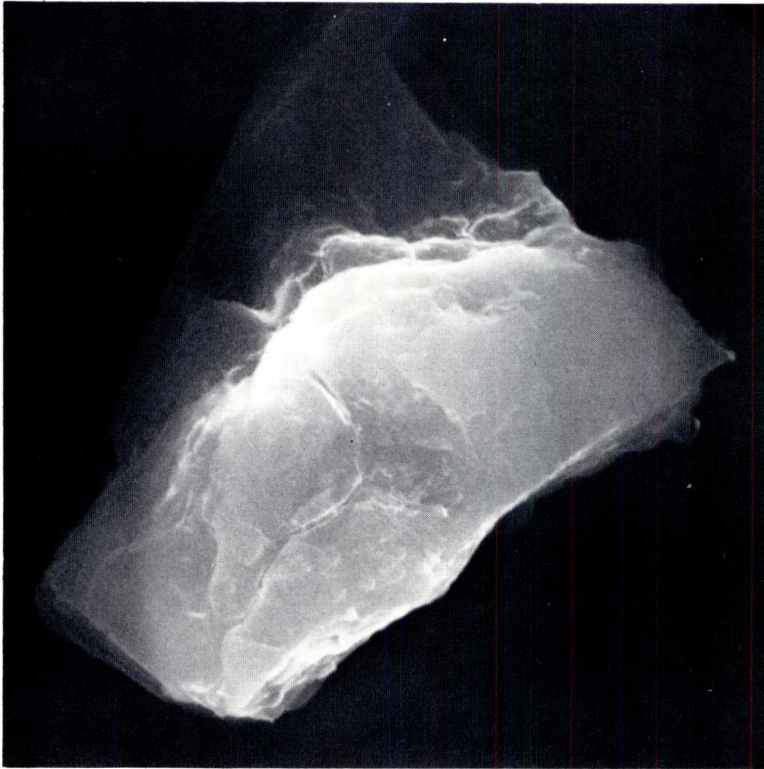
COMMENTS:
Related to W7074H4

S-88-53372

W7H3



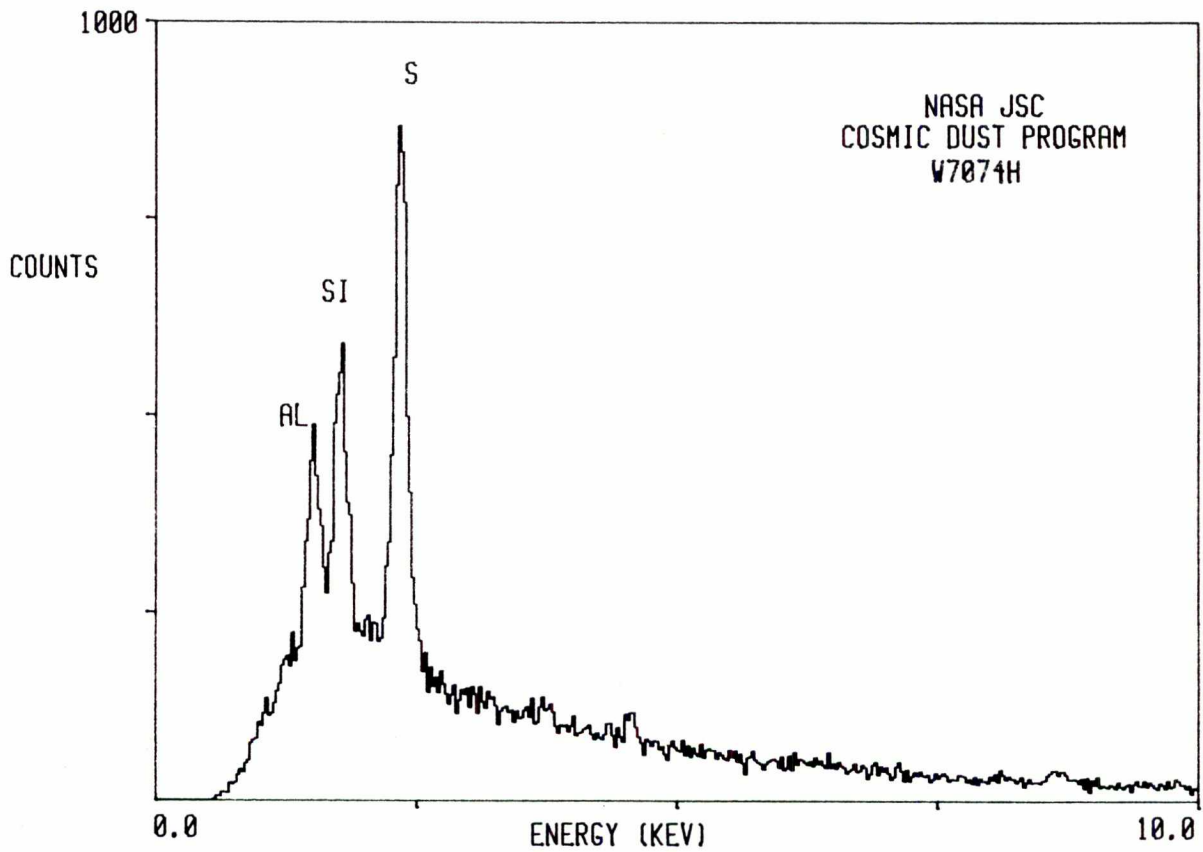
W7074 H 4



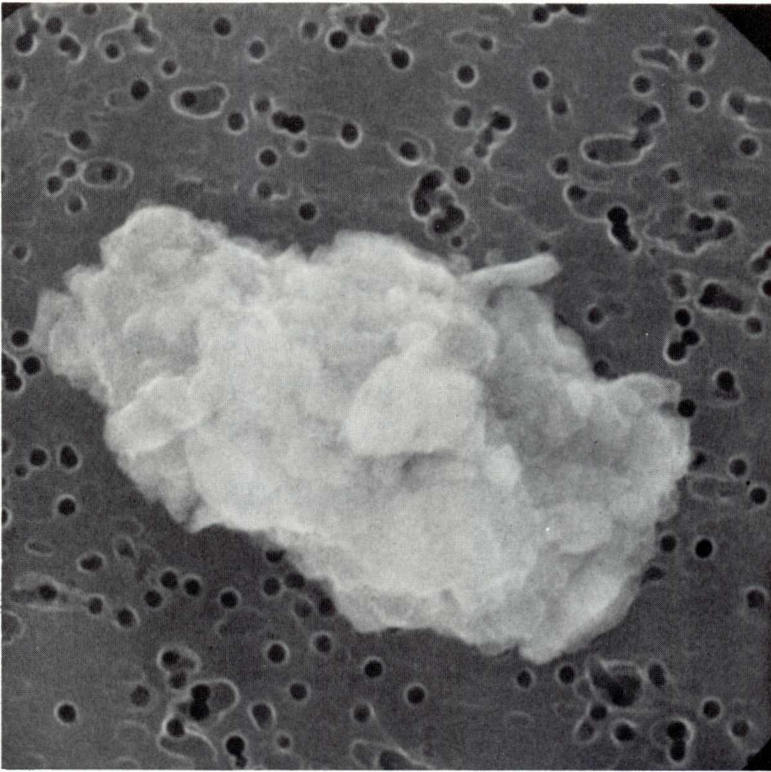
SIZE: 45x35
SHAPE: I
TRANS.: TL
COLOR: Yellow
LUSTER: R
TYPE: TCN
COMMENTS:
Related to W7074H3

S-88-53373

W7H4



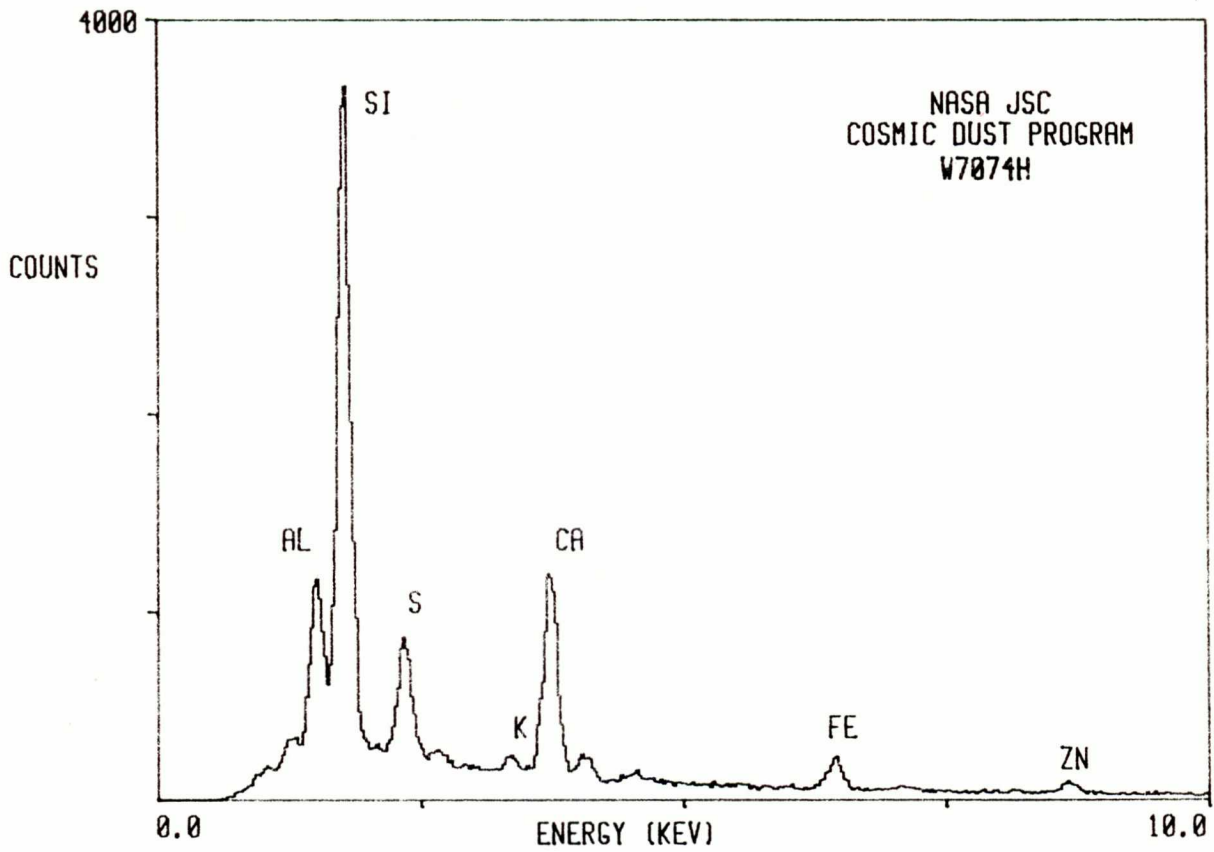
W7074 H 7



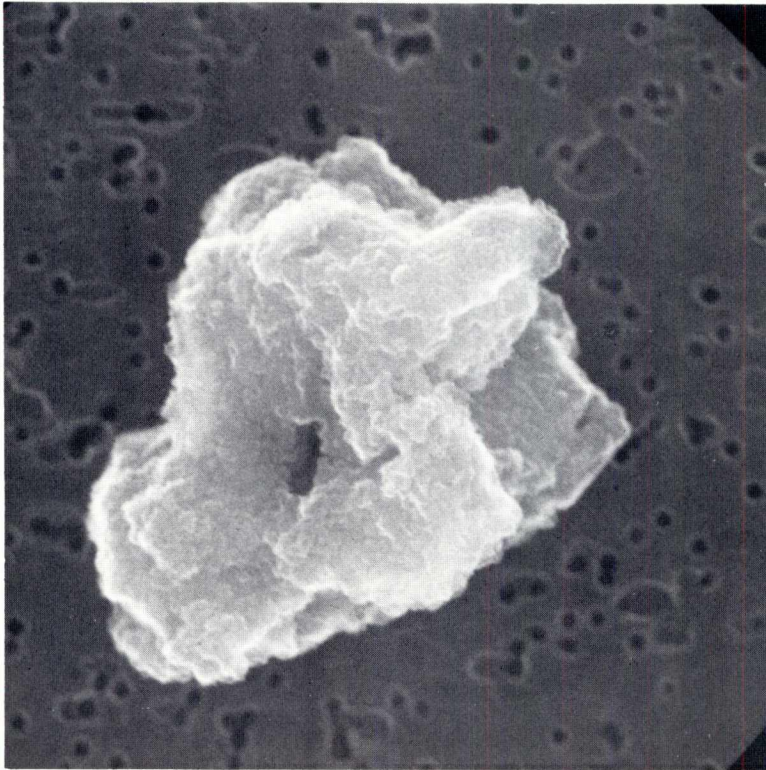
SIZE: 12x7
SHAPE: I
TRANS.: O
COLOR: Brown
LUSTER: SM/D
TYPE: TCN
COMMENTS:

S-88-53376

W7H7



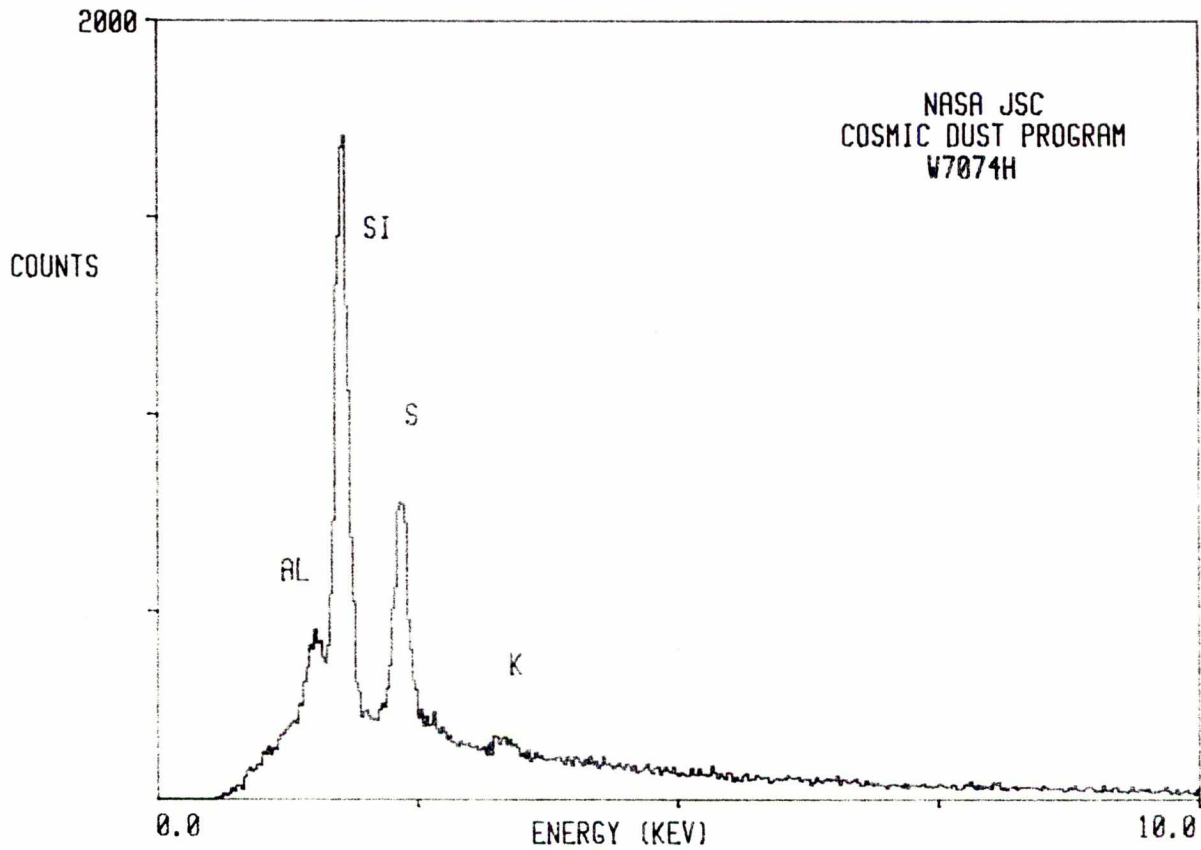
W7074 H 14



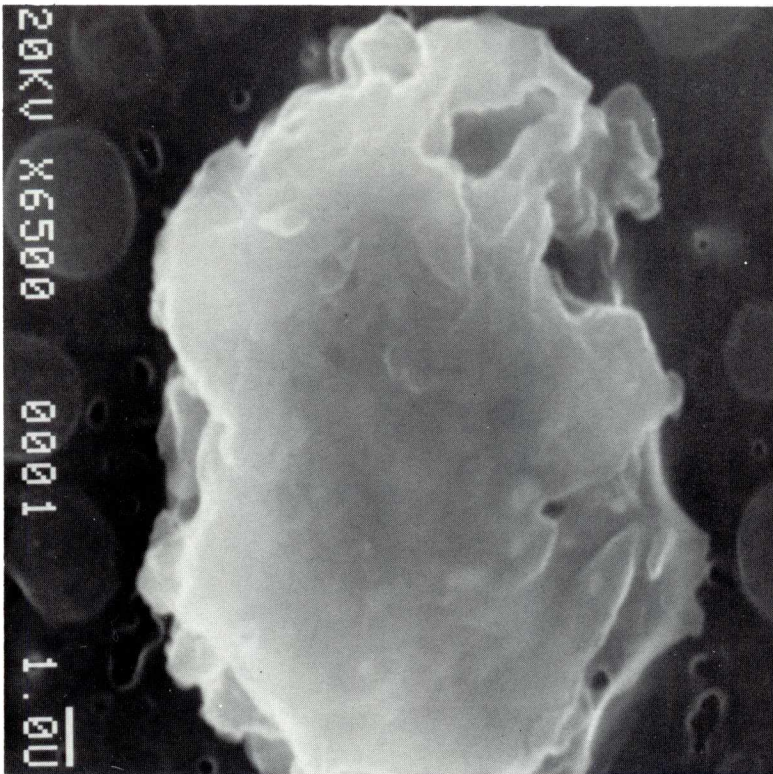
SIZE: 10x8
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: D
TYPE: TCN
COMMENTS:

S-88-53383

W7H14

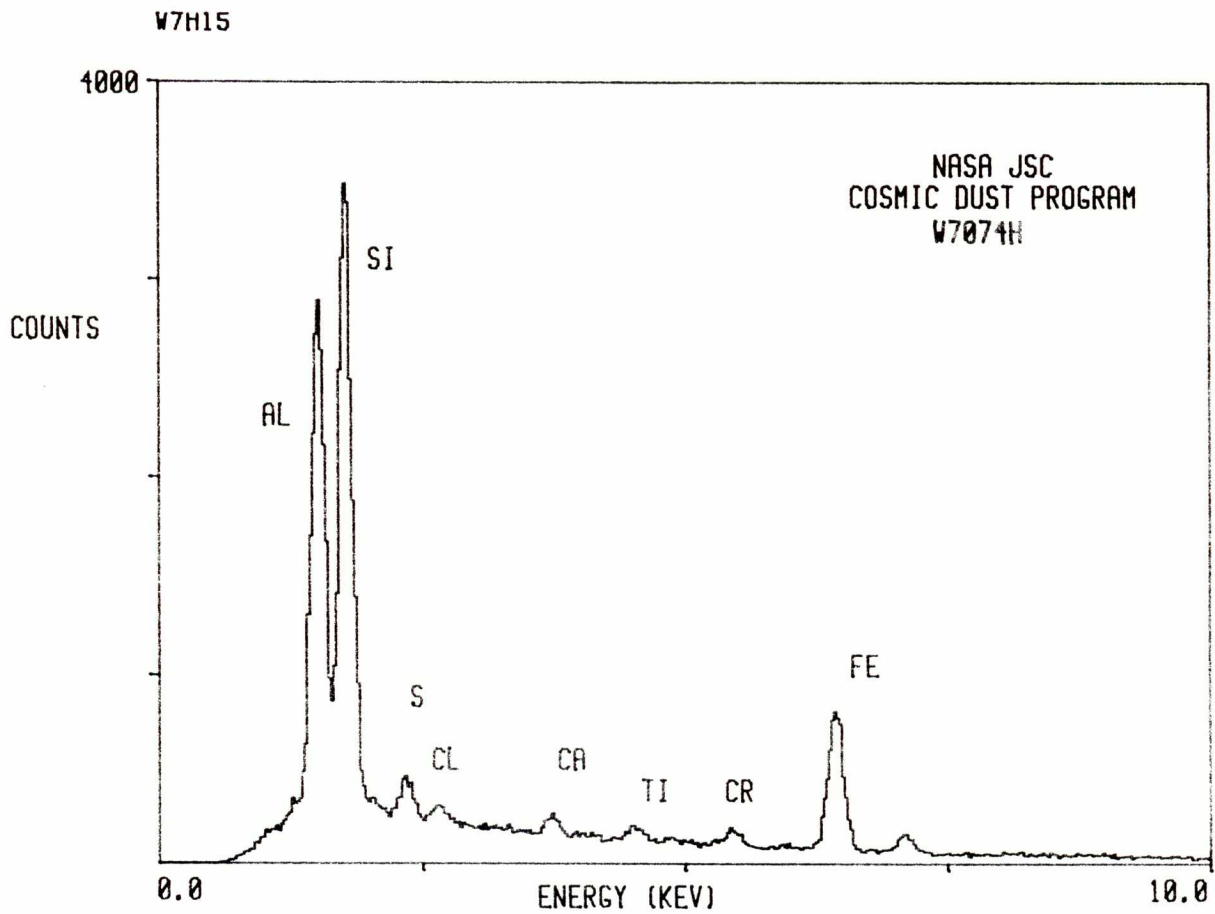


W7074 H 15

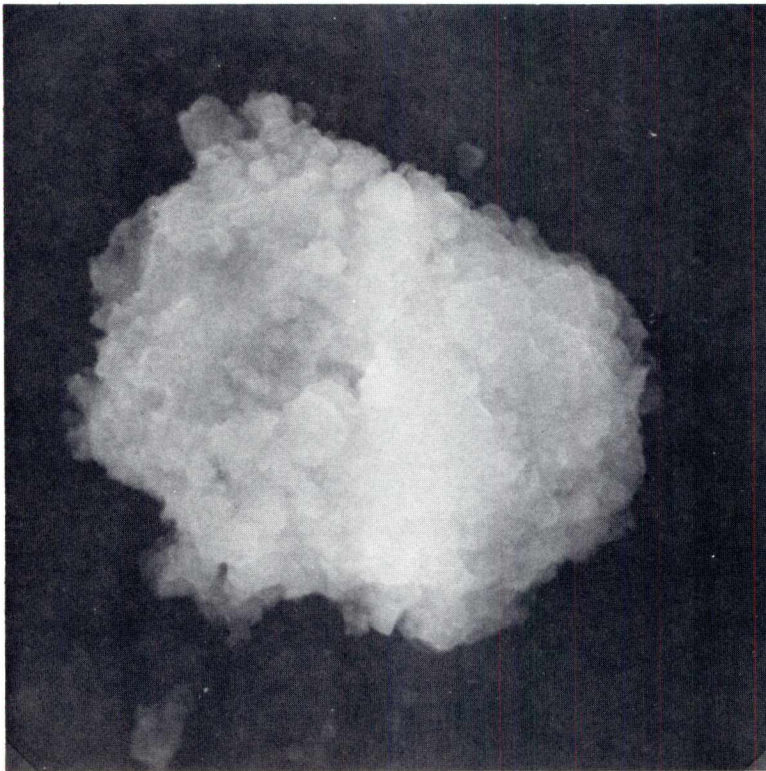


SIZE: 21
SHAPE: I
TRANS.: T
COLOR: Colorless
LUSTER: V
TYPE: TCN
COMMENTS:

S-88-53384

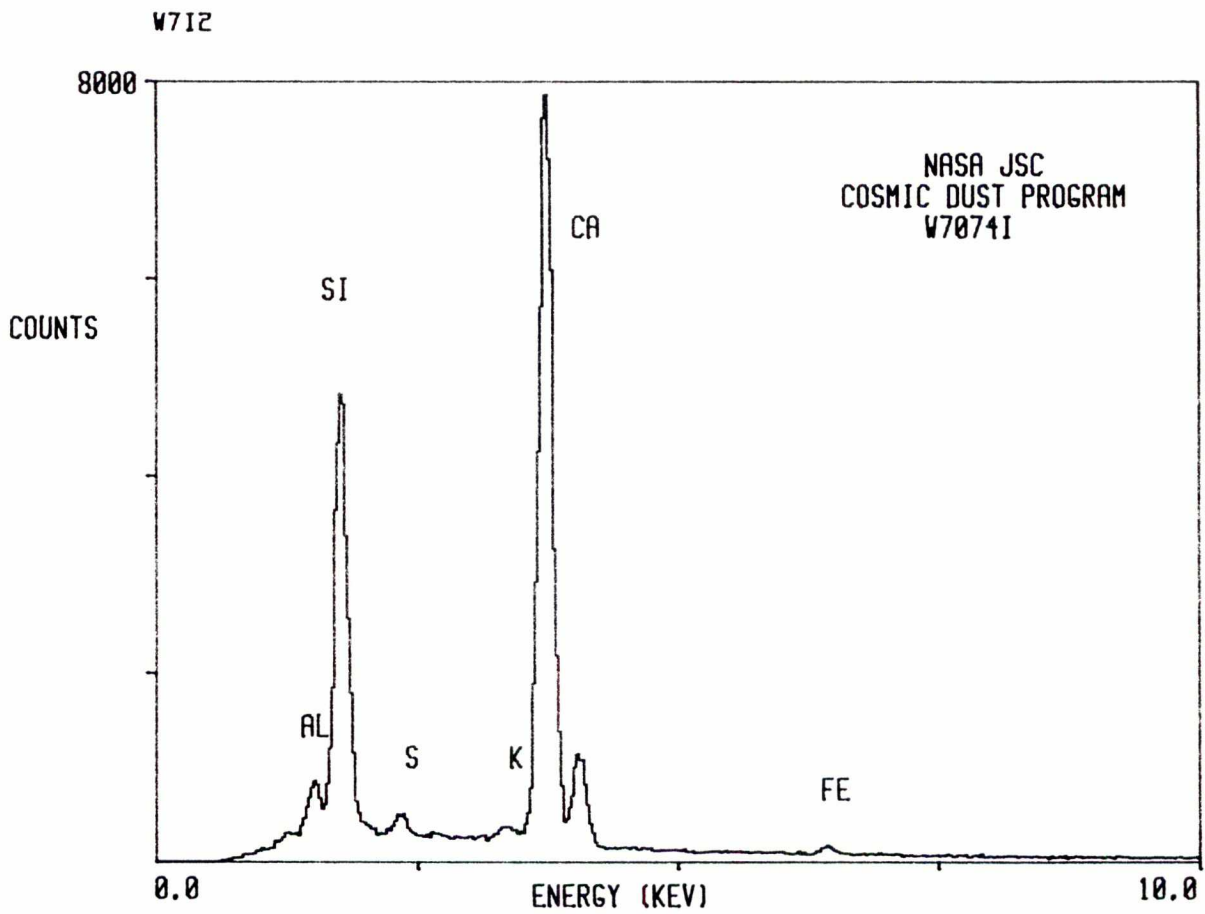


W7074 I 2

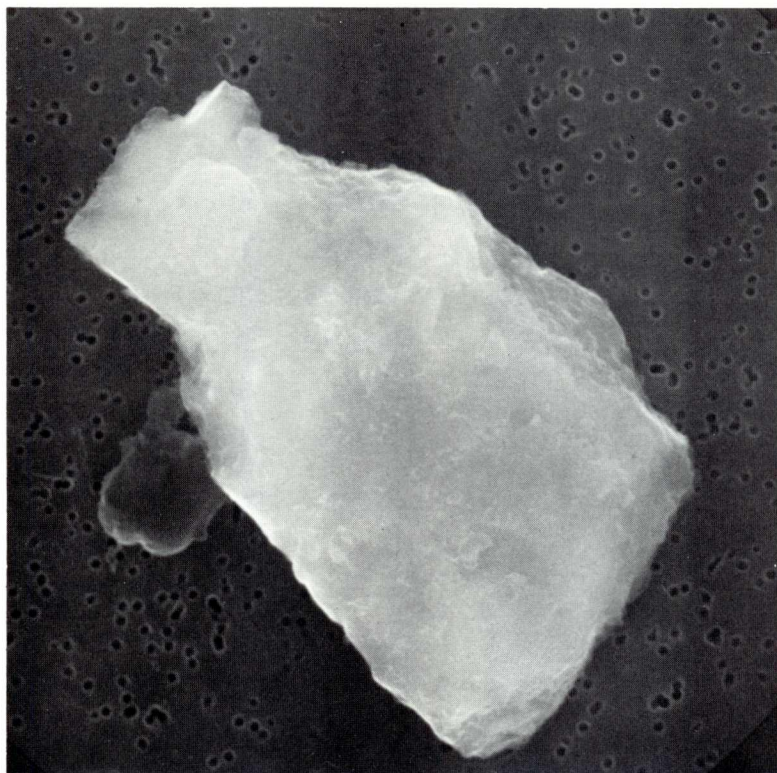


SIZE: 32x25
SHAPE: I
TRANS.: TL/O
COLOR: White
LUSTER: R/D
TYPE: TCN
COMMENTS:

S-88-53386



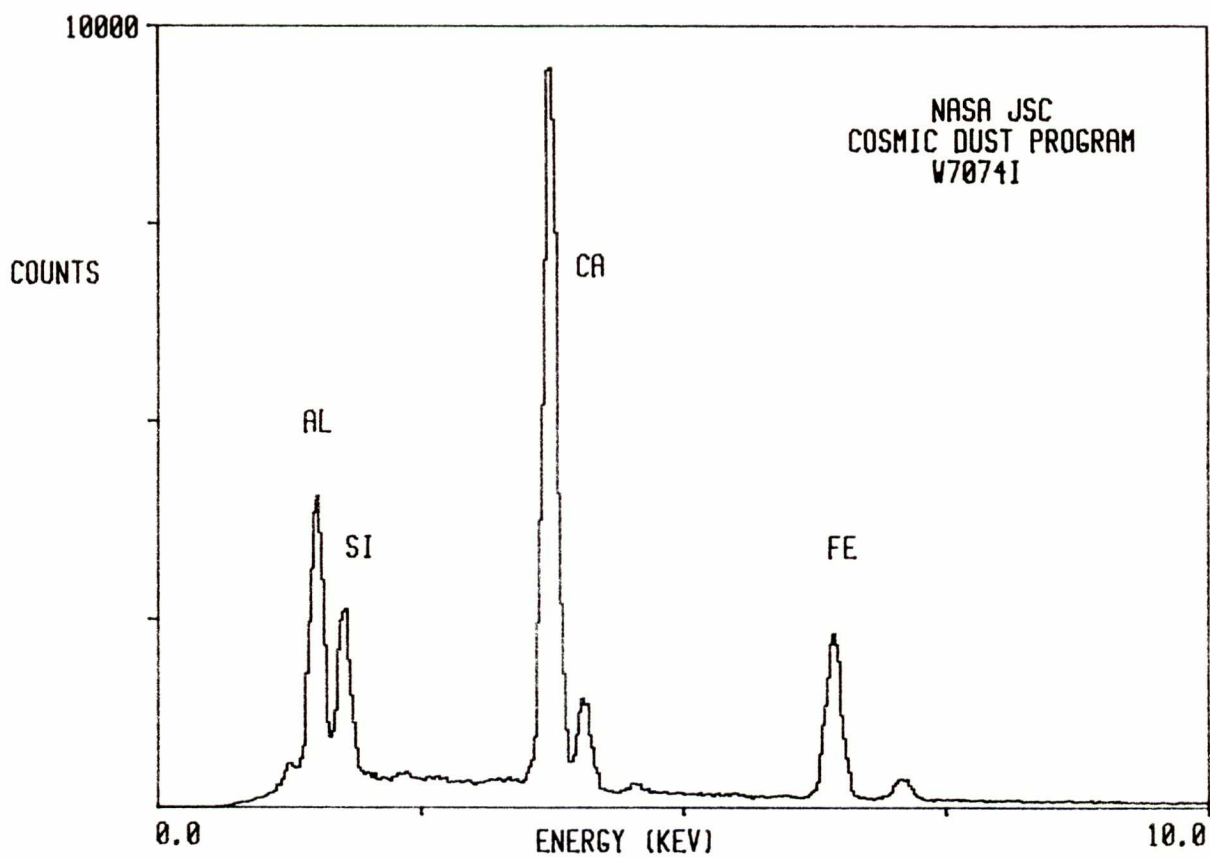
W7074 I 4



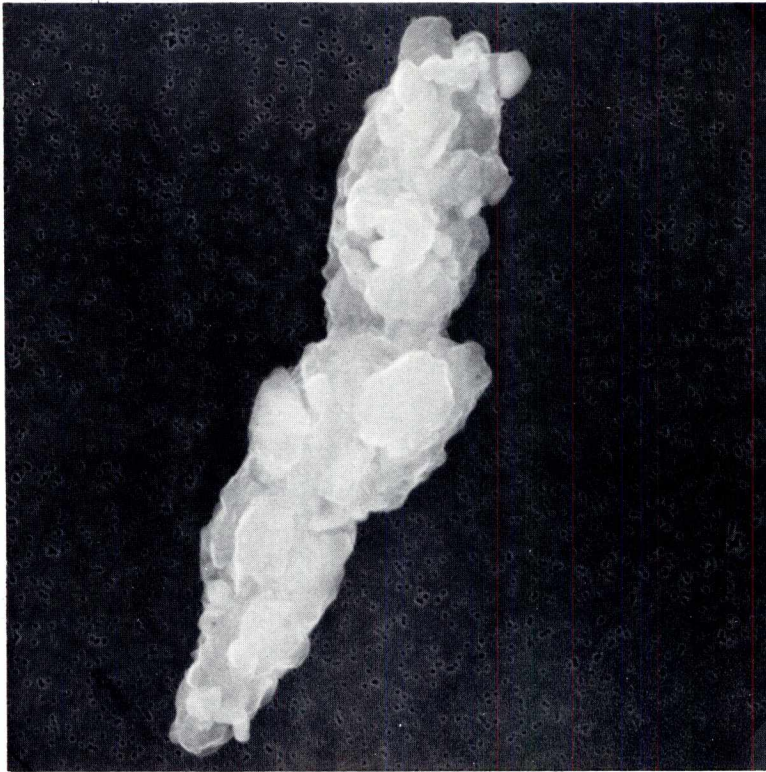
SIZE: 24x15
SHAPE: I
TRANS.: TL
COLOR: Orange to brown
LUSTER: R/D
TYPE: TCN
COMMENTS:

S-88-53388

W714



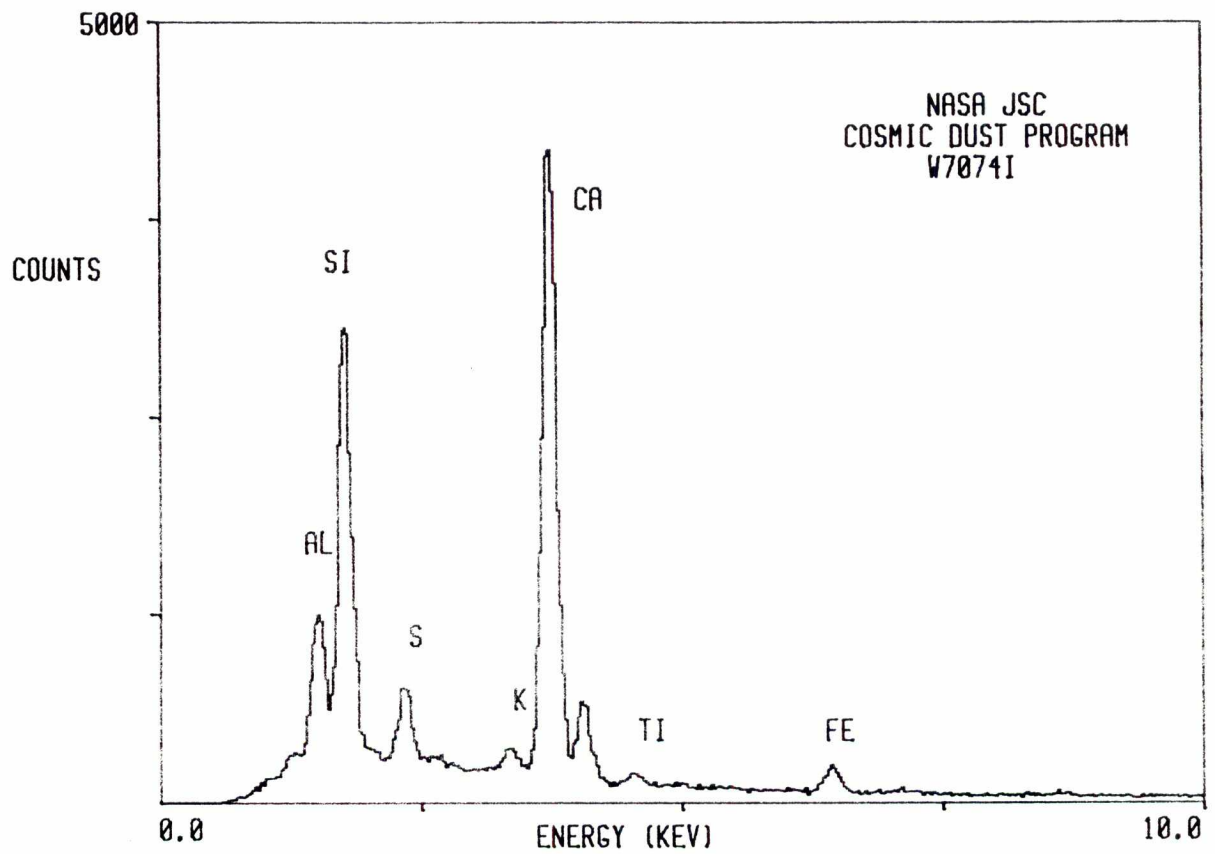
W7074 I 6



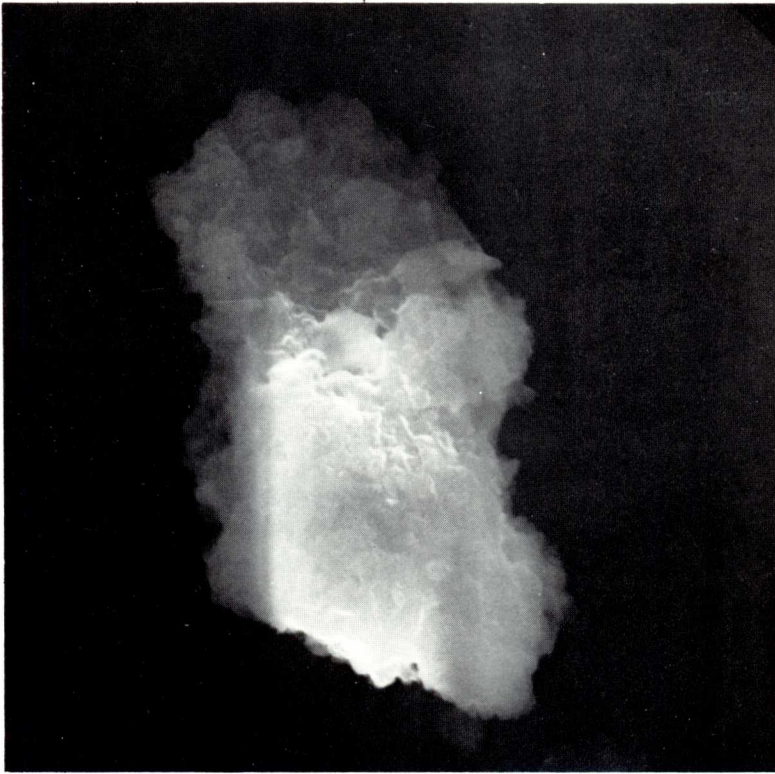
SIZE: 60x14
SHAPE: I
TRANS.: TL/O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCN
COMMENTS:

S-88-53389

W716



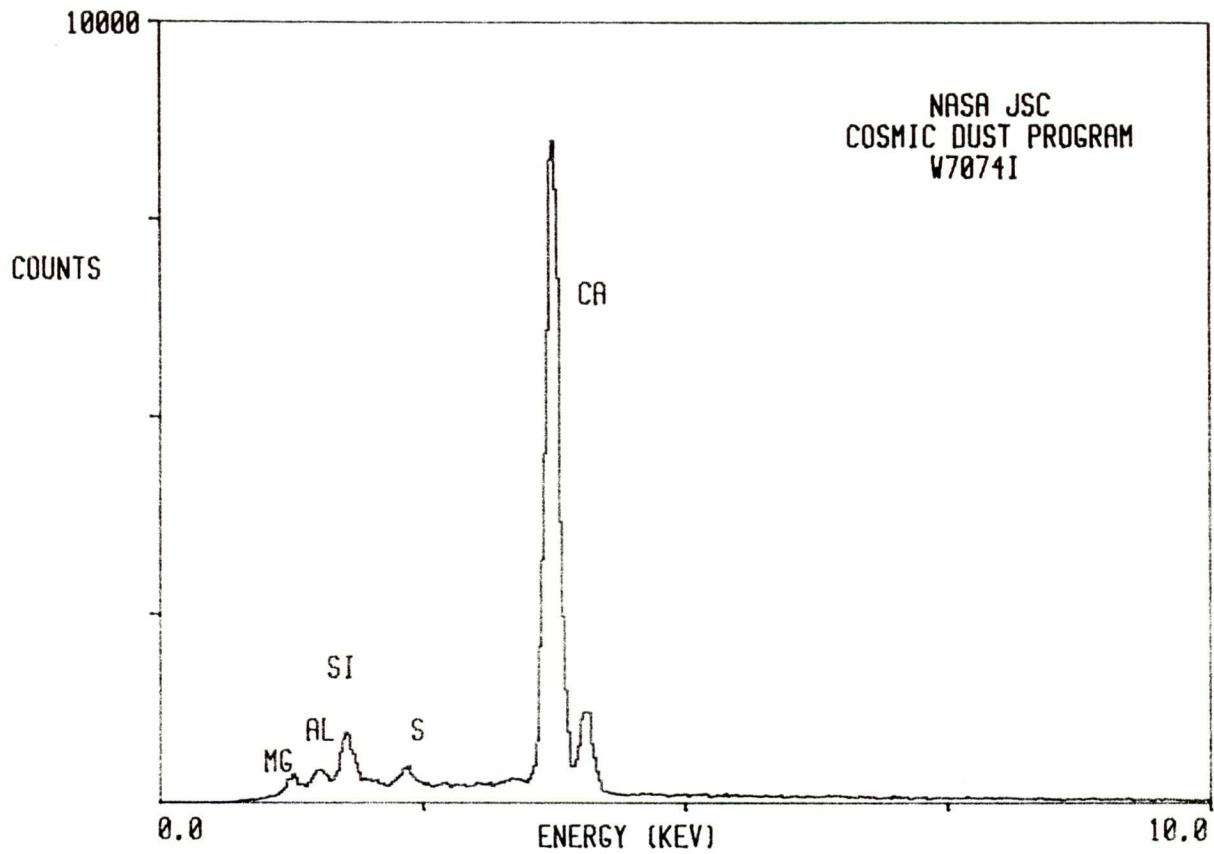
W7074 I 7



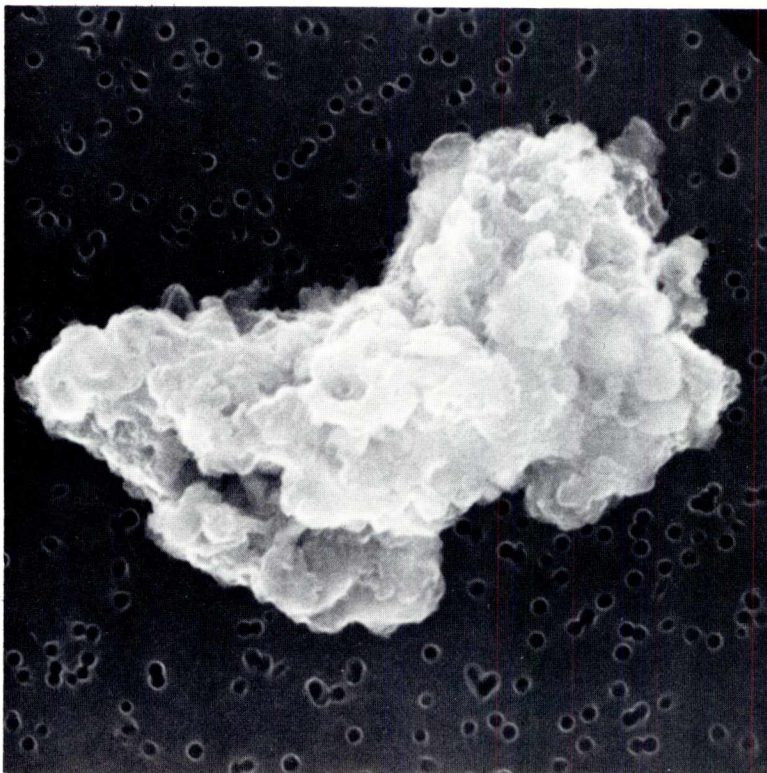
SIZE: 45x24
SHAPE: I
TRANS.: TL/O
COLOR: White to yellow
LUSTER: R/D
TYPE: TCN
COMMENTS:

S-88-53390

W717



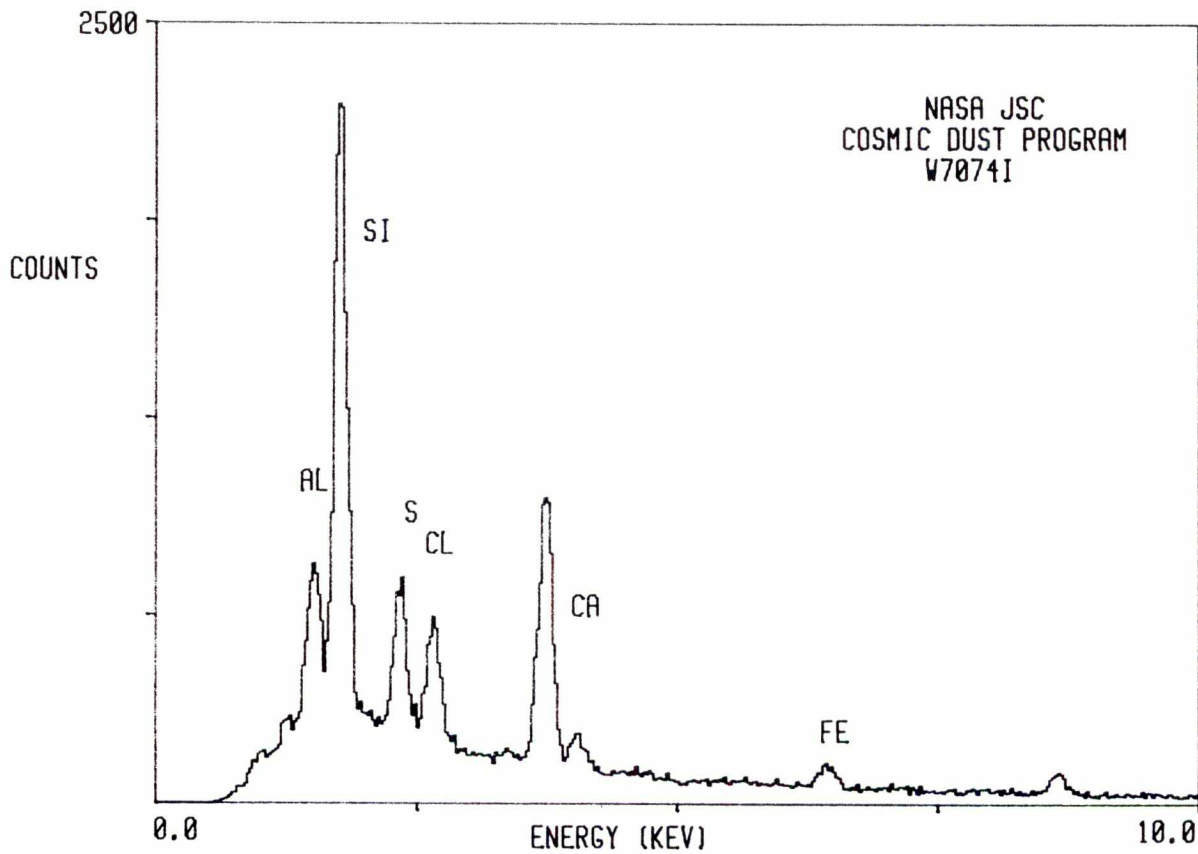
W7074 I 14



SIZE: 20x10
SHAPE: I
TRANS.: O
COLOR: Brown to black
LUSTER: SM/D
TYPE: TCN
COMMENTS:

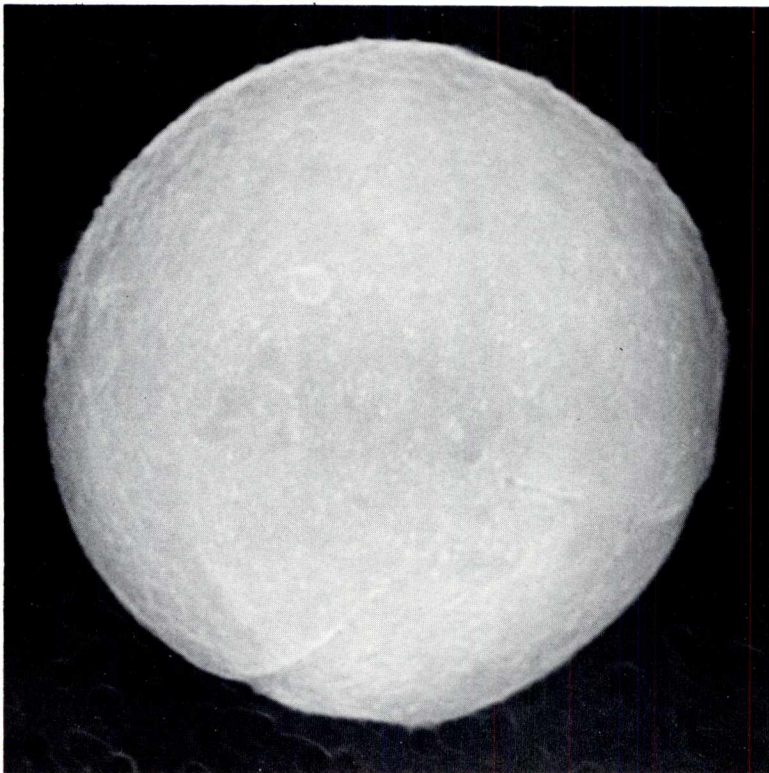
S-88-53396

W7114



ALUMINUM OXIDE SPHERES

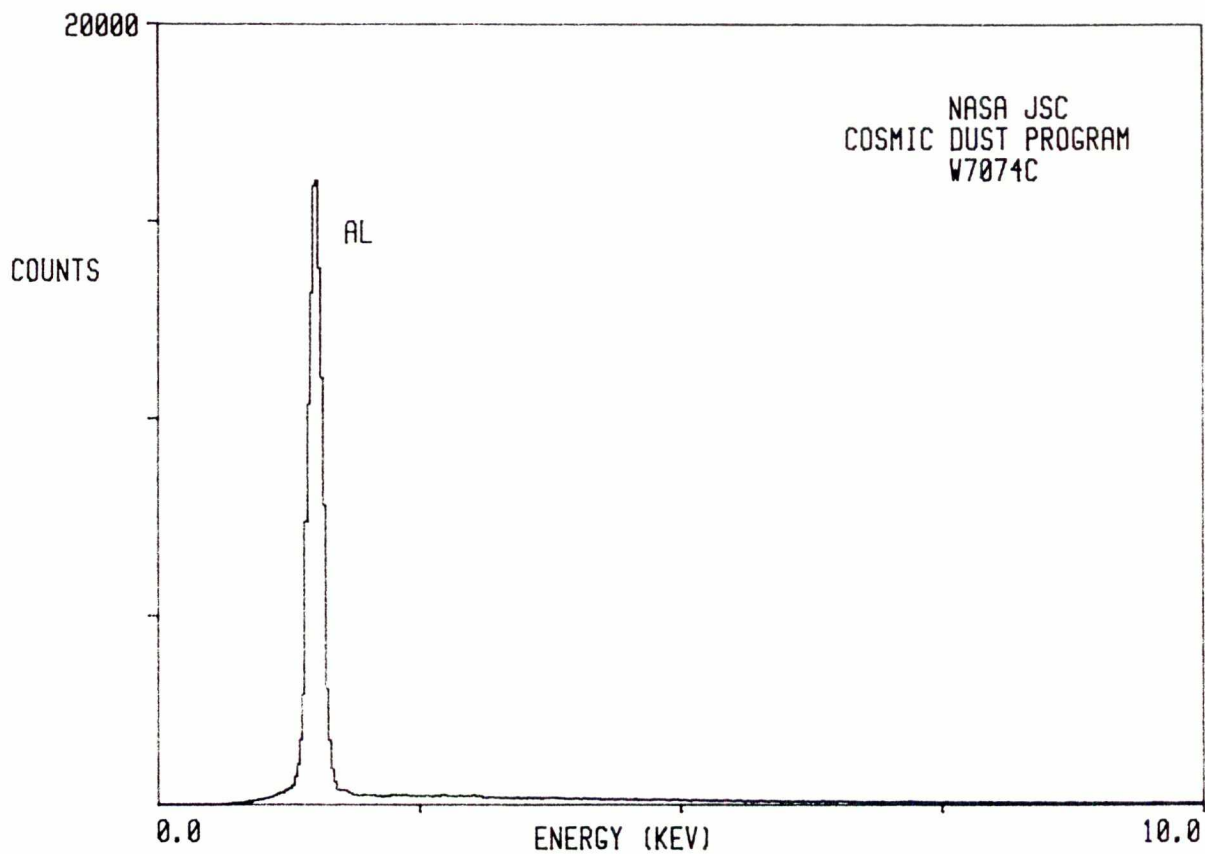
W7074 C 18



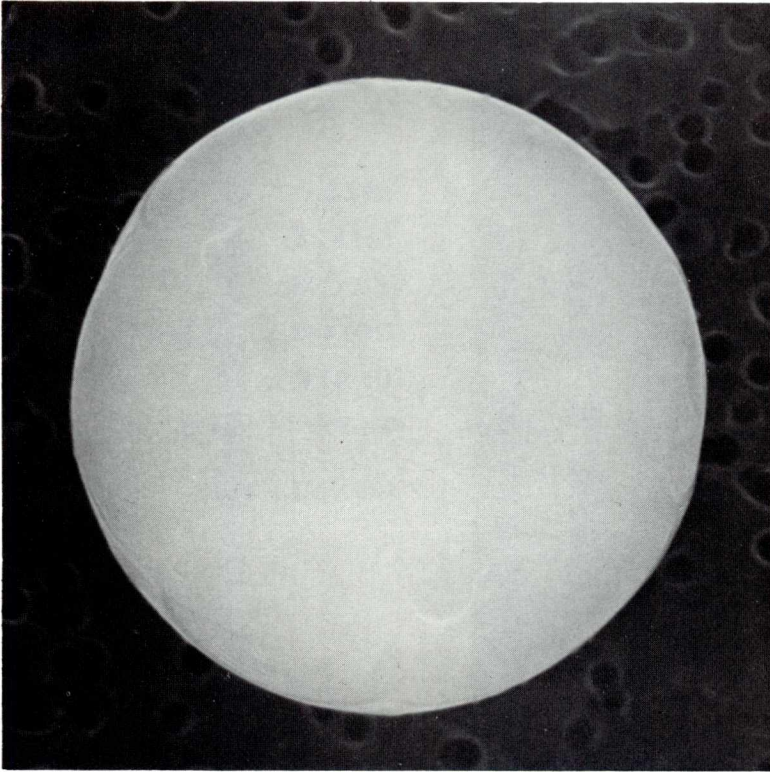
SIZE: 8
SHAPE: S
TRANS.: T
COLOR: Yellow
LUSTER: V
TYPE: AOS
COMMENTS:

S-88-53305

W7C18



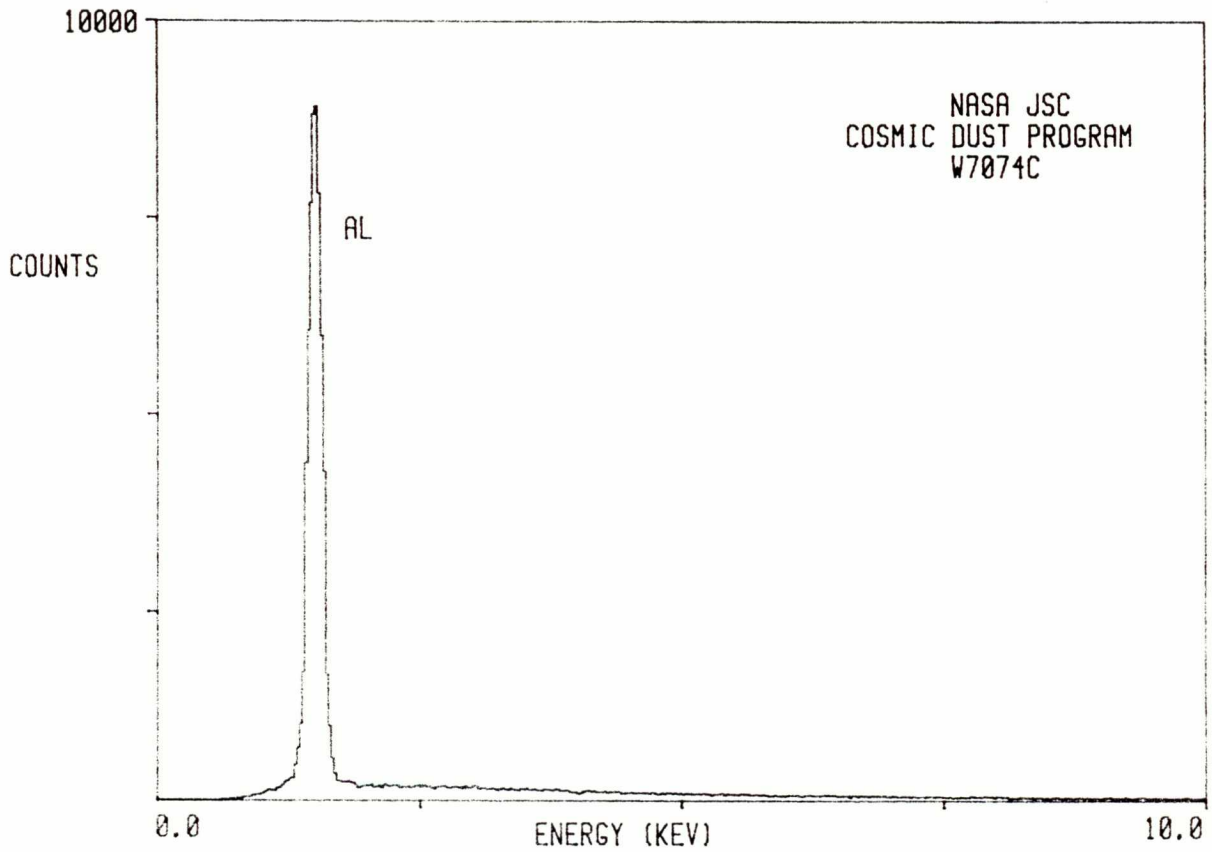
W7074 C 19



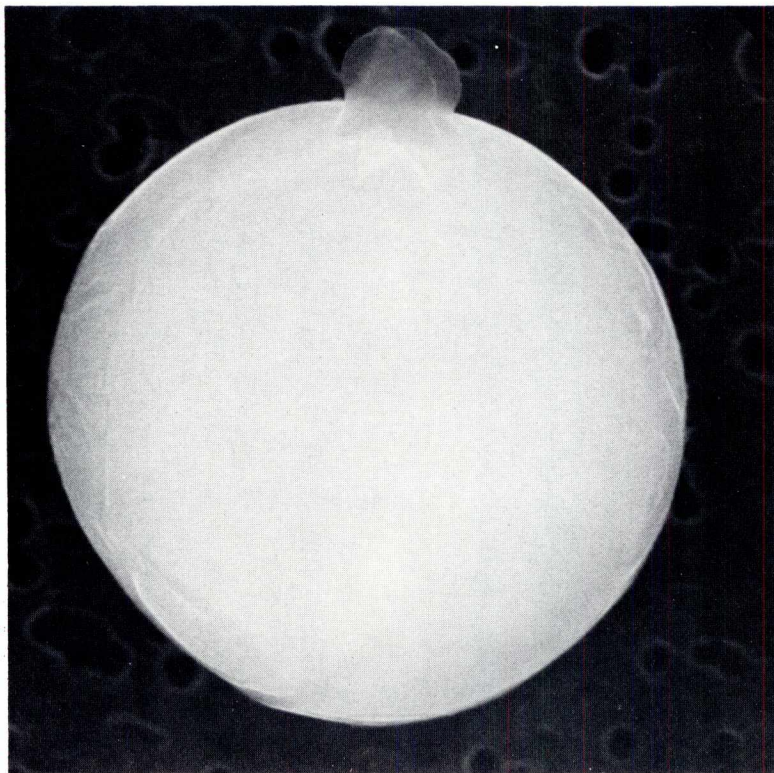
SIZE: 6
SHAPE: S
TRANS.: T
COLOR: Yellow
LUSTER: V
TYPE: AOS
COMMENTS:

S-88-53306

W7C19

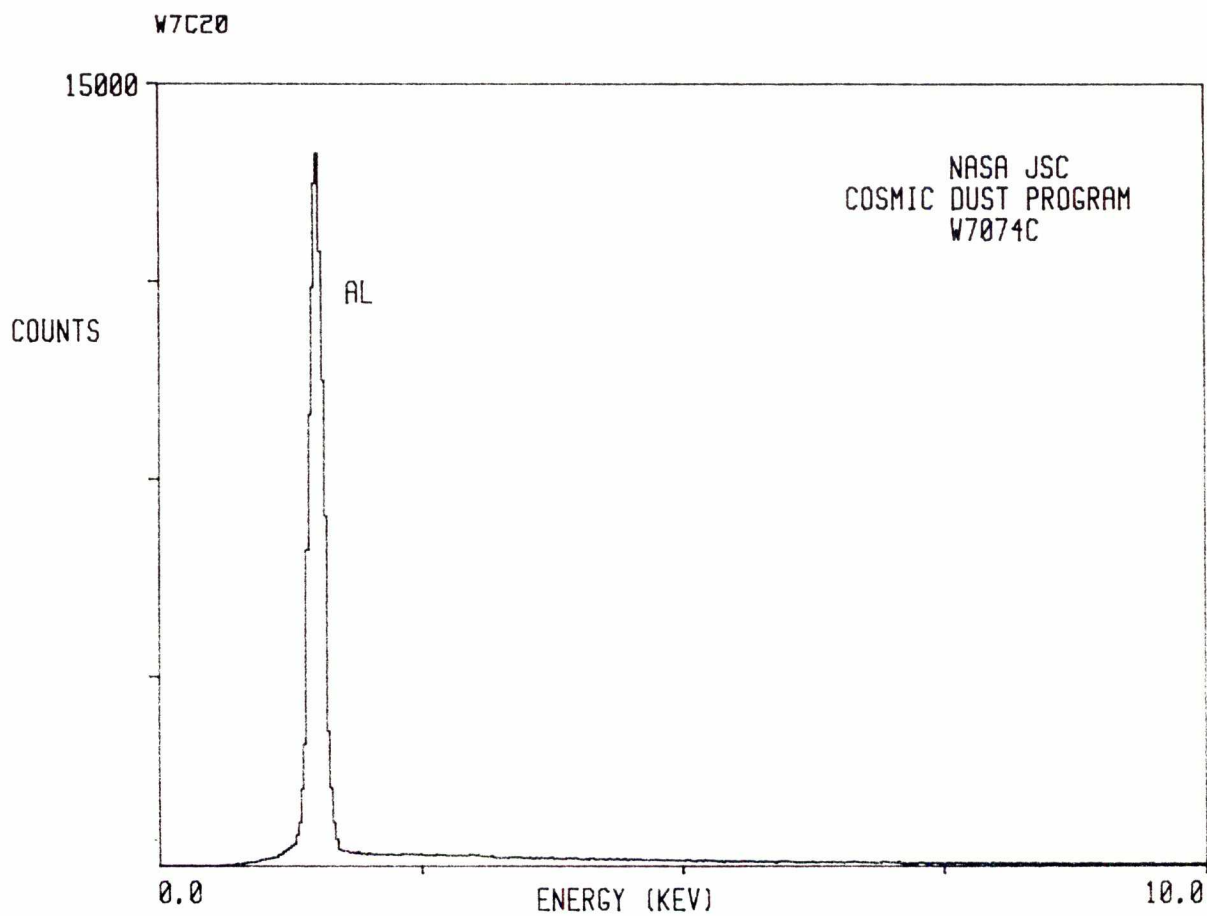


W7074 C 20

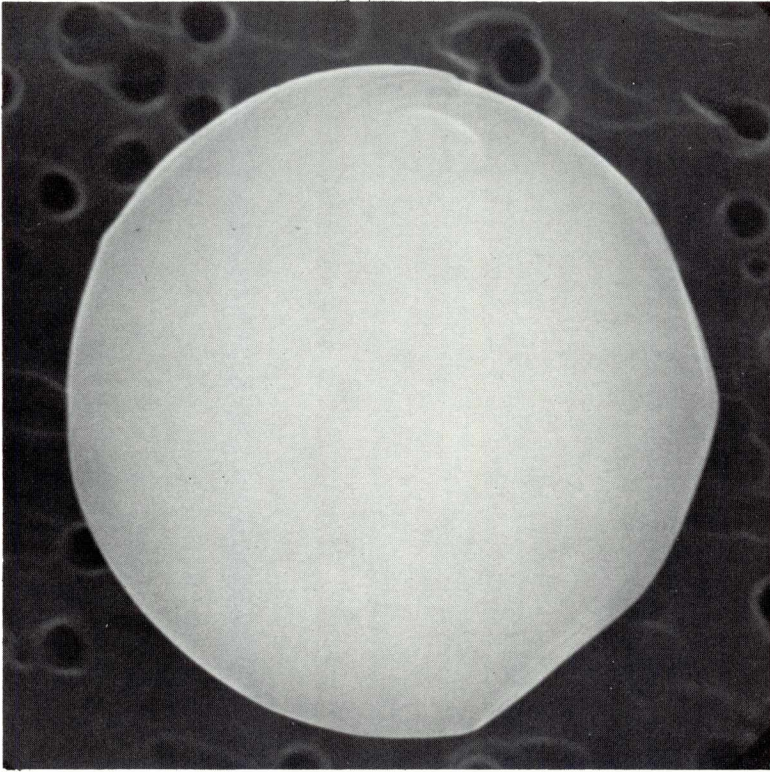


SIZE: 6
SHAPE: S
TRANS.: T
COLOR: Yellow
LUSTER: V
TYPE: AOS
COMMENTS:

S-88-53307



W7074 C 21



SIZE: 4
SHAPE: S
TRANS.: T
COLOR: Yellow
LUSTER: V
TYPE: AOS
COMMENTS:

S-88-53308

W7C21

