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Cutting of Johns-Manville Asbestos Containing Cement Pipe

Work Practice Study

October, 2003

By:

Richard L. Hatfield
Michael D. Mount, CIH
William E. Longo, Ph.D.

Materials Analytical Services, Inc.

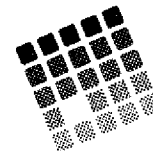


INDEX OF REVISIONS

Revision #		Date Completed	Remarks
1)	Revision #0	October 31, 2003	N/A
2)	Revision #1	December 21, 2007	Dimensions of pipe corrected.

CUTTING OF JOHNS-MANVILLE ASBESTOS CONTAINING CEMENT PIPE

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Cutting of Johns-Manville Asbestos Containing Cement Pipe Work Practice Study

William E. Longo, Ph.D., Richard Hatfield, and Michael Mount, CIH

STUDY DESIGN AND METHODOLOGY

The study was performed in the exposure characterization lab (ECL). The size of the ECL is approximately 20' x 15' x 8' and the walls and ceiling are constructed of a painted plastic laminate. The ECL was constructed with two viewing windows for video taping purposes and has an air exchange rate of approximately 200 cubic feet per minute with two primary inlet sources and a negative air machine that produces a constant airflow during the study. Before the study, the ECL was decontaminated by standard asbestos abatement methods including HEPA vacuuming of all dust and debris and wet wiping of all surfaces in the ECL.

During video taping of the workplace study, high intensity lighting (three Altman 360Q 750 watt lights) were utilized inside the ECL to enhance the possible observations of any respirable size dust particles released during the work activity. Previous studies and protocols have shown that the use of high intensity lighting is an effective method of displaying microscopic airborne dust generated from workplace activities.^{1,2,3,4,5,6} To minimize reflection, the walls inside the ECL were painted black.

During the study, air samples were collected using 25mm air cassettes containing 0.8 micron pore size mixed cellulose ester (MCE) filters and a 5.0 micron backing pad. The air sampling pumps were calibrated utilizing a DryCal[®] primary standard before and after the sample collection. High volume pumps (Dawson 110V) were used for area or bystander air samples during the study. The pumps were located outside the ECL and connected to the air sample cassettes by Tygon[®] tubing through the walls of the ECL. The four area air samples were located on the quadrant ends of the ECL. The air sampling cassettes were located approximately five feet from the floor and six to eight feet from the work activity. For background samples, the high volume pumps were calibrated to a flow rate of between 9.6 and 9.9 liters per minute. During the actual work practice, the high volume pumps in the ECL were calibrated to a flow rate of between 2.0 and 2.2 liters per minute.

¹ Surgen Commander P.G. Harris, "The Effects and Control of Disease Associated with Exposure in Devonport Dockyard", Doctoral Dissertation.

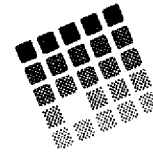
² C. Dornick & K.S. Lane, "Asbestos Toxicology Report", Union Carbide Corporation.

³ D.T. ECLs, "Dust Control Development" (S. Chissick and R. Derricott), in Asbestos Volume 2 Properties, Applications and Hazards, 6 193, 1983.

⁴ I.J. Selikoff, "Insulation Hygiene Progress Report", Volume 3 No.4, Winter, 1971.

⁵ Environmental Protection Agency SOP EPA-Libby-02, March 2001.

⁶ MDHS 82, The Dust Lamp, Health & Safety Executive, March 1997.



The investigator performing the work activity was fitted with two personal air samplers attached to his left and right shoulder areas. The samples were positioned to measure the breathing zone concentration of the asbestos dust during the studies. The personal air samples were collected with battery operated Gillian pumps calibrated to a flow rate of approximately 2 liters per minute. Before the study, background samples were run inside the ECL. The PCM and TEM air samples were collected in general accordance with methods outlined in the NIOSH 7400 method. During the study, two air cassettes were opened in the ECL for approximately 30 seconds, and then closed. These samples were analyzed as field blanks.

The individuals working inside the ECL wore a Tyvek suit under 100% cotton work clothes and were protected with a powered air purified respirator. The ECL design included decontamination areas for clothing removal and for a shower to remove any residual asbestos contamination before the worker left the ECL area.

The air sampling and work time for the cutting of Johns-Manville (JM) cement pipe was five minutes in length. After completion of the cutting activities and air sampling, fabric samples from the work clothes of the investigator who cut the pipe and the helper were collected in the ECL.

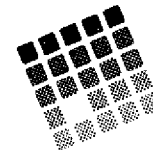
A sample of the Johns-Manville cement pipe was analyzed by PLM to determine the asbestos type and content. Before and after the cutting, one dust sample was collected again from the finish surface of the Johns-Manville pipe.

ANALYTICAL METHODS

The air filters were analyzed in general accordance with the NIOSH 7400 method for PCM using A counting rules. For TEM analysis, a modified Yamate EPA level II indirect air sample analysis was performed. The samples for TEM analysis were first prepared using a washout redeposit method. The fabric samples were prepared by the recommended EPA method to determine the level of asbestos contamination of the clothing worn by the investigators. The midjet impinger samples were analyzed by the ACGIH method. A solution of 50% water and alcohol was used in the impinger and the results were expressed as million particles per cubic feet (MPPCF).

WORK PRACTICE

MAS received a section of Johns-Manville asbestos containing cement pipe from J. Riggs, Salmon Brothers, Inc. The dimension of the cement pipe was approximately five inches long with a one-half inch wall thickness and a six inch outside diameter. Photographs were taken of this pipe section and are shown in Section 8 of this report. A common work practice used for this type of cement pipe was to cut the material with an electric handsaw containing a masonry blade. Our study consisted of making one cut across an end of the Johns-Manville pipe section that we received. A new 7 1/4" Skil saw with a new DeWalt® abrasive saw blade was used for the study. The saw was



rated at 2.3 HP and 13 amps. Additional information about this tool is shown in Section 8 of this report.

During the pipe cutting study, air samples were collected according to the following schedule:

I. Personal (IWA)

- 1) 0 – 5 minutes P-1-A, P-1-B, P-1-C and P-1-D

II. Area (IWA)

- 1) 0 – 5 minutes 1st Area Sample Set
- 2) 60 – 82 minutes 2nd Area Sample Set

III. Midget Impingers

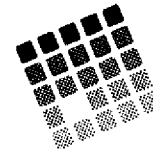
- 1) 0 – 5 minutes P-1-MIMM & P-1-MIRH

RESULTS

During the work practice, the individual performing the cutting operation was exposed to levels of airborne asbestos fibers of between 47 to 73 fibers/cc as measured by PCM. The helper/assistant's exposure level ranged from 58 to 73 fibers/cc when also measured by PCM. Due to pump failure, only the helpers' midget impinger air sample could be analyzed and the midget impinger level was found to 40.6 MPPCF. The results for the surface dust samples can be found in the summary page.

The PLM analysis showed that the Johns-Manville cement pipe contained 25% chrysotile and trace crocidolite asbestos as determined by the recommended Environmental Protection Agency protocol for this analysis.

The average asbestos exposure for the investigators performing the cutting in this study was approximately 62.6 fibers/cc as measured by PCM. The personal samples were collected over a five minute period. Assuming that in an 8-hour work day that was the only exposure this individual would have had was for the five minutes, then his 15 minute excursion limit would have been 20.9 f/cc (over OSHA's 1972 limit).



CONCLUSION

MAS conducted a study to determine the release and potential exposure to airborne asbestos fibers during the dry cutting of Johns-Manville asbestos-containing cement pipe. This study shows that when one cut is made, with an electric saw containing a masonry blade, across the 6" outside diameter cement pipe, significant amounts of airborne asbestos fibers were released into the breathing zone of the individual and the bystander/assistant who were performing this work activity.

The surface dust data here clearly shows that when an individual has to cut the Johns-Manville pipe with a dry electric saw, not only will he breathe a significant level of airborne asbestos fibers, but the severe residual asbestos contamination on the surface of the pipe and in his work area after the cut provides another potential source for exposure to that individual.

When the clothing worn by the person cutting the pipe in this study was analyzed, it was found to be highly contaminated with asbestos. This asbestos contamination on his clothing is yet another potential source of exposure through re-entrainment of the asbestos dust from the clothing when such activities as the brushing of the clothing or laundry activities are done.

QUALITY CONTROL

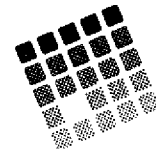
Phase Contrast Microscopy

MAS is accredited by AIHA for phase contrast microscopy of fiber analysis and has been a participant in AIHA's asbestos Proficiency Analytical Testing (PAT) program for asbestos fiber analysis for the last 13 years. During that time, MAS has been found proficient in each and every PAT round for the fiber analysis. Additionally, MAS exchanges air samples with outside laboratories and has developed intra and inter-counter precision for the laboratory.

For the PCM air samples analyzed in this study, 10% blind recounts were performed and those results were within the confidence limits as specified by NIOSH.

Transmission Electron Microscopy & Bulk Analysis

MAS is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) to analyze asbestos air samples by transmission electron microscopy and bulk samples by optical microscopy.



Rate of Error Calculation

The rate of error for this study is based on the PCM analysis and is determined as follows:

	<u>Cement Pipe Cutting</u>	<u>Average f/cc</u>
1)	Personal Samples	62.6

The coefficient of variation determined at this laboratory for this range of PCM fiber counts are 0.136 for personal samples.

SECTION 1



Cutting of Johns-Manville Asbestos Containing Cement Pipe

Work Practice Study

August 6, 2003

Protocol

I. ECL SET-UP

- A. Study is to be performed in the exposure characterization lab (ECL) constructed using negative airflow asbestos abatement technology. The size of the ECL is approximately 15' x 20' x 8'.
- B. Air exchange inside the ECL will be approximately 200 cubic feet per minute as measured (Extech Model 451126) at the air exhaust of the HEPA filter negative air machine (Aramco, Comanche Model #55011).
- C. Tyndall lighting setup in accordance with the methods described in D.T. Chambers, "Asbestos", John Wiley & Sons, 6, 193, 1983 and the Environmental Protection Agency SOP, EPA-Libby-02, Revision #1, March 2001 (Tyndall lighting section only). The lighting source will be three high intensity lights (750 watts, ellipsoid pyrex glass lens, 219K candle power, 8 degree beam divergence) located on each side of the work activity at an approximate 15 degree angle from the line of sight of the cameras.
- D. Two video cameras (the Sony Handcam, Model TRV99) will be used in this study and operated in manual focus mode.

II. BACKGROUND AIR SAMPLES

- A. The ventilation flow rate will be adjusted to approximately 200 cubic feet per minute during background sampling.
- B. Adjust and calibrate high volume area pumps to 10 liters per minute.
- C. Setup four area air samples inside the ECL. Use 25 mm air cassettes containing 0.8 micron pore size mixed cellulose ester (MCE) filters with a 5.0 micron backing pad.
- D. Locate the area air samples in each quadrant of the ECL at a height of 55" from the floor and a distance of approximately 7 feet from the work activity.



III. WORK PRACTICE STUDY

- A. Before the study, one dust sample will be collected from the surface of the pipe and submitted to the laboratory with a field blank. After the cutting is completed, a second dust sample will be collected on the surface of the pipe.
- B. The investigators will wear a supplied air respirator.
- C. Each investigator will wear three personal air pumps for two air cassettes and one midjet impinger air sampler.
- D. The work practice will be viewed from time to time under high intensity lighting. The entire procedure will be video taped with two separate cameras.
- E. Area air samples will be taken during the study in each quadrant of the chamber at a flow rate of approximately 2.0 – 2.5 liters per minute. Two sets of area samples will be collected in this study. The high volume pumps will be calibrated both before and after the air samples are collected.
- F. A 7¼" 13 amp Skil® saw (2.3 HP) Model #5600-01 with a 7" abrasive saw (DeWalt) will be used in this study and was purchased new for the study.
- G. The work practice will consist of cutting one cross section from the end of the Johns-Manville cement pipe.
- H. The investigators will wear personal air samples during the work practice. The Gilian pumps will be calibrated to approximately 0.5 liters per minutes for the air cassettes and 2.75 liters per minute for the midjet impinger. After the study, the air pumps will be recalibrated.
- I. The personal air cassettes will be collected for five minutes.
- J. The first set of area samples will be collected for five minutes, the second set will be run for approximately 20 minutes and started approximately 60 minutes after the first area samples have been collected.



IV. Laboratory Analysis

- A. All air samples will be analyzed in general accordance with the NIOSH 7400 PCM method using A counting rules. After a portion of the filter has been removed for the PCM analysis, the filter then will be analyzed by TEM.
- B. For the TEM analysis, all air samples will be prepared by the indirect washout method. Samples will be analyzed using the EPA Level II Modified Counting Rules.
- C. Fabric samples will be analyzed by the EPA recommended method.
- D. Dust samples will be analyzed in general accordance with the ASTM D5755-3 method.
- E. Midget impinger samples analyzed by the ACGIH method.



Work Practice Simulation Protocol

I) Chamber Setup

- A) The walls, ceiling, and floor are painted black to diminish light reflection.
- B) Arranged lighting for Tyndall effect in general accordance with the method described in by D.T. Chambers, "Asbestos", John Wiley & Sons, 6, 193, 1983.

II) Background Air Samples

- A) Adjust and calibrate high volume area pump to appropriate flow rate.
- B) Set up two or more air samples inside the chamber and one outside air sample in general accordance with the procedure outlined in the NIOSH 7400 method.¹

III) Work Practice Study²

- A) Review the appropriate information on work practices simulation.
- B) Acquire all necessary tools and materials required for work practice simulation.
- C) Calibrate personal and high volume sampling pumps appropriate to flow rates.
- D) Set ventilation to 200 cubic feet per minute as measured with the Extech Flow Anemometer.
- E) Set up two or more inside air samples and one outside air sample in general accordance with the procedure outlined in the NIOSH 7400 Method.¹
- F) Participants in the study are to wear protective clothing, work apparel, and respiratory protection equipment.
- G) Set up the personal air samples in general accordance with the procedure outlined in the NIOSH 7400 method.¹
- H) Determine the appropriate time for the length of study.
- I) Work practice study performed as determined in Section III, A&B.

¹ If midjet impinger air sampling is to be done, set up the samples in general accordance with the ACGIH method.

² Parts of the procedure may be done in advance of chamber set up.



- J) If appropriate, film the work practice study from start to finish in two directions. During filming, turn off Tyndall lighting and turn the overhead lights on at least on one occasion.

IV. ANALYSIS

- A) Analyze air samples in general accordance with the NIOSH 7400 PCM methods with A counting rules. (*See Note*)
- B) Analyze some or all of the air samples by the NIOSH 7402 TEM method.
- C) Analyze the cloth/fabric samples by the recommended EPA method.
- D) Analyze dust samples by the ASTM D-5755-95 method.

V. RESULTS

- A) Air: Report PCM results as fibers/cc, if NIOSH 7402 method is used, provide the results of the percentage of asbestos versus non-asbestos fibers and calculate the PCME.
- B) Fabric: Report TEM results as number of asbestos structures per cm² and per square foot of cloth sample.
- C) Dust: Report TEM results as number of asbestos structures per cm² and per square foot of surface area sampled.

VI. OPTIONAL ANALYSIS

- A) Midget impinger samples analyzed by the ACGIH method.
- B) Dust samples analyzed by the ASTM D-5755-95.

Note: According to the NIOSH 7400 method, fiber counts outside 100-1300 fibers/mm² range have greater than optimal variability and are probably biased.

SECTION 2

Cutting of Johns Manville Asbestos Containing Cement Pipe



Asbestos Air, Dust & Fabric Analysis Results

<u>Sample No.</u>	<u>Sample Description</u>	<u>PCM Fibers/cc</u>	<u>TEM Str/cc (All)</u>	<u>TEM Fibers ≥ 5 μm/cc</u>	<u>Midget Impinger MPPCF</u>
A-0-A (NE)	IWA Background	<0.01	<0.05	N/A	
A-0-B (SE)	IWA Background	<0.01	<0.05	N/A	
A-0-C (SW)	IWA Background	<0.01	<0.05	N/A	
A-0-D (NW)	IWA Background	<0.01	<0.05	N/A	
A-MP-1	IWA Background	-----	-----	-----	0.25

PERSONAL SAMPLES

<u>Sample No.</u>	<u>Sample Description</u>	<u>PCM Fibers/cc</u>	<u>TEM Str/cc (All)</u>	<u>TEM Fibers ≥ 5 μm/cc</u>	<u>Midget Impinger MPPCF</u>
P-1-A RHR	Personal	47.1	3,814.9	978.2	
P-1-B RHL	Personal	73.2	1,911.2	182.0	
P-1-C MMR	Personal	57.5	3,003.3	455.1	
P-1-D MML	Personal	72.5	3,668.2	611.4	
P-1-RH	Personal	-----	-----	-----	Pump Failure
P-1-MM	Personal	-----	-----	-----	40.6

AREA SAMPLES

<u>Sample No.</u>	<u>Sample Description</u>	<u>PCM Fibers/cc</u>	<u>TEM Str/cc (All)</u>	<u>TEM Fibers ≥ 5 μm/cc</u>
A-1-A	IWA Area	21.9	2,245.4	377.9
A-1-B	IWA Area	22.0	6,969.5	1,222.7
A-1-C	IWA Area	21.9	3,938.1	317.6
A-1-D	IWA Area	23.5	933.7	222.3

Collected 60 Minutes After Area 1 Samples

A-2-A	IWA Area	5.8	63.5	15.9
A-2-B	IWA Area	6.3	55.8	22.3
A-2-C	IWA Area	6.3	40.6	10.2
A-2-D	IWA Area	4.4	60.6	5.1

AIR FIELD BLANKS

		<u>PCM Fibers/mm²</u>	<u>TEM Structures/mm²</u>
FB-1	IWA	<7	< 13
FB-2	IWA	<7	< 13



**Cutting of Johns Manville
Asbestos Containing Cement Pipe**

Asbestos Air & Fabric Analysis Results

Continued

FABRIC ANALYSIS

			<u>Structures/ ft²</u>	<u>Structures/cm²</u>
Fabric Blank RH	F-1-RH	Blank	N/D	N/D
Fabric Blank MM	F-1-MM	Blank	N/D	N/D
Fabric MM	F-2-MM	Fabric	68.15 million	73.35 thousand
Fabric RH	F-2-RH	Fabric	148.4 million	159.7 thousand

SURFACE DUST ANALYSIS

		<u>Structures/ ft²</u>	<u>Structures/cm²</u>
DS-1	Outside Surface Before Study	956.6 million	1.0 million
DS-2	Outside Surface After Study	745.5 million	802.4 thousand
DS-B	Field Blank	N/D	N/D

ND = Non-detected

SECTION 3

**MATERIALS ANALYTICAL SERVICES, INC.
CHAIN-OF-CUSTODY****CLIENT:** LEVY, PHILLIPS & KONIGSBERG**MAS JOB:** M31736**CONTACT:** Moshe Maimon**DATE RECEIVED:** 7/25/2003**PHONE:** (212) 605-6260**SUBMITTED BY:** J Riggs, Salmon Bros.**CLIENT JOB NAME:** Asbestos Pipe**TRANSPORT:** UPS**CLIENT JOB#:****RECEIVED BY:** dmazzaferro**CLIENT DOC(S):** Letter of transmittal**CONDITION:** good**FAX NUMBER:**

MAS #	CLIENT ID	VOLUME	TYPE MATERIAL
001	B-1		tri corner pipe - big
<u>LOCATION</u>			

002	B-2		smaller ring pipe
<u>LOCATION</u>			

MAS #	CLIENT ID	VOLUME	TYPE MATERIAL
-------	-----------	--------	---------------

INITIAL FILE REVIEW:	_____	DATE:	_____
SAMPLE PREP BY:	_____	DATE:	_____
SAMPLE ANALYSIS BY:	_____	DATE:	_____
COMMENT:	_____		

Materials Analytical Services, Inc.
3945 Lakefield Court
Suwanee, Georgia 30024
(770) 866-3200

Telephone: (973) 347-0013
Fax: (973) 347-0928

Equal Opportunity Employer

Salmon Bros., Inc.

ROAD BUILDERS

P.O. BOX 67 • NETCONG, N.J. 07857

M31736

July 23, 2003

Wm. Longo
Materials Analytical Service
3945 Lakefield Court
Suwanee, Georgia 30024

Re: Testing of enclosed pieces
of asbestos pipe

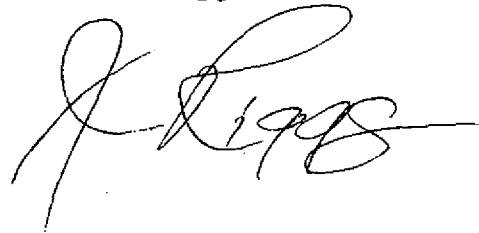
Dear William:

Please find enclosed two pieces of pipe for testing per Mr.
Moshe Maimon, Attorney at Law.

Levy, Phillips & Konigsberg LLC
520 Madison Avenue
New York, New York 10022
212-605-6260

We were instructed to send you these pieces - any questions,
please call Moshe Maimon at the law firm listed above.

"J" Riggs



Received 7-25-03 [Signature]

Bulk
INDUSTRIAL HYGIENE AIR SAMPLING CHAIN OF CUSTODY



3945 Lakefield Court
Suwanee, GA 30024
PH: (770) 866-3200
FAX: (770) 866-3259

Co. Name _____

Address _____

PH: _____

FAX: _____

Project Number: M31736

Project Name: Cutting AC pipe - KVM

Work Area Description: _____

Project Representative: _____

Sampling Date: _____

Sheet 1 of 1

Date	Sample No.	Sample Location	Sample Media	Analysis Desired	Start Time	Stop Time	Total Time (Minutes)	Average Flow Rate (LPM)	Air Volume (Liters)
8/5	B-1 (Big)	f/pipe After Cut	—	PLM	—	—	—	—	—
8/5	B-2 (Small)	/ Pipe After Cut							

First Transfer By: *Michael M...*
Second Transfer By: _____
Third Transfer By: _____

CHAIN OF CUSTODY

Mode of Transfer	Log-In Date	Received By
Initial Shipment Date: <u>8/5/03</u>		

MATERIALS ANALYTICAL SERVICES, INC.
PLM ANALYSIS

Proj#-Spl#: M31736 - 002 Analyst W.B. Egeland Date: 8/12/2003
 ClientName LEVY, PHILLIPS & KONIGSBERG ClientSpl: B-2
 Location: _____
 Type_Mat: smaller ring pipe
 Gross Light gray. 6" outside diameter pipe w/ 1/2" thick wall. Cementitious with white and blue fiber
 Visual: bundles throughout. No paint observed.

OPTICAL DATA FOR ASBESTOS IDENTIFICATION

Morphology	Wavy	Straight	
Pleochroism	None	Blue/Dk. Blue	
Refract Index	1.555/1.548	1.705/1.695	
Sign	+	-	
Extinction	Parallel	Parallel	
Birefringence	Low	Mod	
Melt	No	No	
Fiber Name	Chrysotile	Crocidolite	

ASBESTOS MINERALS

EST. VOL. %

Chrysotile.....	25
Amosite.....	
Crocidolite.....	Trace
Tremolite/Actinolite.....	
Anthophyllite.....	

OTHER FIBROUS COMPONENTS

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

NON FIBROUS COMPONENTS

_____	_____
_____	_____
_____	_____
Binder	75

Effervescence: Strong.

Binder Description: Fine-grained aggregate

Comments: No starch observed

SECTION 4

MATERIALS ANALYTICAL SERVICES PROJECT LOG

Client Code: MASCORP

MAS ID: M31835

Client Name: Materials Analytical Services, Inc.

Project Name: Cutting CA Pipe JM

Logged By: dmazzaferro

Client Job No: _____

Client PO: _____

Date In: 8/6/03

TRANSPORT INFORMATION:

Submitted By: Mike Mount

Documents: COC

Delivery By: Hand Delivery

Received By: dmazzaferro

Comments for COC: _____

Condition: good

CONTACT INFORMATION:

Contact: Richard Hatfield

Work Phone: (770) 866-3204 Ext: _____

Title: First Name: Last Name: Suffix

Other Phone: _____ Ext: _____

Mr. Richard Hatfield

Fax: (770) 866-3259

Page 1 of 4

M31835

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
001	P-1-MIRH	13.65			
002	P-1-MIMM	13.95			
003	P-1-BLANK	0			
004	P-1-BG	49.14			
005	A-O-A	1840			
006	A-O-B	1840			
007	A-O-C	1840			
008	A-O-D	1895			

SIGNATURES

RECEIVED BY: _____

REVIEWED BY: _____

PREPARED BY: _____

ANALYZED BY: _____

REPORTED BY: _____

DEPOSED BY: _____

M31835

SAMPLE INFORMATION:

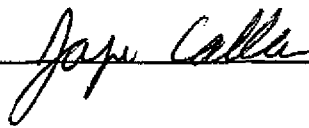
#	Client ID	Volume	#	Client ID	Volume
009	A-O-E	1877			
010	P-1-A	2.5			
011	P-1-B	2.7			
012	P-1-C	2.7			
013	P-1-D	2.8			
014	A-1-A	11			
015	A-1-B	10			
016	A-1-C	11			
017	A-1-D	11			
018	A-1-E	918			
019	A-2-A	46.2			
020	A-2-B	44			
021	A-2-C	48.4			
022	A-2-D	48.4			
023	ASFB-1	0			
024	ASBF-2	0			
001	P-1-MIRH	13.65			
002	P-1-MIMM	13.95			
003	P-1-BLANK	0			
004	P-1-BG	49.14			
005	A-O-A	1840			
006	A-O-B	1840			
007	A-O-C	1840			
008	A-O-D	1895			

SIGNATURES

RECEIVED BY: _____

REVIEWED BY: _____

PREPARED BY: _____

ANALYZED BY: _____


REPORTED BY: _____

DEPOSED BY: _____

M31835

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
009	A-O-E	1877			
010	P-1-A	2.5			
011	P-1-B	2.7			
012	P-1-C	2.7			
013	P-1-D	2.8			
014	A-1-A	11			
015	A-1-B	10			
016	A-1-C	11			
017	A-1-D	11			
018	A-1-E	918			
019	A-2-A	46.2			
020	A-2-B	44			
021	A-2-C	48.4			
022	A-2-D	48.4			
023	ASFB-1	0			
024	ASBF-2	0			
001	P-1-MIRH	13.65			
002	P-1-MIMM	13.95			
003	P-1-BLANK	0			
004	P-1-BG	49.14			
005	A-O-A	1840			
006	A-O-B	1840			
007	A-O-C	1840			
008	A-O-D	1895			

SIGNATURES

RECEIVED BY: _____

REVIEWED BY: _____

PREPARED BY: _____

ANALYZED BY: John Calla

REPORTED BY: _____

DEPOSED BY: _____

M31835

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
009	A-O-E	1877			
010	P-1-A	2.5			
011	P-1-B	2.7			
012	P-1-C	2.7			
013	P-1-D	2.8			
014	A-1-A	11			
015	A-1-B	10			
016	A-1-C	11			
017	A-1-D	11			
018	A-1-E	918			
019	A-2-A	46.2			
020	A-2-B	44			
021	A-2-C	48.4			
022	A-2-D	48.4			
023	ASFB-1	0			
024	ASBF-2	0			

SIGNATURES

RECEIVED BY: _____

REVIEWED BY: _____

PREPARED BY: _____

ANALYZED BY: _____

REPORTED BY: _____

DEPOSED BY: _____

TEM SAMPLE DATA

M31835

Page 1 of 3

Prep SOP#: MT-022
Prep Status: Complete
Sample Type: Indirect Air
Analysis type: MAS indirect

prep_date: 8/13/03 Prep Tech: dmazzaferro

Archival Information

Slides: 180 Filters: Bottles: 947 Gld_box: 6623

Archive Comments:

Disposal Comments:

Reprep Dates

Sample Number	Sample ID	Area	Filter Portion	Total Susp	#1	#2	#3	#4	#5	Filter Type:
000	lab blank	0	Liters 1/ 1	100	30					MCE 47mm
					Dilution Factors	3.333				1297
001	P-1-MIRH	13.65	Liters 1/ 0	0						
					Dilution Factors					
002	P-1-MIMM	13.95	Liters 1/ 0	0						
					Dilution Factors					
003	P-1-BLANK	0	Liters 1/ 0	0						
					Dilution Factors					
004	P-1-BG	49.14	Liters 1/ 0	0						
					Dilution Factors					
005	A-O-A	1840	Liters 1/ 2	100	30					MCE 47mm
					Dilution Factors	6.667				1297
006	A-O-B	1840	Liters 1/ 2	100	30					MCE 47mm
					Dilution Factors	6.667				1297
007	A-O-C	1840	Liters 1/ 2	100	30					MCE 47mm
					Dilution Factors	6.667				1297
008	A-O-D	1895	Liters 1/ 2	100	30					MCE 47mm
					Dilution Factors	6.667				1297
009	A-O-E	1877	Liters 1/ 2	100	30					MCE 47mm
					Dilution Factors	6.667				1297
010	P-1-A	2.5	Liters 1/ 2	100	10	30				MCE 47mm
					Dilution Factors	20	6.667			1297

TEM SAMPLE DATA

M31835

Page 2 of 3

Prep SOP#: MT-022
Prep Status: Complete
Sample Type: Indirect Air
Analysis type: MAS indirect

prep_date: 8/13/03 Prep Tech: dmazzaferro

Archival Information

Slides: 180 Filters: Bottles: 947 Gld_box: 6623

Archive Comments:

Disposal Comments:

Reprep Dates

011	P-1-B	2.7	Liters	1/2	100	Dilution Factors	10	30				MCE 47mm
							20	6.667				1297
012	P-1-C	2.7	Liters	1/2	100	Dilution Factors	10	30				MCE 47mm
							20	6.667				1297
013	P-1-D	2.8	Liters	1/2	100	Dilution Factors	10	30				MCE 47mm
							20	6.667				1297
014	A-1-A	11	Liters	1/2	100	Dilution Factors	10	30				MCE 47mm
							20	6.667				1297
015	A-1-B	10	Liters	1/2	100	Dilution Factors	10	30				MCE 47mm
							20	6.667				1297
016	A-1-C	11	Liters	1/2	100	Dilution Factors	10	30				MCE 47mm
							20	6.667				1297
017	A-1-D	11	Liters	1/2	100	Dilution Factors	10	30				MCE 47mm
							20	6.667				1297
018	A-1-E	918	Liters	1/2	100	Dilution Factors	30					MCE 47mm
							6.667					1297
019	A-2-A	46.2	Liters	1/2	100	Dilution Factors	10	30				MCE 47mm
							20	6.667				1297
020	A-2-B	44	Liters	1/2	100	Dilution Factors	10	30				MCE 47mm
							20	6.667				1297
021	A-2-C	48.4	Liters	1/2	100	Dilution Factors	10	30				MCE 47mm
							20	6.667				1297
022	A-2-D	48.4	Liters	1/2	100	Dilution Factors	10	30				MCE 47mm
							20	6.667				1297

TEM SAMPLE DATA

M31835

Page 3 of 3

Prep SOP#: MT-022
 Prep Status: Complete
 Sample Type: Indirect Air
 Analysis type: MAS Indirect

prep_date: 8/13/03 Prep Tech: dmazzaferro

Archival Information

Slides: 180 Filters: Bottles: 947 Gid_box: 6623

Archive Comments:

Disposal Comments:

Reprep Dates

023	ASFB-1	0	Liters	1/2	100	Dilution Factors	30						MCE 47mm
							6.667						1297
024	ASBF-2	0	Liters	1/2	100	Dilution Factors	30						MCE 47mm
							6.667						1297

INDUSTRIAL HYGIENE AIR SAMPLING CHAIN OF CUSTODY

M2835



Co. Name

Address

3945 Lakefield Court

Suwanee, GA 30024

PH: (770) 866-3200

FAX: (770) 866-3259

PH:

FAX:

Project Number:

Project Name:

Work Area Description:

Project Representative:

Sampling Date:

Culling CA Pipe - JM

Test chamber

R. Hatfield

8/6/03

Sheet 1 of 2

Date	Sample No.	Sample Location	Sample Media	Analysis Desired	Start Time	Stop Time	Total Time (Minutes)	Average Flow Rate (LPM)	Air Volume (Liters)
8/6	A-0-A	N.E. Quad	MCE	PCM / TEM	10:47	13:51	184	10.0	1840
	A-0-B	S.E.						10.0	1840
	A-0-C	S.W.						10.0	1840
	A-0-D	N.W.						10.3	1895
	A-0-E	Outside Test Chamber						10.2	1877
	P-1-A	RH-Left side			15:11	15:16	5	.50	2.5
	P-1-B	RH-Right						.54	2.7
	P-1-C	mm-Right						.53	2.7
	P-1-D	mm-Left						.55	2.8
	A-1-A	N.E. Quad			15:11	15:16	5	2.1	11.0
	A-1-B	S.E.						2.0	10.0
	A-1-C	S.W.						2.2	11.0
	A-1-D	N.W.						2.2	11.0
	A-1-E	Outside Chamber			15:07	16:37	90.	10.2	918.

First Transfer By:

Second Transfer By:

Third Transfer By:

CHAIN OF CUSTODY

Initial Shipment Date:

Mode of Transfer

Log-In Date

Received By

Amber 8-6-03

INDUSTRIAL HYGIENE AIR SAMPLING CHAIN OF CUSTODY



3945 Lakefield Court
Suwanee, GA 30024
PH: (770) 866-3200
FAX: (770) 866-3259

Co. Name

Address

PH:

FAX:

Project Number:

Project Name:

Work Area Description:

Project Representative:

Sampling Date:

Cutting CA Pipe - JM
Test Chamber
R.H.
8/6/03

Sheet 2 of 2

Date	Sample No.	Sample Location	Sample Media	Analysis Desired	Start Time	Stop Time	Total Time (Minutes)	Average Flow Rate (LPM)	Air Volume (Liters)
8/6	A-2-A	NE Quad - After	MCE	PCM / TEM	16:15	16:37	22	2.1	46.
	A-2-B	SE						2.0	44
	A-2-C	SW						2.2	48.4
	A-2-D	NW						2.2	48.4
	ASFB-1	Blank	MCE	PCM / TEM	-	-	0	0	0
	ASFB-2				-	-	0	0	0
8/6	DS-B	NA	MCE	TEM	-	-	-	-	0
8/6	DS-1	from pipe before	MCE		-	-	2	2.0	80cm ²
8/6	DS-2	from pipe after	MCE		-	-	2	2.0	80cm ²
8/6	F-1-RH	from shirt before	fabric	TEM	-	-	-	-	
8/6	F-1-MM				-	-	-	-	
8/6	F-2-MM				-	-	-	-	
8/6	F-2-RH				-	-	-	-	

First Transfer By: *Michael D. Mount*
Second Transfer By:
Third Transfer By:

CHAIN OF CUSTODY

Initial Shipment Date:

Mode of Transfer

Log-In Date

Received By

8/6/03

[Signature]

Materials Analytical Services Airborne Fiber Analysis
NIOSH 7400 Issue 2; Phase Contrast Microscopy

Project Name: CUTTING CA PIPE JM

Sample # M 31835-005

Analysis Date: 9/30/03

Media Type: 25 mm MCE Filter

—	1/2	—	1/2	—
—	—	—	—	—
—	—	—	—	—
—	1	—	—	—
—	—	—	—	1/2
—	—	—	—	—
—	—	—	—	—
1	—	—	—	—
—	—	—	—	—
—	—	—	—	1
—	—	—	—	—
—	—	—	—	—
—	—	1	—	—
—	—	—	—	—
—	—	—	—	—
—	1/2	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	1

Sample ID: A-0-A

Pump Flow Rate, Liters/minute (FR) _____

Sample Time, minutes (T) _____

Sample Volume, Liters (V) 1840

Total Fibers Counted, Sample (FCS) 8

Total Fields Counted, Sample (FLS) 100

Total Fibers Counted, Blank (FCB) _____

Total Fields Counted, Blank (FLB) _____

Area of Filter, mm² (AF) 315

Graticule Field Area, mm² (GFA) 0.0077

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = 10.4 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{E * (AF)}{1000 * V}$$

C = 0.002 fibers/cubic centimeter

Notes: _____

Limit of Quantitation (LOQ) = 7 fibers/mm²

Fiber counts outside the 100-300 fibers/mm² range have greater than optimal variability and are probably biased

Analyst: W. B. Sell

Date: _____

Reviewed By: [Signature]

Date: 10/2/03

Materials Analytical Services Airborne Fiber Analysis
NIOSH 7400 Issue 2; Phase Contrast Microscopy

Project Name: CUTTING CA PIPE JM

Sample # M31835-006

Analysis Date: 9/30/03

Media Type: 25 mm MCE Filter

—	—	—	—	—
1	—	—	—	—
—	—	1/2	—	—
—	—	—	—	—
—	—	—	—	—
1	—	—	1/2	—
—	—	—	—	—
—	1	—	—	—
1/2	—	—	—	—
1	—	—	1	—
—	—	—	—	—
—	1	—	—	—
—	—	—	—	—
—	—	—	—	—
1/2	—	—	—	—
—	—	—	—	—
—	—	—	—	1/2
—	—	—	—	—
—	—	1	1	—

10
20
30
40
50
60
70
80
90
100

Sample ID: A-0-B

Pump Flow Rate, Liters/minute (FR) _____

Sample Time, minutes (T) _____

Sample Volume, Liters (V) 1840

Total Fibers Counted, Sample (FCS) 11 1/2

Total Fields Counted, Sample (FLS) 100

Total Fibers Counted, Blank (FCB) 0

Total Fields Counted, Blank (FLB) 100

Area of Filter, mm² (AF) 385

Graticule Field Area, mm² (GFA) 0.0077

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = 14.9 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{(E) * (AF)}{1000 * V}$$

C = 0.003 fibers/cubic centimeter

Notes: _____

Limit of Quantitation (LOQ) = 7 fibers/mm²

* Fiber counts outside the 100-1300 fibers/mm² range have greater than optimal variability and are probably biased

Analyst: _____

Date: _____

Reviewed By: _____

Date: 10/2/03

Materials Analytical Services Airborne Fiber Analysis
NIOSH 7400 Issue 2; Phase Contrast Microscopy

Project Name: CUTTING LA PIPE JM

Sample # M31935-007

Analysis Date: 9/30/03

Media Type: **25 mm MCE Filter**

—	—	—	1	—
—	1	—	—	—
—	—	—	—	—
—	—	—	—	—
—	1	—	—	—
—	—	1	—	—
—	1/2	1	—	—
—	—	—	—	—
1	1/2	—	—	—
—	—	—	—	—
1	—	—	—	—
—	—	1	—	—
—	1/2	—	—	—
—	—	1	—	—
—	—	—	—	—
—	1/2	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—

10
20
30
40
50
60
70
80
90
100

Sample ID: A-0-C

Pump Flow Rate, Liters/minute (FR) _____

Sample Time, minutes (T) _____

Sample Volume, Liters (V) 1840

Total Fibers Counted, Sample (FCS) 11

Total Fields Counted, Sample (FLS) 100

Total Fibers Counted, Blank (FCB) 0

Total Fields Counted, Blank (FLB) 100

Area of Filter, mm² (AF) 385

Graticule Field Area, mm² (GFA) 0.0077

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = 14.3 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{E * (AF)}{1000 * V}$$

C = 0.003 fibers/cubic centimeter

Notes: _____

Limit of Quantitation (LOQ) = 7 fibers/mm²

* Fiber counts outside the 100-1300 fibers/mm² range have greater than optimal variability and are probably biased

Analyst: W.D. Jeld

Date: _____

Reviewed By: Debra J. Brown

Date: 10/2/03

Materials Analytical Services Airborne Fiber Analysis
NIOSH 7400 Issue 2; Phase Contrast Microscopy

Project Name: CUTTING CA PIPE JM

Sample # 1731835-008

Analysis Date: 9/30/03 Media Type: 25 mm MCE Filter

—	—	—	—	—
—	—	—	—	—
—	—	—	—	1
—	—	—	—	1/2
—	—	—	—	—
—	—	—	1/2	—
—	—	—	—	—
—	—	—	—	1
1	—	—	—	—
—	—	—	—	—
—	—	1	—	—
—	—	—	—	—
1	—	—	1	—
—	—	—	—	—
—	—	—	1	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	1/2	—	2	—
—	1	—	—	—

10
20
30
40
50
60
70
80
90
100

Sample ID: A-0-D

Pump Flow Rate, Liters/minute (FR) _____

Sample Time, minutes (T) _____

Sample Volume, Liters (V) 1885

Total Fibers Counted, Sample (FCS) 11 1/2

Total Fields Counted, Sample (FLS) 100

Total Fibers Counted, Blank (FCB) 0

Total Fields Counted, Blank (FLB) 100

Area of Filter, mm² (AF) 385

Graticule Field Area, mm² (GFA) 0.0077

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = 14.9 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{(E) * (AF)}{1000 * V}$$

C = 0.003 fibers/cubic centimeter

Notes: _____

Limit of Quantitation (LOQ) = 7 fibers/mm²

* Fiber counts outside the 100-1300 fibers/mm² range have greater than optimal variability and are probably biased

Analyst: Will B. Shill

Date: _____

Reviewed By: Donell D. Quinn

Date: 10/9/03

Materials Analytical Services Airborne Fiber Analysis NIOSH 7400 Issue 2; Phase Contrast Microscopy

Project Name: CUTTING CA PIPE JM

Sample # 1731835-010

Analysis Date: 9/30/03 Media Type: **25 mm MCE Filter**

[illegible]

Notes:

Sample ID:	P-1-A
Pump Flow Rate, Liters/minute (FR)	
Sample Time, minutes (T)	
Sample Volume, Liters (V)	3
Total Fibers Counted, Sample (FCS)	104 $\frac{1}{2}$
Total Fields Counted, Sample (FLS)	37
Total Fibers Counted, Blank (FCB)	0
Total Fields Counted, Blank (FLB)	100
Area of Filter, mm ² (AF)	385
Graticule Field Area, mm ² (GFA)	0.0077

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS)-(FCB/FLB))/GFA$$

E = 366.8 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{(E) \cdot (AF)}{1000 \cdot V}$$

C = 47.072 fibers/cubic centimeter

Limit of Quantitation (LOQ) = 7 fibers/mm²

* Fiber counts outside the 100-1300 fibers/mm² range have greater than optimal variability and are probably biased

Analyst: W. B. Gild

Reviewed By: 

Date. _____

Date: 10/2/03

Sample # 173/835-011

Analysis Date: 9/30/03

10
20
30
40
50
60
70
80
90
100

Limit of Quantitation (LOQ) = 7 fibers/mm²
Fiber counts outside the 100-1300 fibers/mm² range have greater than optimal variability and are probably biased

W. B. J. J. J.

Genell Brown

Date: 10/2/03

Materials Analytical Services Airborne Fiber Analysis

Project Name: CUTTING CA PIPE JM

Sample # 1731835-014

Analysis Date: 9/30/03

Media Type: 25 mm MCE Filter

[illegible]

Notes: _____

Sample ID: A-1-A

Pump Flow Rate, Liters/minute (FR)

Sample Time, minutes (T)

Sample Volume, Liters (V)

Total Fibers Counted, Sample (FCS)

40 Total Fields Counted, Sample (FLS)

Total Fibers Counted, Blank (FC8)

50 Total Fields Counted, Blank (FLB)

Area of Filter, mm² (AF)60 Graticule Field Area, mm² (GFA)

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS)-(FCB/FLB))/GFA$$

E = 624.6 fibers/mm2

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$G = \frac{(E) \cdot (AF)}{1000 \cdot V}$$

C = 21.861 fibers/cubic centimeter

Limit of Quantitation (LOQ) = 7 fibers/mm²

* Fiber counts outside the 100-1300 fibers/mm² range have greater than optimal variability and are probably biased

Analyst:

Date.

Reviewed By:

Date:

Materials Analytical Services Airborne Fiber Analysis

Sample # 1731835-016

Analysis Date: 9/30/03 Media Type: 25 mm MCE Filter

[illegible]

Notes: _____

Sample ID: A-1-C

Pump Flow Rate, Liters/minute (FR)

Sample Time, minutes (T)

Sample Volume, Liters (V)

Total Fibers Counted, Sample (FCS)

Total Fields Counted, Sample (FLS)

Total Fibers Counted, Blank (FCB)

Total Fields Counted, Blank (FLB)

Area of Filter, mm² (AF)Graticule Field Area, mm² (GFA)

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS)-(FCB/FLB))/GFA$$

E = 624.6 fibers/mm2

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$G = \frac{(E) \cdot (AF)}{1000 \cdot V}$$

C = 21.86 / fibers/cubic centimeter

Limit of Quantitation (LOQ) = 7 fibers/mm²

* Fiber counts outside the 100-1300 fibers/mm² range have greater than optimal variability and are probably biased

Analyst:

Date _____

Reviewed By:

Date:

NIOSH 7400 Issue 2: Phase Contrast Microscopy

Project Name: CUTTING CA PIPE JN

Sample # 1731835-019

Analysis Date: 9/30/63

Media Type: 25 mm MCE Filter

[illegible]

Notes: _____

Sample ID: A-2-A

Pump Flow Rate, Liters/minute (FR) _____

Sample Time, minutes (T) _____

Sample Volume, Liters (V) 46

Total Fibers Counted, Sample (FCS) 1062

Total Fields Counted, Sample (FLS) 20

Total Fibers Counted, Blank (FCB) 0

Total Fields Counted, Blank (FLB) 100

Area of Filter, mm² (AF) 385

Graticule Field Area, mm² (GFA) 0.0077

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = 691.6 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{E * (AF)}{1000 * V}$$

C = 5.788 fibers/cubic centimeter

Limit of Quantitation (LOQ) = 7 fibers/mm²

* Fiber counts outside the 100-1300 fibers/mm² range have greater than optimal variability and are probably biased

Analyst: W. B. Hill

Date. _____

Reviewed By:

Date: 10/2/03

□

Sample # 1731835-021

[illegible]

Notes: _____

Sample ID:	A-2-C
Pump Flow Rate, Liters/minute (FR)	
Sample Time, minutes (T)	
Sample Volume, Liters (V)	48
Total Fibers Counted, Sample (FCS)	120
Total Fields Counted, Sample (FLS)	20
Total Fibers Counted, Blank (FCB)	0
Total Fields Counted, Blank (FLB)	100
Area of Filter, mm ² (AF)	385
Graticule Field Area, mm ² (GFA)	0.0077

90 E = 779.2 fibers/mm2

$C = 6.250$ fibers/cubic centimeter

* Fiber counts outside the "00-1300 fibers/mm²" range have greater than optimal variability and are probably biased

Date.

Date: 10/2/03

NIOSH 7400 Issue 2: Phase Contrast Microscopy

CUTTING CA PIPE JM

Sample # M31835-024

Media Type: 25 mm MCE Filter

100

Limit of Quantitation (LOQ) = 7 fibers/mm²

* Fiber counts outside the 100-1300 fibers/mm² range have greater than optimal variability and are probably biased

Date.

Date: 10/2/03

Page _____ of _____

C =  fibers/cubic centimeter

MAS Indirect TEM ANALYSIS M31835-000

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: lab blank	
Sample Area/ Volume:	0 Liters	Date Analyzed:	8/19/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	MAS indirect	Screen Mag:	20 KX
Grid Acceptance/Loading	YES 0%	Grid box Number:	6623

Str < 5um:	0
Str ≥ 5um:	0
Total str:	0
Str / cc > 5:	#Error /cc

Number of grids:	2	#1:	101	#3:	102
Number of openings:	10	#2:	103	#4:	105

Average Grid Size:	0.010557
Total Area Analyzed:	0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	#Div/01
1/ 1	30	3.333333	Total cc:	#Error

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	E9-I6		NSD					
	J7		NSD					
	G6		NSD					
	F7		NSD					
	C6		NSD					
	E10-I5		NSD					
	J3		NSD					
	G2		NSD					
	E7		NSD					
	C10		NSD					

M31835 000 Sample Comments:

MAS Indirect TEM ANALYSIS M31835-005

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-O-A	
Sample Area/ Volume:	1840 Liters	Date Analyzed:	8/19/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	MAS indirect	Screen Mag:	20 KX
Grid Acceptance/Loading	YES 1%	Grid box Number:	6623

Str < 5um:	0
Str ≥ 5um:	0
Total str:	0
Str / cc > 5:	0.0000 /cc

Number of grids:	2	#1:	101	#3:	102
Number of openings:	10	#2:	103	#4:	106

Average Grid Size:	0.010608
Total Area Analyzed:	0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	0.04430
1/ 2	30	6.666667	Total cc:	0.00000

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	E7-G6		NSD					
	F3		NSD					
	D1		NSD					
	J1		NSD					
	I3		NSD					
	D7-F7		NSD					
	C5		NSD					
	B3		NSD					
	A7		NSD					
	D9		NSD					

M31835 005 Sample Comments:

MAS Indirect TEM ANALYSIS M31835-006

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-O-B	
Sample Area/ Volume:	1840 Liters	Date Analyzed:	8/19/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	MAS indirect	Screen Mag:	20 KX
Grid Acceptance/Loading	YES 1 %	Grid box Number:	6623

Str < 5um:	0
Str ≥ 5um:	0
Total str:	0
Str / cc > 5:	0.0000 /cc

Number of grids:	2	#1:	101	#3:	102
Number of openings:	10	#2:	103	#4:	105

Average Grid Size:	0.010557
Total Area Analyzed:	0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	0.04452
1 / 2	30	6.666667	Total cc:	0.00000

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	D6-G6		NSD					
	G4		NSD					
	I3		NSD					
	B6		NSD					
	A4		NSD					
	E6-F1		NSD					
	H2		NSD					
	F7		NSD					
	E9		NSD					
	C6		NSD					

M31835 006 Sample Comments:

MAS Indirect TEM ANALYSIS M31835-007

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-O-C

Sample Area/ Volume:	1840	Liters	Date Analyzed:	8/19/2003	
Filter Type:	MCE 47mm		Analyst:	Jayne Callan	
Pore size:	0.45		Scope Number:	4	
Effective Filter Area:	1297		Accelerating Voltage:	100	KV
Sample type:	Indirect Air		Indicated Mag:	25	KX
Analysis type:	MAS indirect		Screen Mag:	20	KX
Grid Acceptance/Loading	YES	1 %	Grid box Number:	6623	

Str < 5um:	0
Str ≥ 5um:	0
Total str:	0
Str / cc > 5:	0.0000 /cc

Number of grids:	2	#1:	101	#3:	102
Number of openings:	10	#2:	103	#4:	106

Average Grid Size:	0.010608
Total Area Analyzed:	0.106

Filter used	Dilution	Dilution Factor
1 / 2	30	6.666667

Detect_cc: 0.04430

Total cc: 0.00000

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	B7-G5		NSD					
	D4		NSD					
	C7		NSD					
	A5		NSD					
	E8		NSD					
	B6-A6		NSD					
	H8		NSD					
	I9		NSD					
	J10		NSD					
	J7		NSD					

M31835 007 Sample Comments:

MAS Indirect TEM ANALYSIS M31835-008

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-O-D	
Sample Area/ Volume:	1895 Liters	Date Analyzed:	8/19/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	MAS Indirect	Screen Mag:	20 KX
Grid Acceptance/Loading	YES 1 %	Grid box Number:	6623

Str < 5um:	0
Str ≥ 5um:	0
Total str:	0
Str / cc > 5:	0.0000 /cc

Number of grids:	2	#1:	101	#3:	102
Number of openings:	10	#2:	103	#4:	106

Average Grid Size:	0.010608
Total Area Analyzed:	0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	0.04302
1 / 2	30	6.666667	Total cc:	0.00000

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	A2-I9		NSD					
	J7		NSD					
	G1		NSD					
	D2		NSD					
	B3		NSD					
	A3-		NSD					
	A4-D5		NSD					
	A7		NSD					
	E7		NSD					
	E1		NSD					

M31835 008 Sample Comments:

MAS Indirect TEM ANALYSIS M31835-010

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: P-1-A	
Sample Area/ Volume:	2.5 Liters	Date Analyzed:	8/19/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	MAS indirect	Screen Mag:	20 KX
Grid Acceptance/Loading	YES 1%	Grid box Number:	6623

Str < 5um: 29
 Str ≥ 5um: 10
 Total str: 39
 Str / cc > 5: 978.1758 /cc

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 106

Average Grid Size: 0.010608
 Total Area Analyzed: 0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	97.81758
1/ 2	10	20	Total cc:	3814.88569

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	B1-H5	C	M-F	1.90	0.05	X	X	Print out
2		C	F	1.80	0.05	X	X	
3	J3	C	F	2.00	0.20	X	X	
4		C	NSD	2.10	0.05	X	X	
5		C	C-B	4.00	1.00	X	X	
6		C	C-B	4.00	0.25	X	X	
7	F3	C	F	18.00	0.10	X	X	
8		C	F	2.00	0.05	X	X	
9		C	B	15.00	1.70	X	X	
10		C	F	8.00	0.40	X	X	
11	D4	C	F	4.80	0.10	X	X	Print out
12		C	B	1.80	0.05	X	X	
13		C	F	1.70	0.05	X	X	
14		C	B	4.30	1.30	X	X	
15		C	M-F	2.10	0.05	X	X	
16	B6	C	F	0.80	0.05	X	X	
17	B2-B5	C	B	1.90	0.20	X	X	
18		C	M-F	1.00	0.05	X	X	
19		C	F	1.40	0.05	X	X	
20		C	F	0.60	0.05	X	X	
21		C	B	19.40	0.50	X	X	Print out
22		C	C-B	7.10	0.40	X	X	
23		C	M-B	2.00	0.40	X	X	
24		C	B	5.60	1.10	X	X	
25		C	B	5.60	0.40	X	X	
26	A4	C	F	0.90	0.10	X	X	
27		C	F	3.00	0.05	X	X	
28		C	B	14.10	0.50	X	X	

MAS Indirect TEM ANALYSIS M31835-010

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: P-1-A

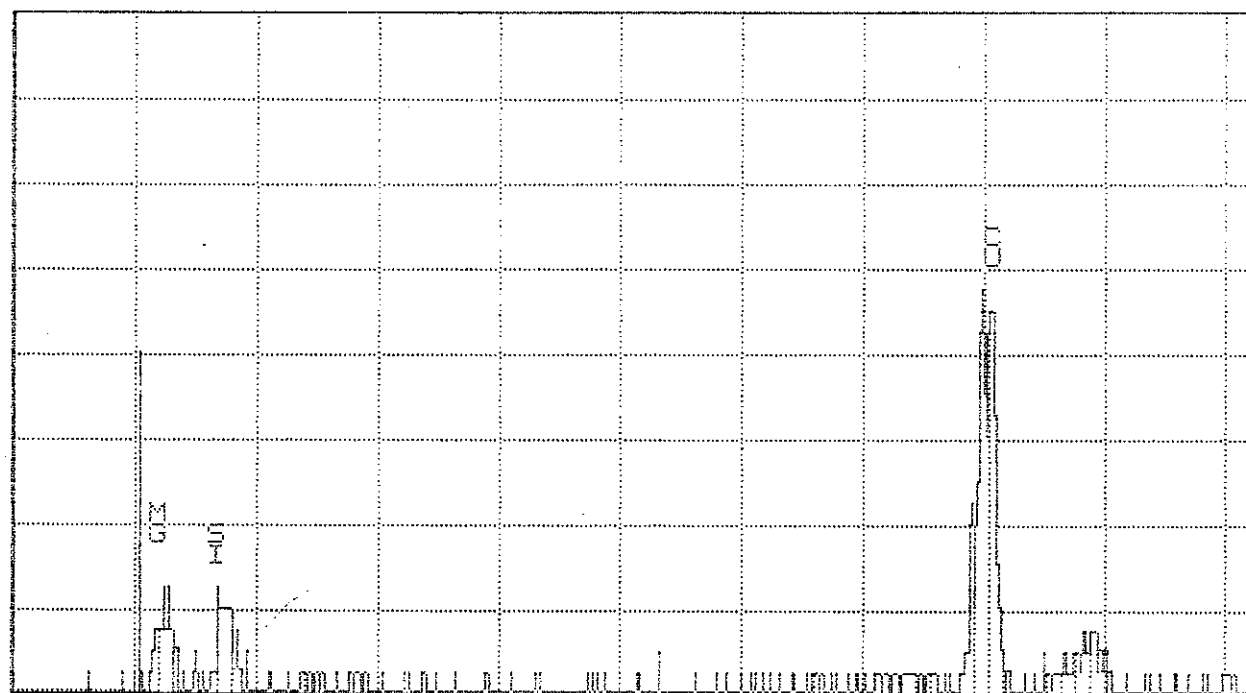
29		C	B	1.90	0.40	X	X	
30	C2	C	F	1.00	0.05	X	X	
31		C	F	1.60	0.10	X	X	Print out
32		C	M-F	0.80	0.10	X	X	
33	E1	C	F	1.60	0.10	X	X	
34		C	F	1.60	0.05	X	X	
35		C	B	14.80	0.50	X	X	
36		C	M-F	2.20	0.05	X	X	
37	I2	C	B	4.10	0.20	X	X	
38		C	B	13.00	1.10	X	X	
39		C	C-F	1.80	0.05	X	X	Print out

M31835 010 Sample Comments:

MATERIALS ANALYTICAL SERVICES

TUE 19-AUG-03 16:42

Cursor: 0.000keV = 0



0.000

NR-11

VFS = 32

10.240

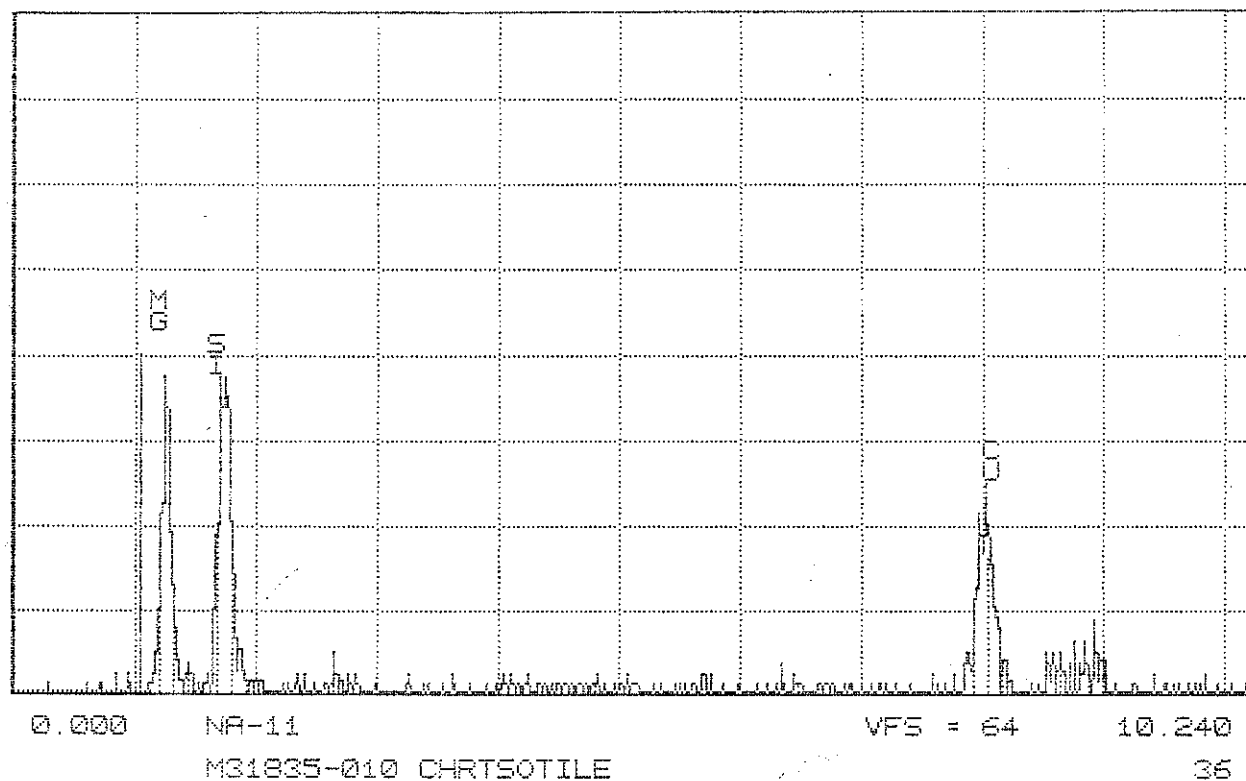
M31835-010 CHRTSOTILE

33

MATERIALS ANALYTICAL SERVICES

TUE 19-AUG-03 16:57

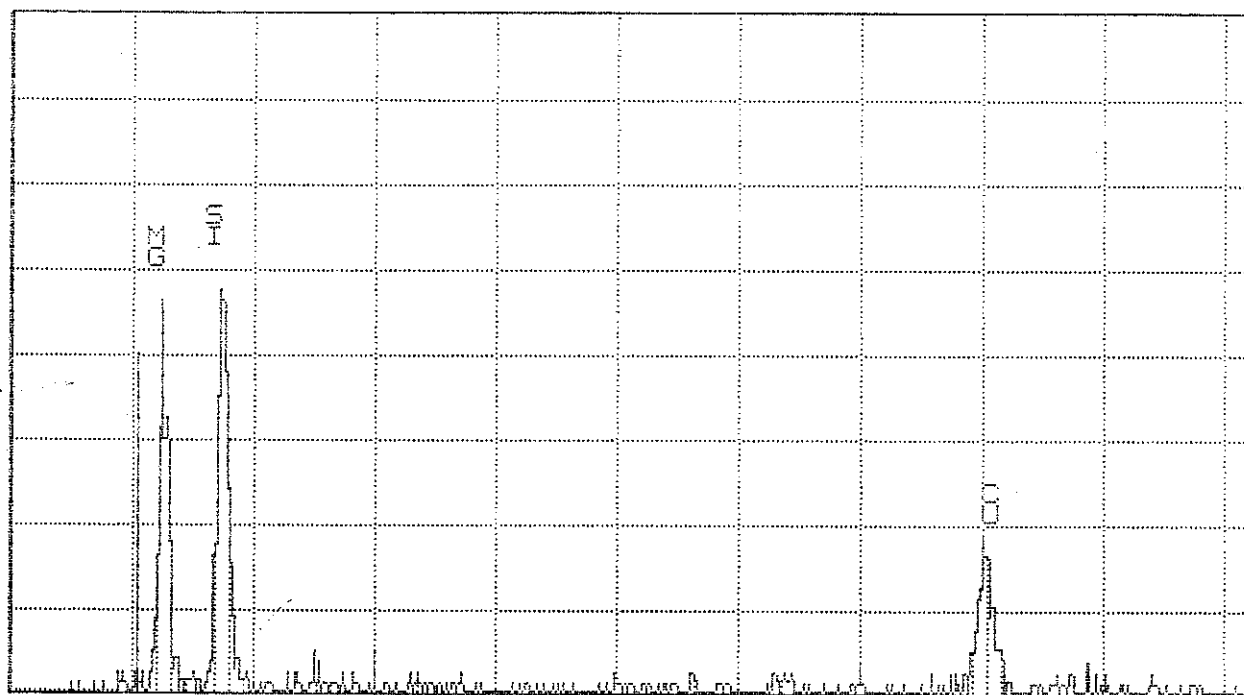
Cursor: 0.000keV = 0



MATERIALS ANALYTICAL SERVICES

TUE 19-AUG-03 17:07

Cursor: 0.000keV = 0



0.000

NR-11

VFS = 64

10.240

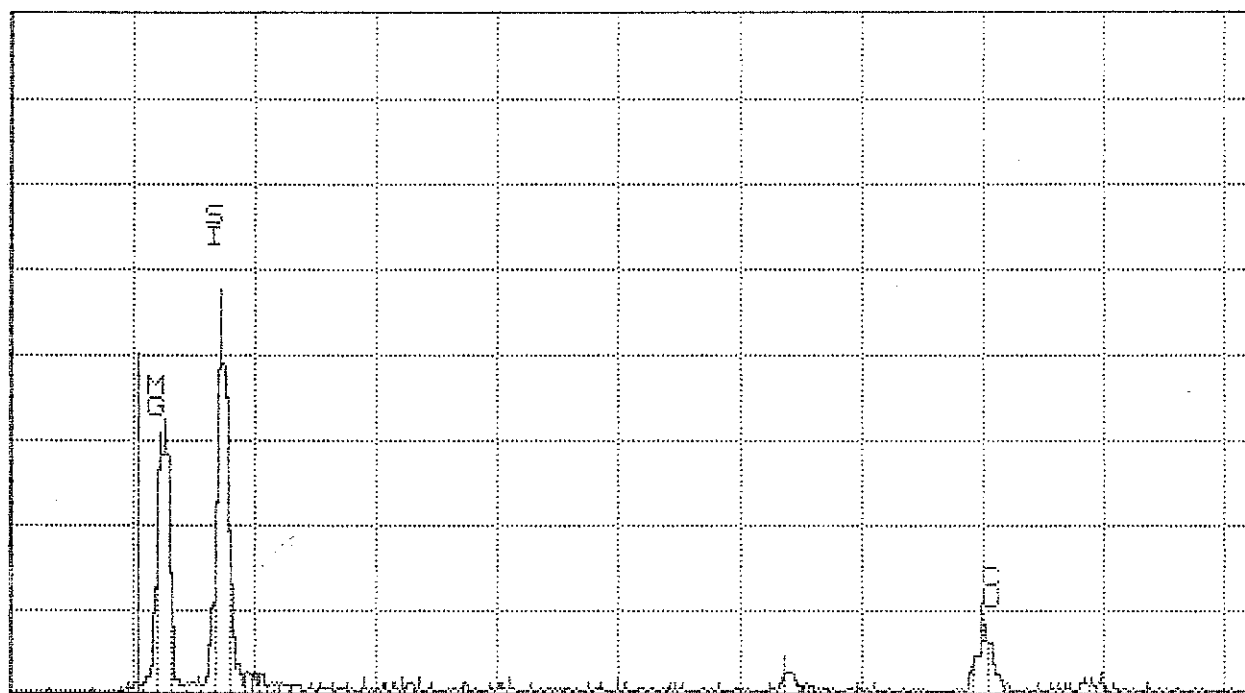
M31835-010 CHRTSOTILE

25

MATERIALS ANALYTICAL SERVICES

TUE 19-AUG-03 17:15

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 128

10.240

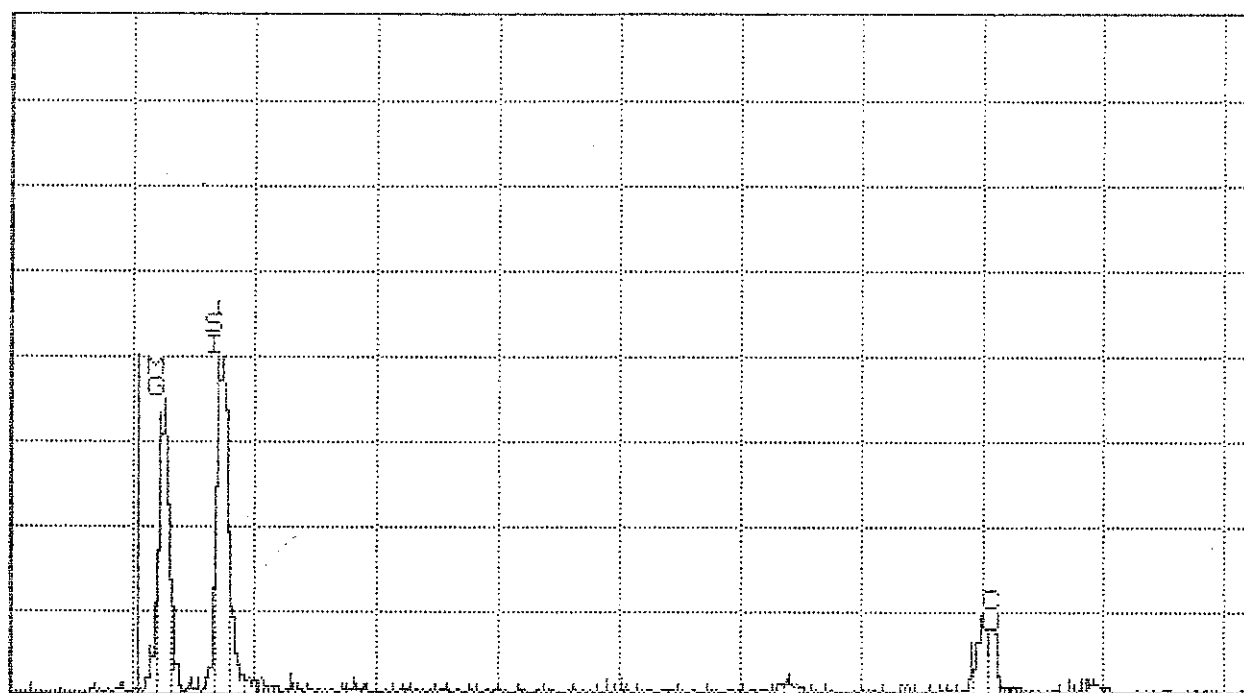
M31835-010 CHRTSOTILE

17

MATERIALS ANALYTICAL SERVICES

TUE 19-AUG-03 17:26

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 128

10.240

M31835-010 CHRT50TILE

21

MAS Indirect TEM ANALYSIS M31835-011

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: P-1-B

Sample Area/ Volume: 2.7 Liters
 Filter Type: MCE 47mm
 Pore size: 0.45
 Effective Filter Area: 1297
 Sample type: Indirect Air
 Analysis type: MAS indirect
 Grid Acceptance/Loading YES 1 %

Date Analyzed: 8/20/2003
 Analyst: Jayme Callan
 Scope Number: 4
 Accelerating Voltage: 100 KV
 Indicated Mag: 25 KX
 Screen Mag: 20 KX
 Grid box Number: 6623

Str < 5um: 19
 Str ≥ 5um: 2
 Total str: 21
 Str / cc > 5: 182.0188 /cc

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 105

Average Grid Size: 0.010557
 Total Area Analyzed: 0.106

Filter used Dilution Dilution Factor
 1/ 2 10 20

Detect_cc: 91.00940
 Total cc: 1911.19742

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
D2-E2		NSD						
1	G4	C	B	2.00	0.20	X	X	Print out
2		C	M-B	0.80	0.15	X	X	
3		C	F	3.00	0.10	X	X	
4	H1	C	F	0.70	0.05	X	X	
5		C	B	10.00	0.40	X	X	
6		C	B	6.80	0.30	X	X	
7	I3	C	F	3.90	0.05	X	X	
8	I8	C	M-B	1.70	0.15	X	X	
9		C	M-F	1.00	0.05	X	X	
D1-E2		NSD						
10	C4	C	F	0.60	0.05	X	X	
11		C	M-B	1.00	0.20	X	X	Print out
12		C	F	2.20	0.10	X	X	
13		C	F	3.80	0.20	X	X	
14	B1	C	F	1.80	0.05	X	X	
15		C	B	2.10	0.30	X	X	
16	E4	C	C-F	4.00	0.10	X	X	
17		C	M-F	2.00	0.10	X	X	
18		C	F	2.10	0.10	X	X	
19		C	B	2.00	0.20	X	X	
20		C	NSD	0.50	0.05	X	X	
21		C	F	1.80	0.10	X	X	Print out
I6		NSD						

M31835 011 Sample Comments:

MAS Indirect TEM ANALYSIS M31835-011

CLIENT NAME: Materials Analytical Services, Inc.

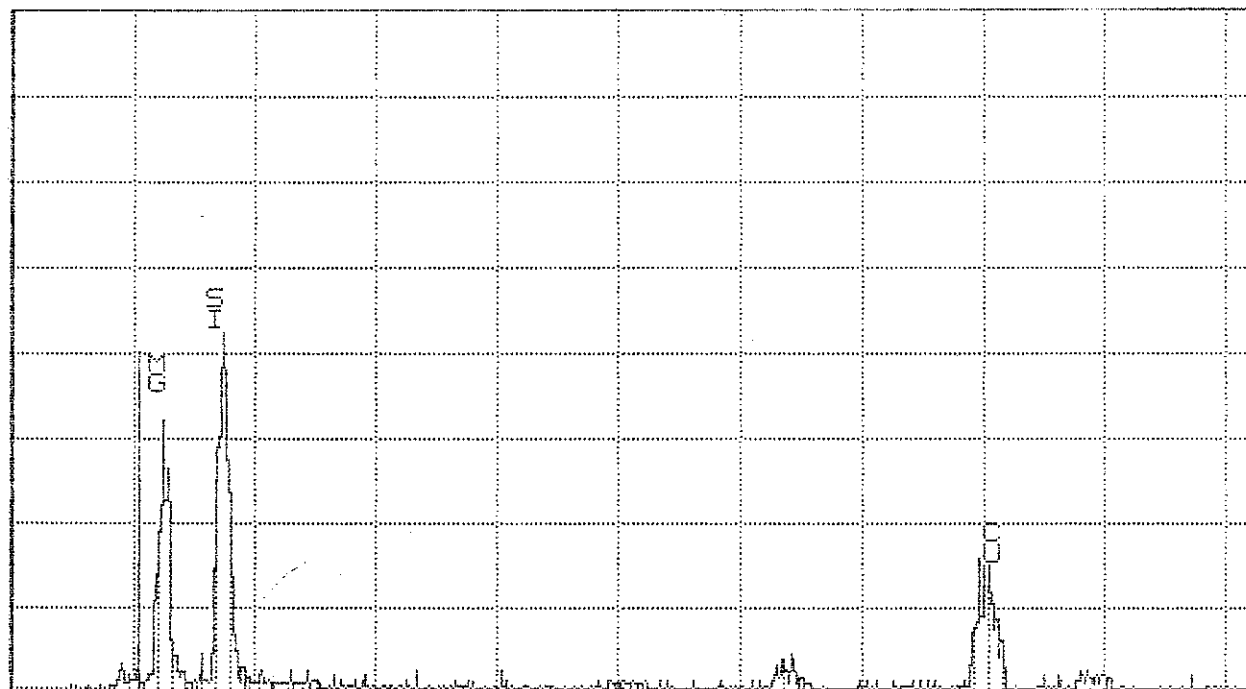
CLIENT SAMPLE ID: P-1-B

--

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 07:52

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 128

10.240

M31835-011 CHRYSOTILE

131

WED 20-AUG-03 07:31

Mass spectrum plot showing relative intensity versus mass-to-charge ratio (m/z). The x-axis ranges from 0 to 100, and the y-axis ranges from 0 to 100. The base peak is at m/z 43. Other significant peaks are labeled at m/z 140 and 170.

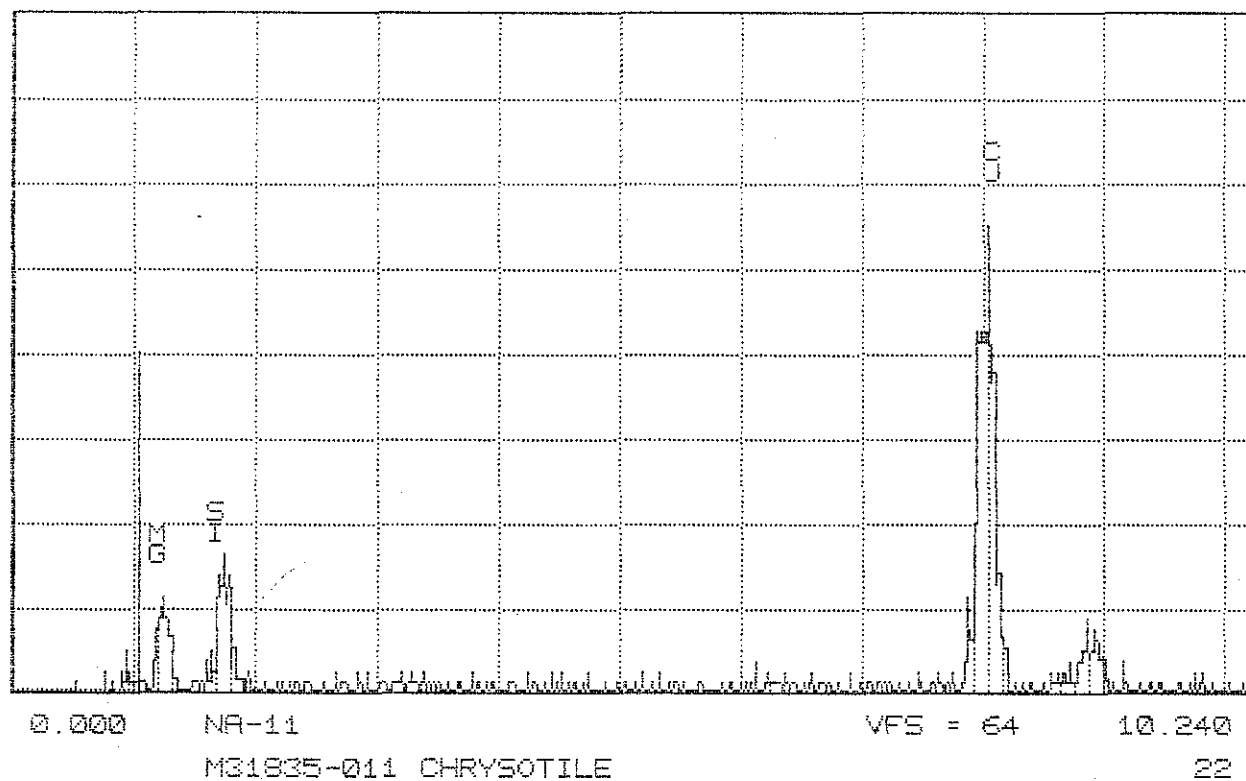
10.240

32

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 08:03

Cursor: 0.000keV = 0



MAS Indirect TEM ANALYSIS M31835-012

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: P-1-C	
Sample Area/ Volume:	2.7 Liters	Date Analyzed:	8/20/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	MAS indirect	Screen Mag:	20 KX
Grid Acceptance/Loading	YES 1 %	Grid box Number:	6623

Str < 5um:	28
Str ≥ 5um:	5
Total str:	33
Str / cc > 5:	455.0470 /cc

Number of grids:	2	#1:	101	#3:	102
Number of openings:	10	#2:	103	#4:	105

Average Grid Size:	0.010557
Total Area Analyzed:	0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	91.00940
1/ 2	10	20	Total cc:	3003.31023

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	A4-F4		NSD					
1	D5	C	M-F	1.00	0.10	X	X	Print out
2	C7	C		2.00	0.10	X	X	
3		C	C-F	1.70	0.05	X	X	
4	E8	C	F	1.80	0.05	X	X	
5		C	F	4.00	0.15	X	X	
6		C	B	2.10	0.20	X	X	
7	G10	C	B	13.00	0.40	X	X	
8		C	F	0.70	0.05	X	X	
9		C	M-F	2.80	0.15	X	X	
10		C	F	1.80	0.05	X	X	
11		C	F	1.00	0.10	X	X	Print out
12		C	F	1.60	0.05	X	X	
13		C	F	1.90	0.05	X	X	
14		C	F	1.70	0.05	X	X	
15		C	F	1.60	0.10	X	X	
16	B4-A4	C	M-B	1.80	0.10	X	X	
17		C	B	1.70	0.10	X	X	
18		C	F	3.90	0.15	X	X	
19		C	B	1.60	0.10	X	X	
20		C	B	2.10	0.10	X	X	
21		C	B	4.00	0.30	X	X	Print out
22		C	B	3.90	0.10	X	X	
23		C	B	1.90	0.10	X	X	
24	D6	C	F	1.60	0.05	X	X	
25		C	F	18.00	0.10	X	X	
26	F8	C	B	3.00	0.15	X	X	
27	D9	C	F	0.80	0.05	X	X	

MAS Indirect TEM ANALYSIS M31835-012

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: P-1-C

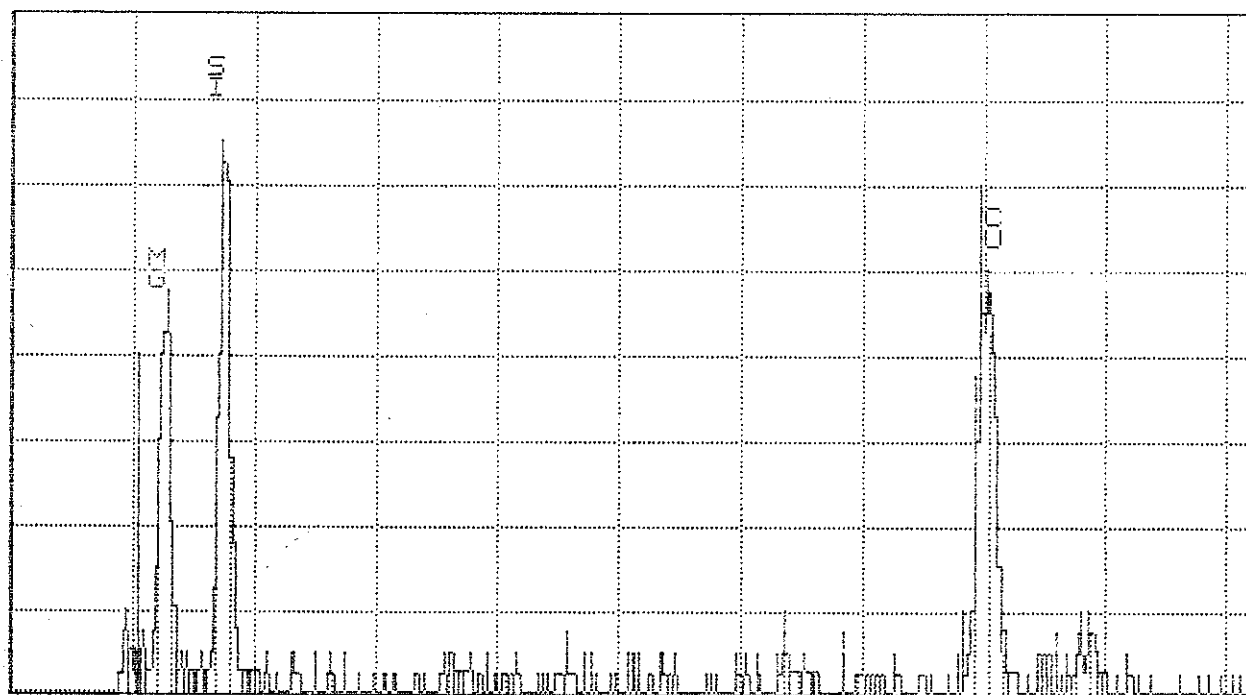
28		C	B	1.80	0.20	X	X	
29		C	F	17.00	0.20	X	X	
30	J8	C	B	6.10	0.60	X	X	
31		C	M-F	2.10	0.10	X	X	Print out
32		C	B	7.90	1.80	X	X	
33		C	F	3.00	0.05	X	X	

M31835 012 Sample Comments:

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 08:18

Cursor: 0.000keV = 0



0.000

NR-11

VFS = 32

10.240

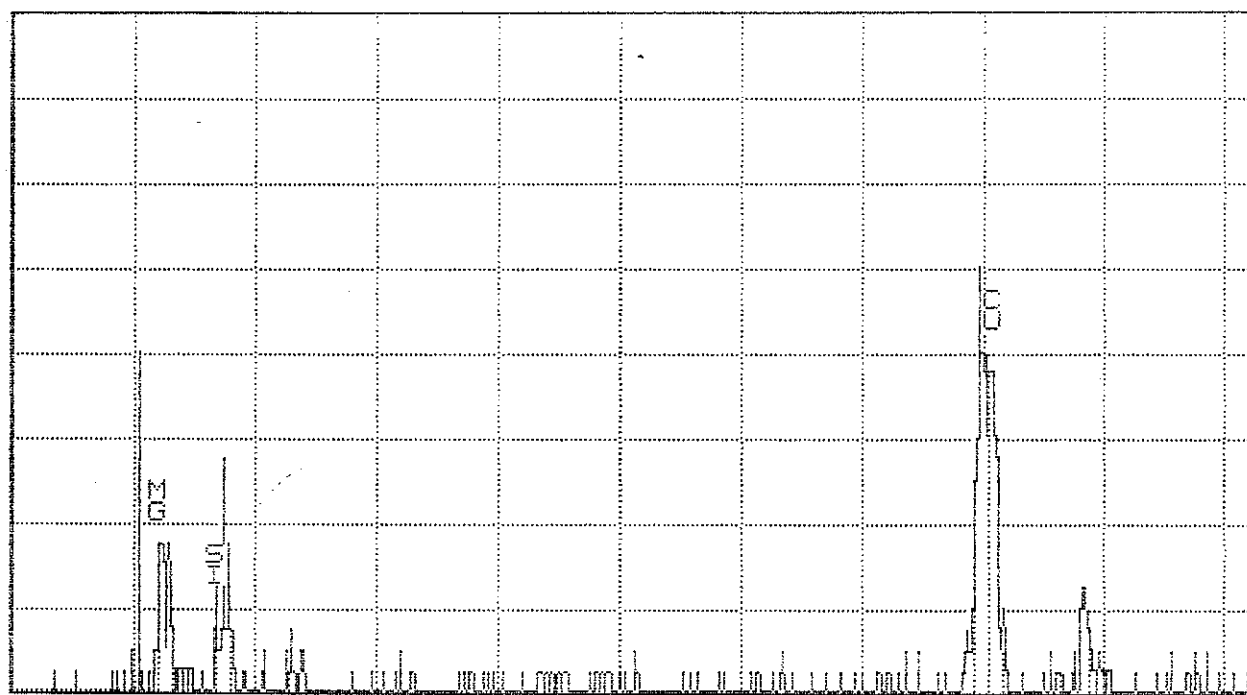
M31835-012 CHRYSOTILE

34

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 08:31

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 32

10.240

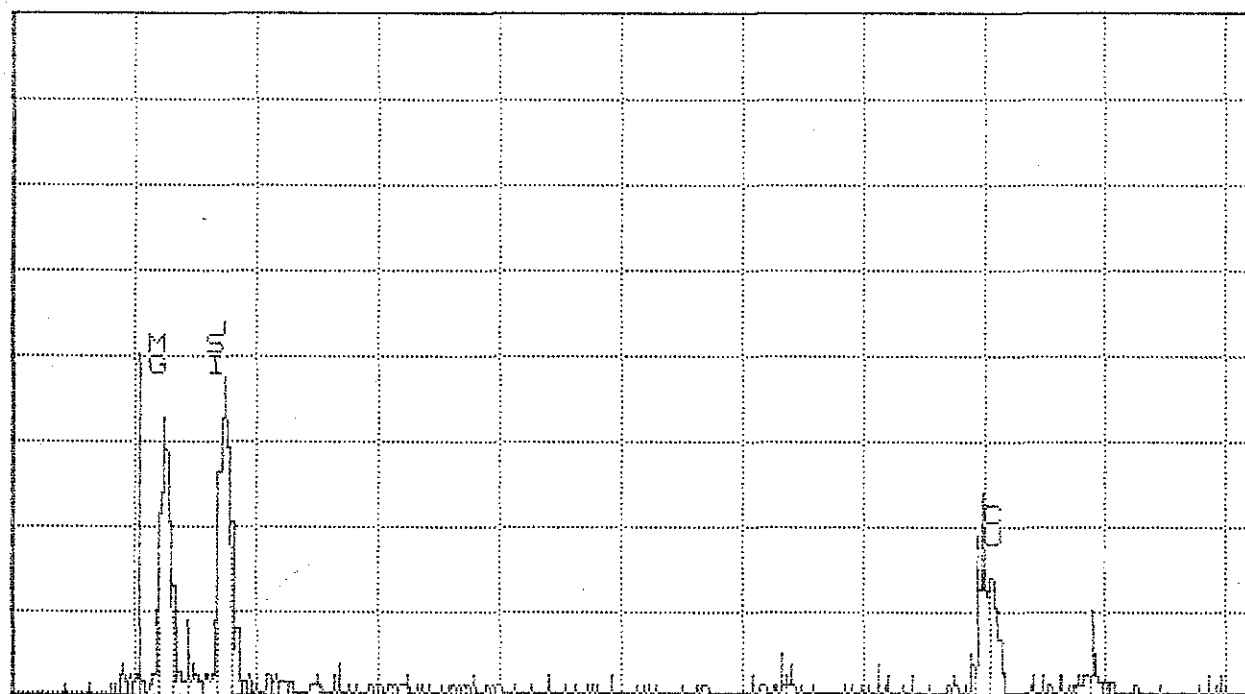
M31835-012 CHRYSOTILE

30

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 08:40

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

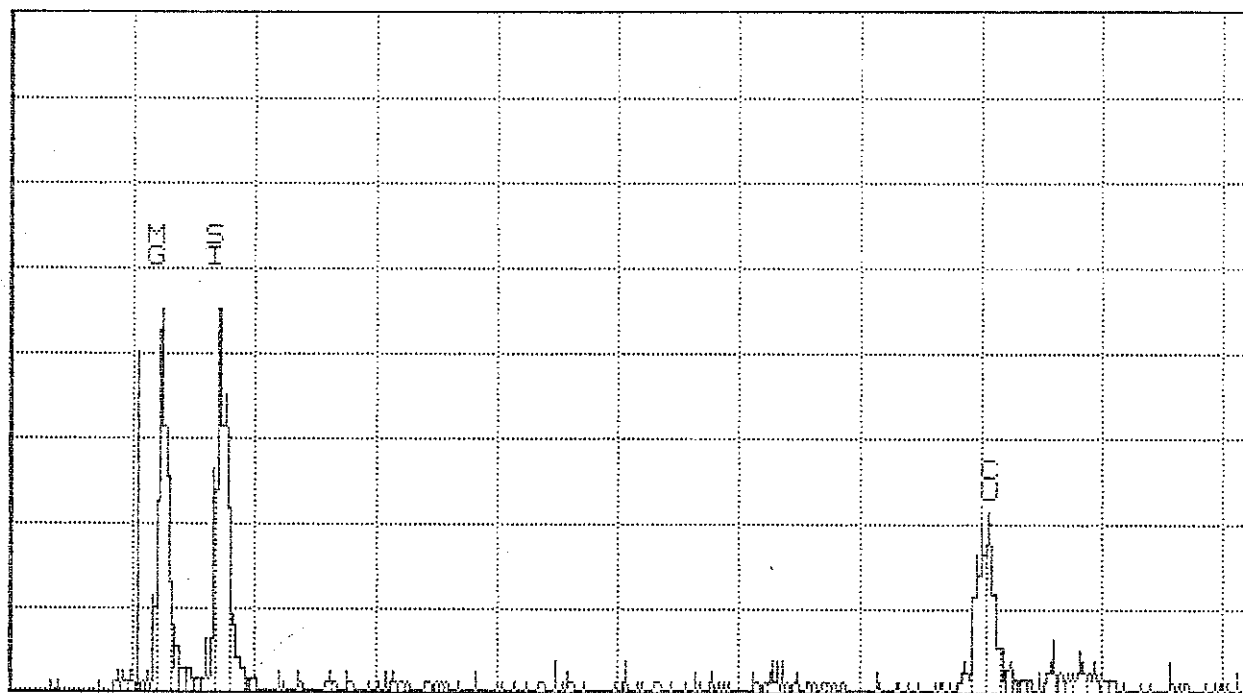
M31835-012 CHRYSOTILE

28

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 08:56

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

M31835-012 CHRYSOTILE

82

MAS Indirect TEM ANALYSIS M31835-013

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: P-1-D

Sample Area/ Volume: 2.8 Liters
 Filter Type: MCE 47mm
 Pore size: 0.45
 Effective Filter Area: 1297
 Sample type: Indirect Air
 Analysis type: MAS indirect
 Grid Acceptance/Loading YES 1%

Date Analyzed: 8/20/2003
 Analyst: Jayme Callan
 Scope Number: 4
 Accelerating Voltage: 100 KV
 Indicated Mag: 25 KX
 Screen Mag: 20 KX
 Grid box Number: 6623

Str < 5um: 35
 Str ≥ 5um: 7
 Total str: 42
 Str / cc > 5: 611.3599 /cc

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 106

Average Grid Size: 0.010608
 Total Area Analyzed: 0.106

Filter used Dilution Dilution Factor
 1/ 2 10 20

Detect_cc: 87.33713
 Total cc: 3668.15932

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	D5-B9	C	B	2.00	0.20	X	X	Print out
2		C	NSD	4.30	0.10	X	X	
3		C	C-F	1.80	0.20	X	X	
4		C	B	9.80	0.40	X	X	
5		C	C-B	6.00	0.40	X	X	
6		C	M-F	0.70	0.05	X	X	
7		C	B	4.10	0.20	X	X	
8		C	F	3.00	0.05	X	X	
9	E10	C	F	2.00	0.05	X	X	
10		C	M-B	13.80	0.30	X	X	
11	A8	C	M-B	2.00	0.15	X	X	Print out
12		C	F	1.00	0.05	X	X	
13		C	B	9.80	0.20	X	X	
14		C	B	1.80	0.10	X	X	
15		C	F	1.80	0.05	X	X	
16		C	F	1.00	0.05	X	X	
17		C	B	2.20	0.40	X	X	
18		C	F	2.00	0.05	X	X	
19		C	F	3.90	0.05	X	X	
20		C	M-B	1.70	0.15	X	X	
21		C	F	1.20	0.10	X	X	Print out
22	C7	C	M-F	1.40	0.05	X	X	
23		C	C-B	5.80	0.20	X	X	
24		C	F	3.90	0.10	X	X	
25	E6	C	M-B	2.20	0.20	X	X	
26		C	F	1.80	0.05	X	X	
27	D4-B7	C	F	2.20	0.05	X	X	
28		C	F	0.80	0.05	X	X	

MAS Indirect TEM ANALYSIS M31835-013

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: P-1-D

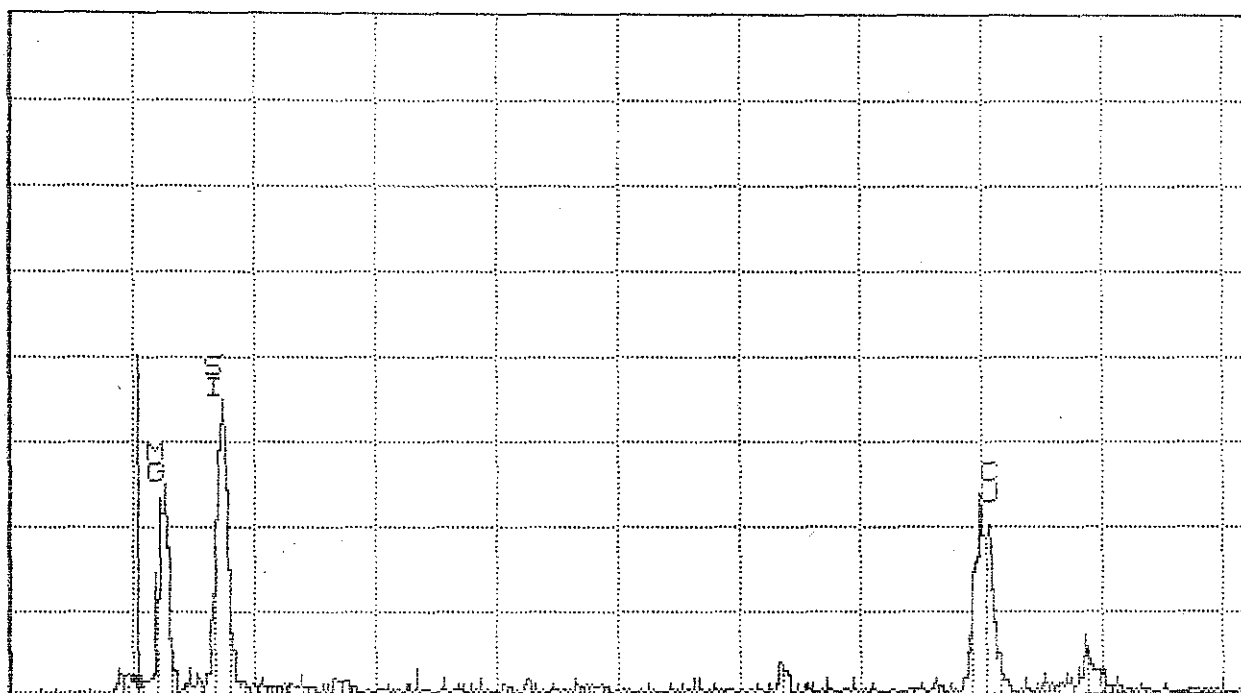
29		C	F	0.70	0.05	X	X	
30		C	F	1.70	0.10	X	X	Print out
31	C2	C	B	4.10	0.15	X	X	
32		C	B	3.70	0.20	X	X	
33		C	C-F	1.90	0.10	X	X	
34		C	F	1.00	0.05	X	X	
35	F1	C	M-F	2.00	0.10	X	X	
36		C	F	0.80	0.05	X	X	
37		C	F	1.00	0.05	X	X	
38	G7	C	B	16.00	0.40	X	X	
39		C	C-B	6.20	0.30	X	X	
40	H4	C	M-B	3.80	0.20	X	X	Print out
41		C	F	1.80	0.05	X	X	
42		C	F	1.70	0.05	X	X	

M31835 013 Sample Comments:

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 09:09

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 128

10.240

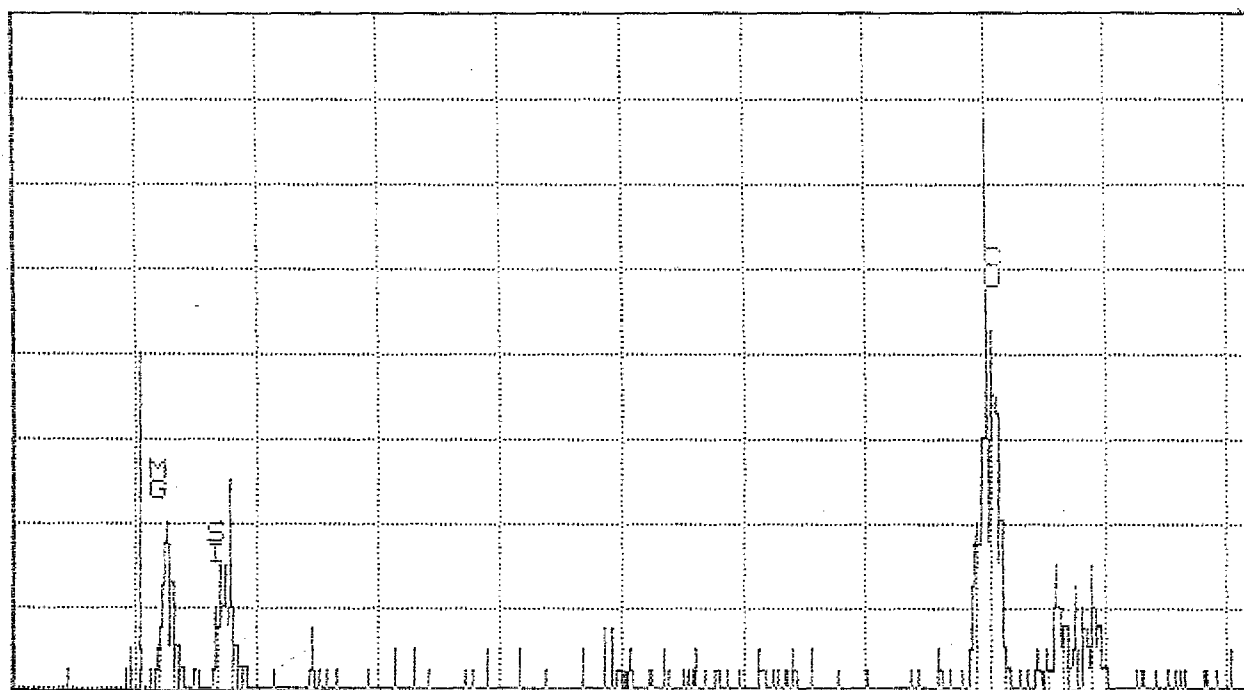
M31835-013 CHRYSOTILE

36

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 09:31

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 32

10.240

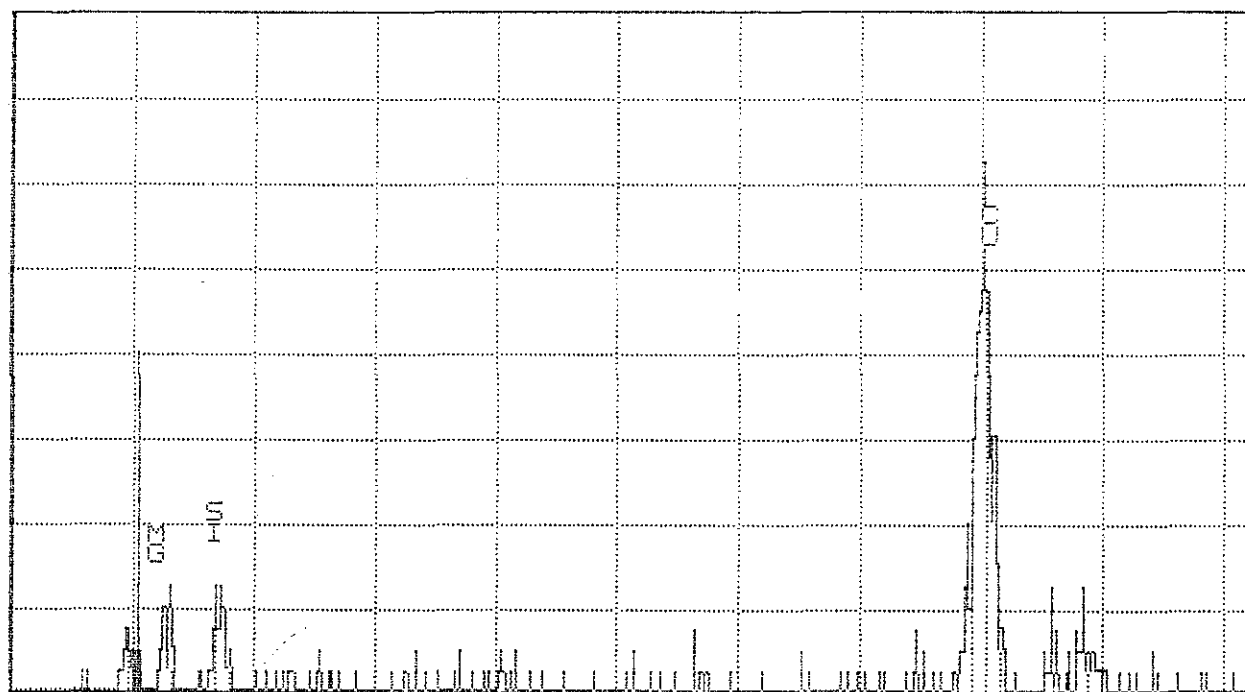
M31835-013 CHRYSOTILE

18

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 09:44

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 32

10.240

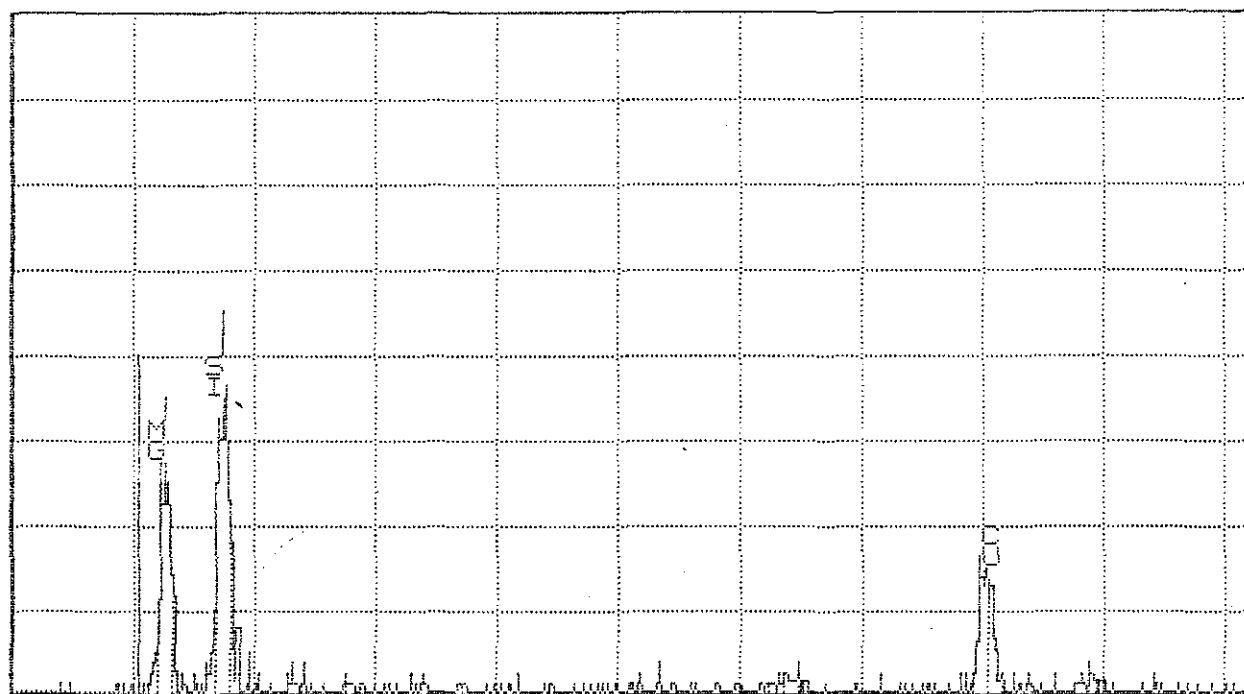
M31835-013 CHRYSOTILE

25

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 09:55

Cursor: 0.000keV = 0



0.000

NR-11

VFS = 64

10.240

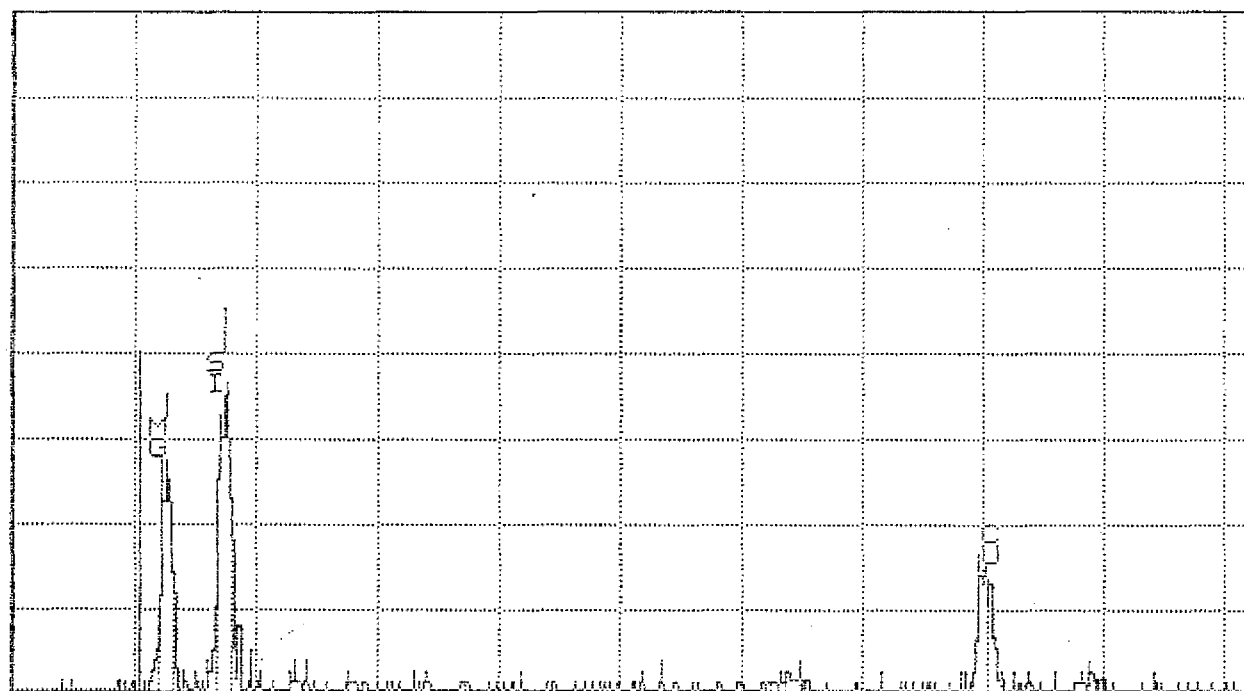
M31835-013 CHRYSOTILE

15

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 10:04

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

M31835-013 CHRYSOTILE

31

MAS Indirect TEM ANALYSIS M31835-014

CLIENT NAME: Materials Analytical Services, Inc.			CLIENT SAMPLE ID: A-1-A	
Sample Area/ Volume:	11	Liters	Date Analyzed:	8/20/2003
Filter Type:	MCE 47mm		Analyst:	Jayne Callan
Pore size:	0.45		Scope Number:	4
Effective Filter Area:	1297		Accelerating Voltage:	100
Sample type:	Indirect Air		Indicated Mag:	25
Analysis type:	MAS indirect		Screen Mag:	20
Grid Acceptance/Loading	YES	1 %	Grid box Number:	6623

Str < 5um: 84
 Str ≥ 5um: 17
 Total str: 101
 Str / cc > 5: 377.9316 /cc

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 106

Average Grid Size: 0.010608
 Total Area Analyzed: 0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	22.23127
1/ 2	10	20	Total cc:	2245.35813

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	D5-H8	C	B	2.80	0.30	X	X	Print out
2		C	B	11.00	0.20	X	X	
3		C	F	2.10	0.10	X	X	
4		C	M-B	1.00	0.10	X	X	
5		C	B	1.80	0.15	X	X	
6		C	B	2.10	0.20	X	X	
7		C	F	1.60	0.10	X	X	
8		C	M-F	1.60	0.05	X	X	
9		C	B	1.00	0.15	X	X	
10		C	F	1.90	0.05	X	X	
11		C	B	1.60	0.20	X	X	Print out
12		C	F	1.00	0.10	X	X	
13	B8	C	F	2.30	0.05	X	X	
14		C	B	18.00	1.80	X	X	
15		C	C-F	0.80	0.10	X	X	
16		C	B	4.00	0.60	X	X	
17		C	F	3.90	0.10	X	X	
18		C	B	10.20	0.40	X	X	
19		C	F	1.00	0.05	X	X	
20		C	F	0.80	0.10	X	X	
21	D6	C	F	1.80	0.05	X	X	Print out
22		C	M-F	1.80	0.05	X	X	
23		C	F	10.10	1.90	X	X	
24		C	B	2.00	0.20	X	X	
25		C	F	1.60	0.30	X	X	
26		C	B	17.00	1.90	X	X	
27		C	B	2.20	0.60	X	X	
28		C	C-F	1.90	0.20	X	X	

MAS Indirect TEM ANALYSIS M31835-014

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-A

29		C	B	6.20	0.20	X	X	
30		C	B	26.20	1.80	X	X	
31		C	F	2.00	0.05	X	X	Print out
32		C	F	4.10	0.05	X	X	
33		C	F	1.50	0.05	X	X	
34		C	M-B	2.10	0.50	X	X	
35		C	B	5.00	0.20	X	X	
36		C	B	2.30	0.35	X	X	
37		C	F	2.10	0.10	X	X	
38		C	B	10.00	0.40	X	X	
39		C	B	4.10	0.40	X	X	
40		C	F	0.60	0.05	X	X	
41		C	B	6.10	0.25	X	X	Print out
42	A5	C	C-B	4.00	0.30	X	X	
43		C	F	1.50	0.05	X	X	
44		C	M-B	6.00	0.20	X	X	
45		C	F	5.70	0.05	X	X	
46		C	F	0.60	0.05	X	X	
47		C	B	17.70	1.60	X	X	
48		C	F	3.70	0.10	X	X	
49	E4	C	F	2.00	0.05	X	X	
50		C	F	1.50	0.05	X	X	
51		C	B	3.90	0.15	X	X	Print out
52		C	B	1.70	0.15	X	X	
53		C	C-F	1.80	0.05	X	X	
54		C	F	2.00	0.05	X	X	
55		C	B	0.80	0.10	X	X	
56		C	F	2.10	0.20	X	X	
57		C	M-F	2.00	0.10	X	X	
58	D4-D6	C	B	2.20	0.20	X	X	
59		C	F	2.10	0.30	X	X	
60		C	C-B	2.00	0.30	X	X	
61		C	B	1.70	0.05	X	X	Print out
62		C	M-B	1.90	0.15	X	X	
63		C	M-F	1.00	0.10	X	X	
64		C	B	4.00	0.20	X	X	
65		C	F	1.70	0.05	X	X	
66		C	B	9.90	1.80	X	X	
67		C	M-F	1.80	0.05	X	X	
68		C	B	4.30	0.60	X	X	
69		C	F	1.00	0.10	X	X	
70		C	F	1.50	0.05	X	X	
71		C	B	19.00	0.50	X	X	Print out
72		C	C-B	1.90	0.10	X	X	
73		C	F	1.60	0.10	X	X	
74		C	B	2.40	0.20	X	X	
75		C	F	2.00	0.05	X	X	
76		C	F	1.00	0.05	X	X	
77	B4	C	B	1.80	0.20	X	X	

MAS Indirect TEM ANALYSIS M31835-014

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID:

A-1-A

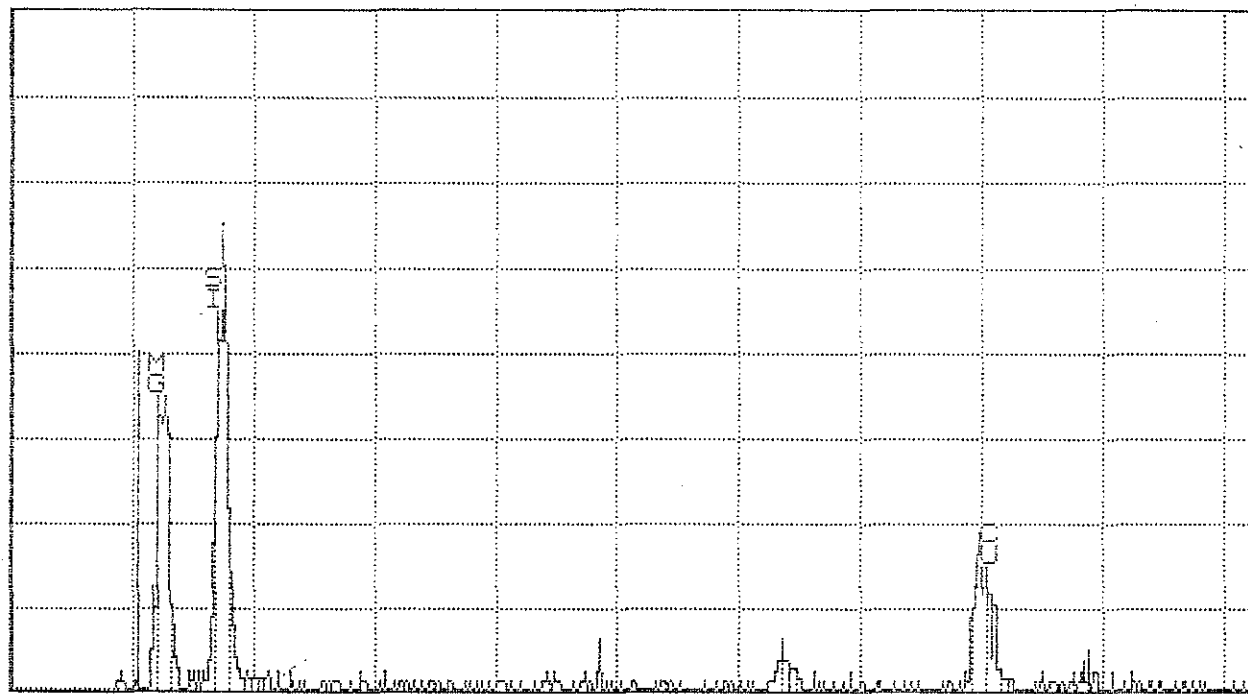
78		C	F	1.80	0.05	X	X	
79		C	M-F	2.00	0.05	X	X	
80		C	M-F	1.70	0.05	X	X	
81		C	B	3.80	0.15	X	X	Print out
82		C	F	0.70	0.05	X	X	
83		C	B	1.00	0.20	X	X	
84		C	B	1.50	0.15	X	X	
85	C1	C	C-B	3.20	0.60	X	X	
86	I8	C	M-B	1.70	0.20	X	X	
87		C	F	0.80	0.05	X	X	
88		C	F	6.00	0.15	X	X	
89		C	B	2.00	0.20	X	X	
90		C	B	9.00	0.20	X	X	
91		C	F	1.70	0.05	X	X	Print out
92		C	F	2.20	0.20	X	X	
93		C	F	1.80	0.05	X	X	
94	J6	C	B	1.90	0.30	X	X	
95		C	F	0.80	0.05	X	X	
96		C	F	0.80	0.05	X	X	
97		C	F	1.60	0.05	X	X	
98		C	F	3.80	0.10	X	X	
99		C	F	0.70	0.05	X	X	
100		C	F	1.50	0.05	X	X	
101		C	B	2.10	0.20	X	X	Print out

M31835 014 Sample Comments:

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 10:30

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

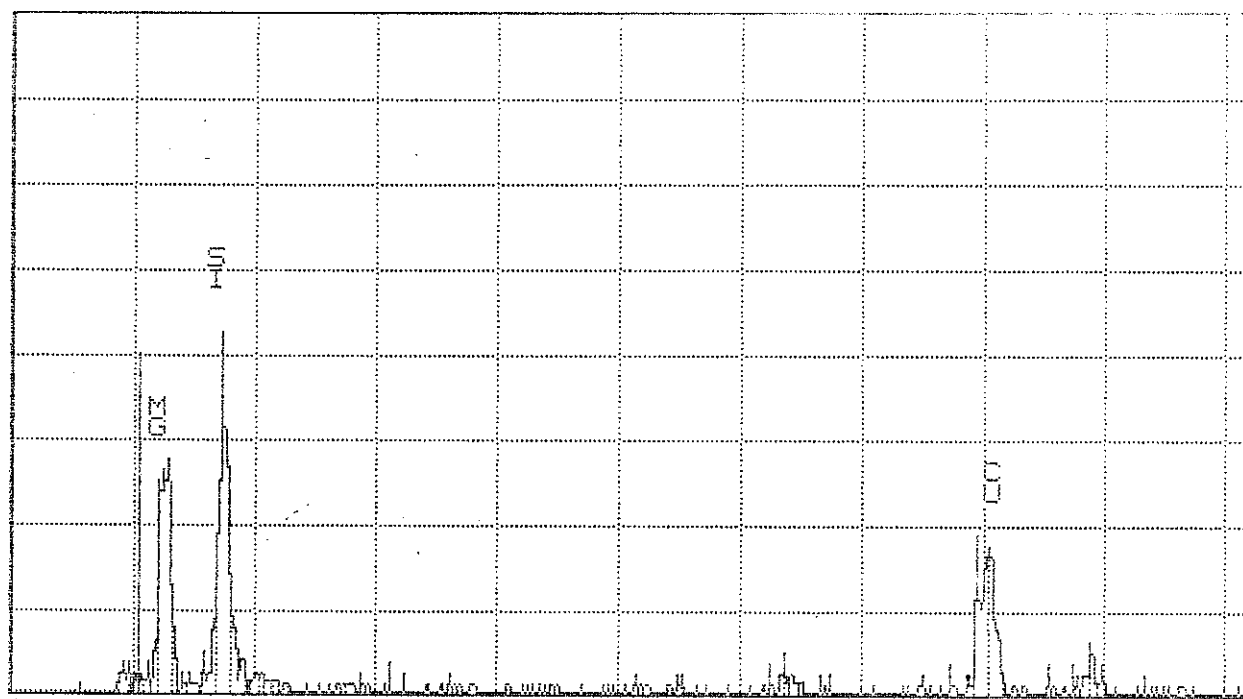
M31835-014 CHRYSOTILE

19

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 10:39

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

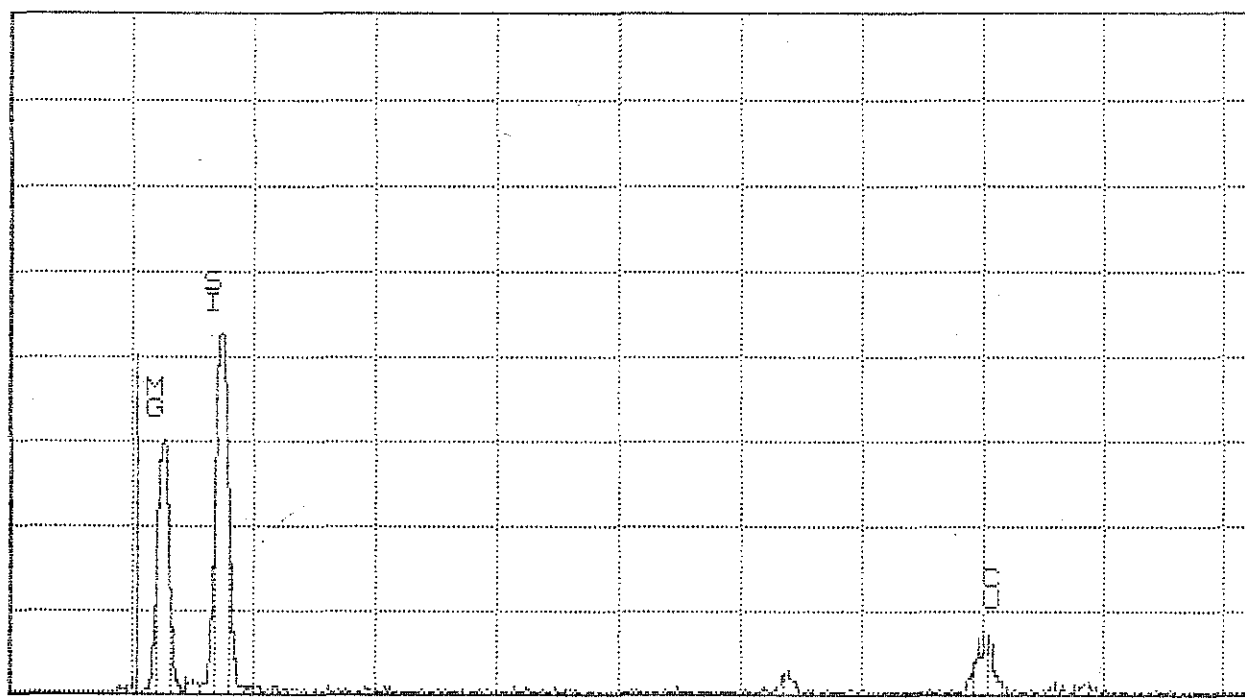
M31835-014 CHRYSOTILE

32

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 10:44

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 512

10.240

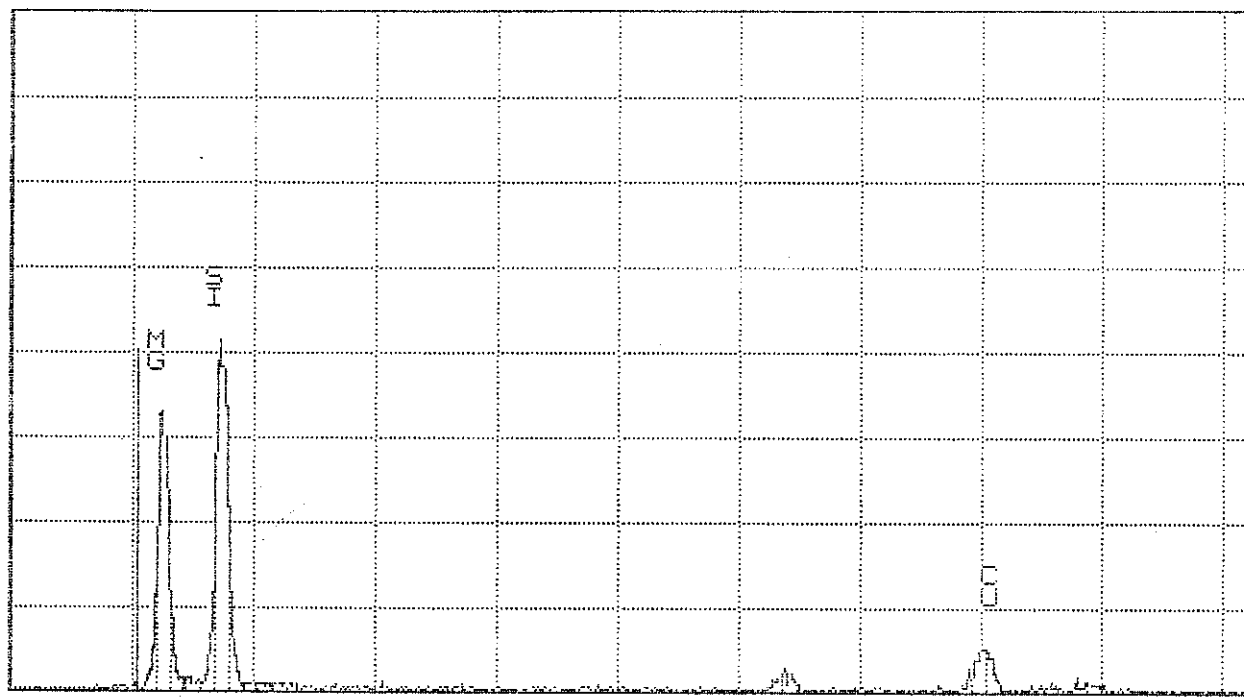
M31835-014 CHRYSOTILE

39

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 10:56

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 512

10.240

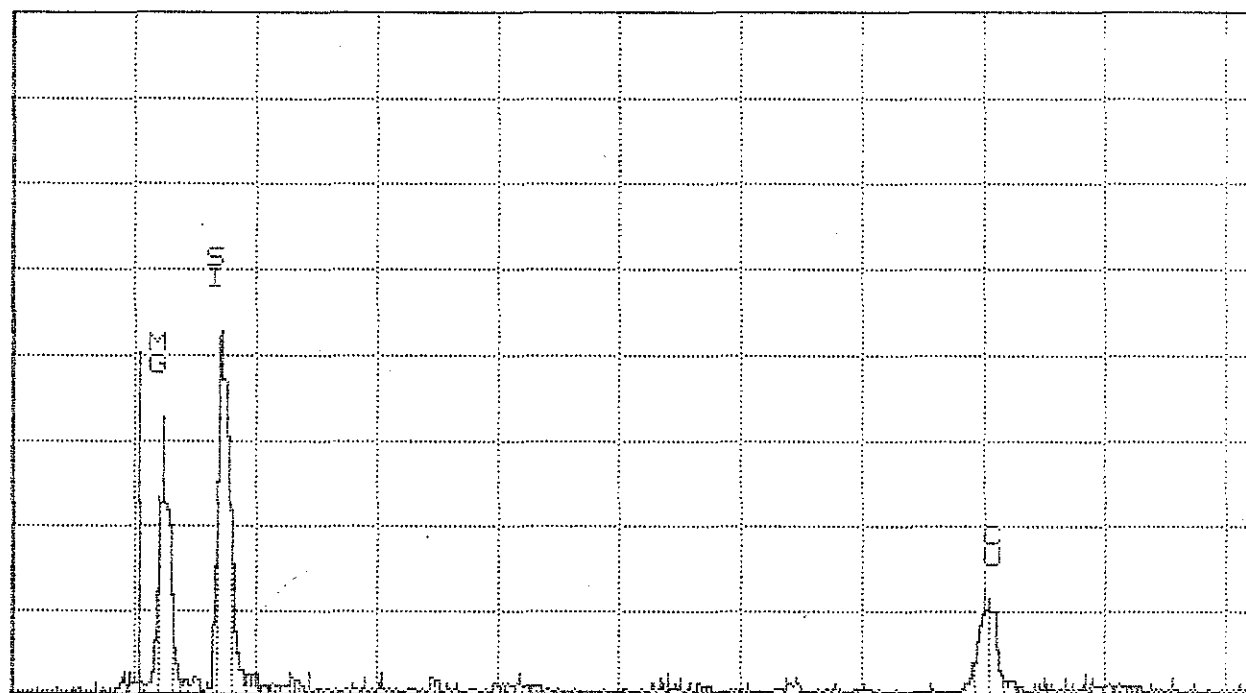
M31835-014 CHRYSOTILE

27

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 11:04

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 128

10.240

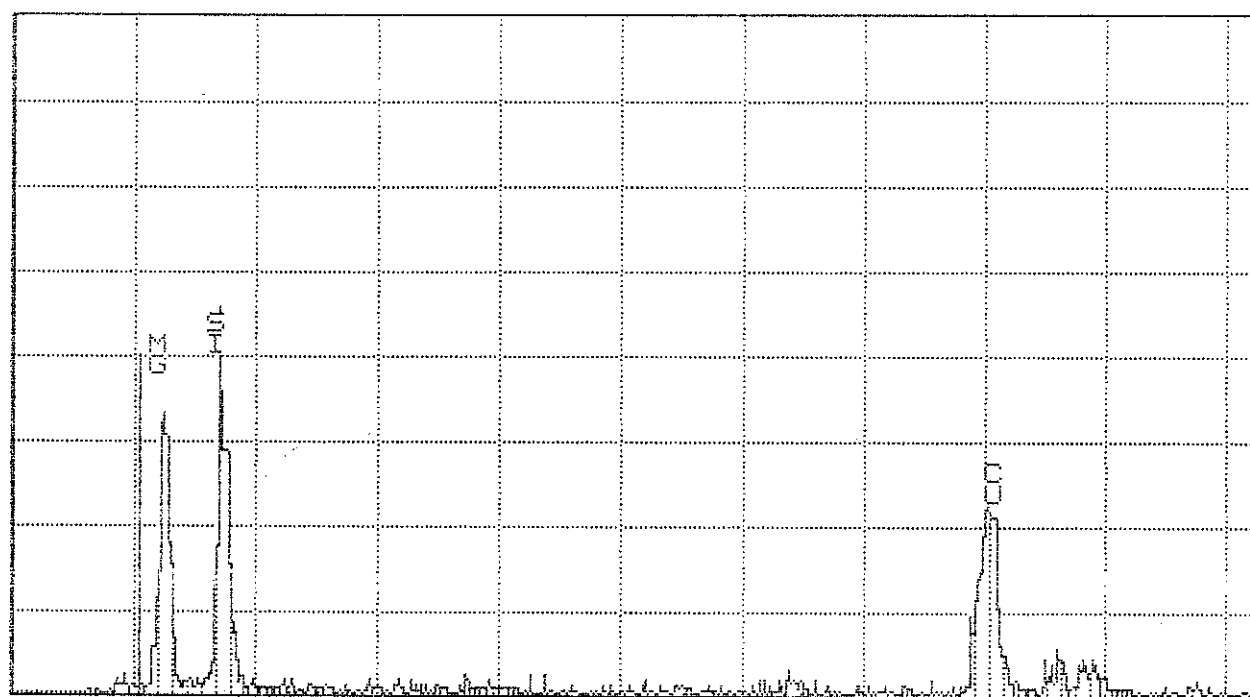
M31835-014 CHRYSOTILE

27

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 11:15

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 128

10.240

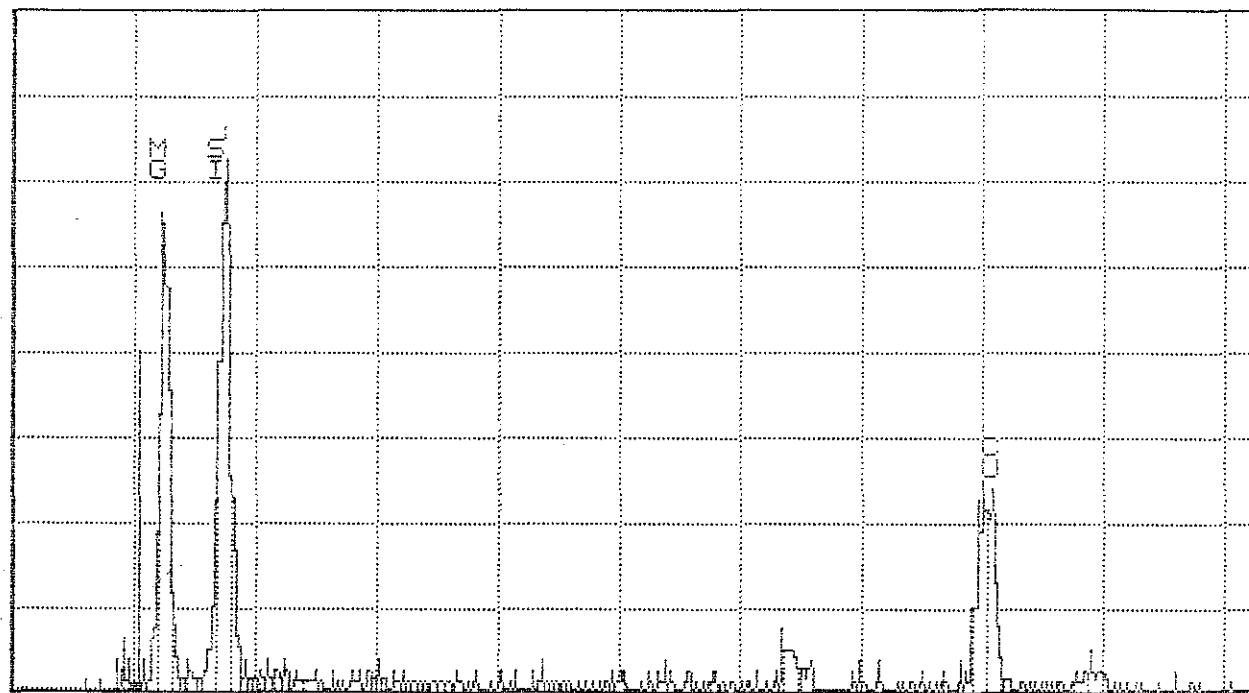
M31835-014 CHRYSOTILE

34

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 11:25

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

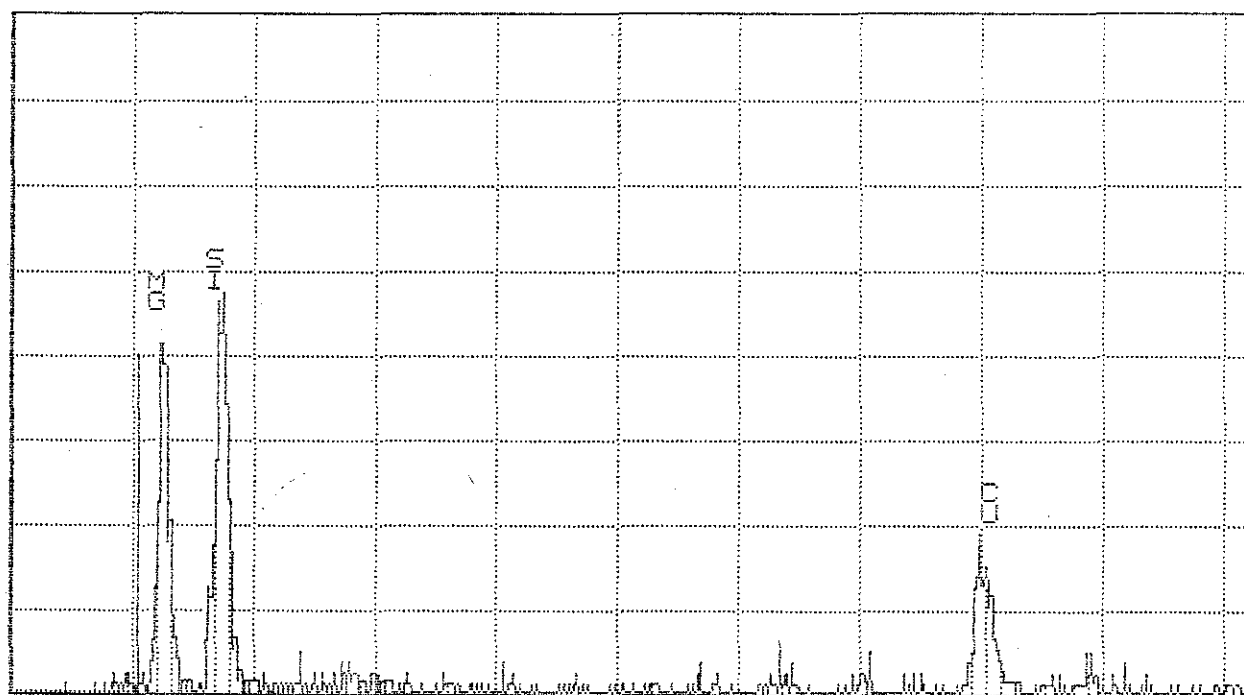
M31835-014 CHRYSOTILE

119

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 11:30

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

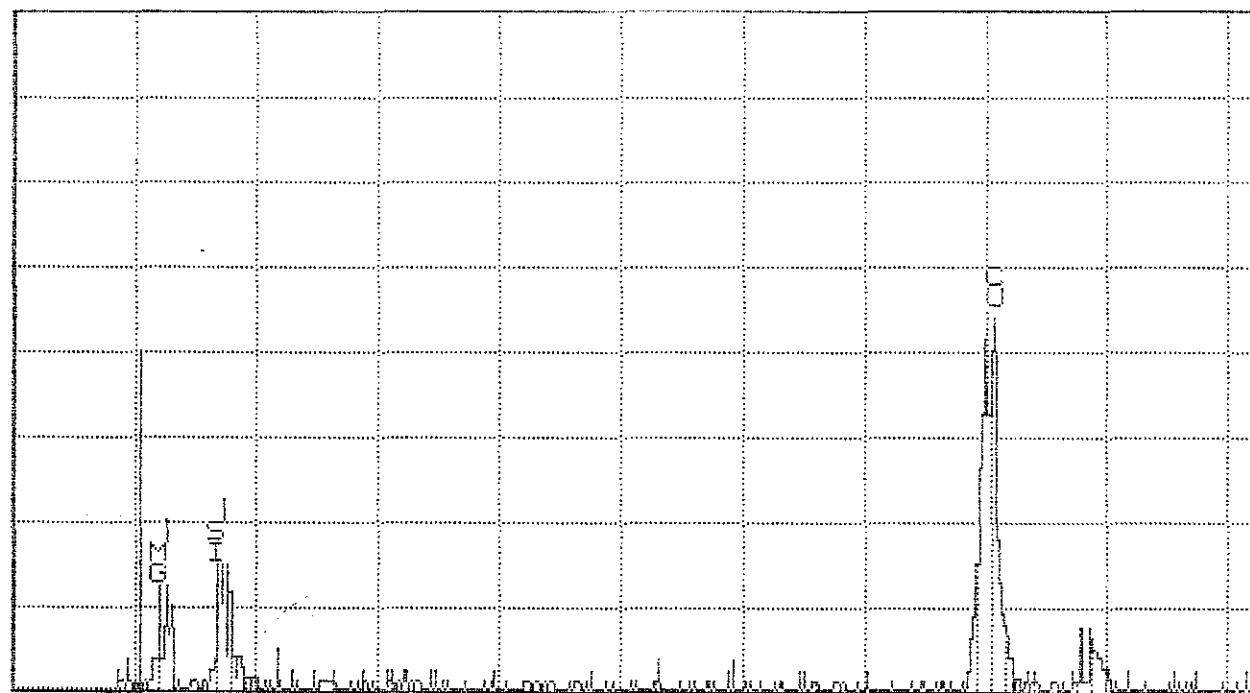
M31835-014 CHRYSOTILE

17

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 11:38

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

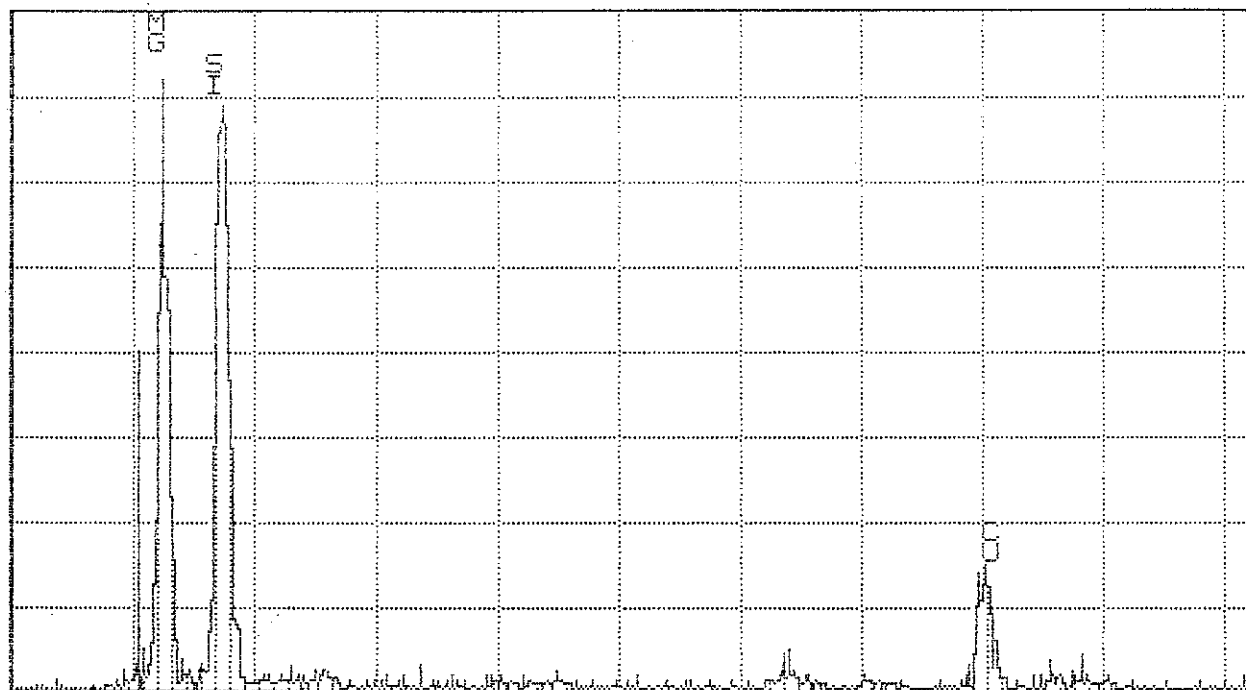
M31835-014 CHRYSOTILE

19

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 11:51

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 128

10.240

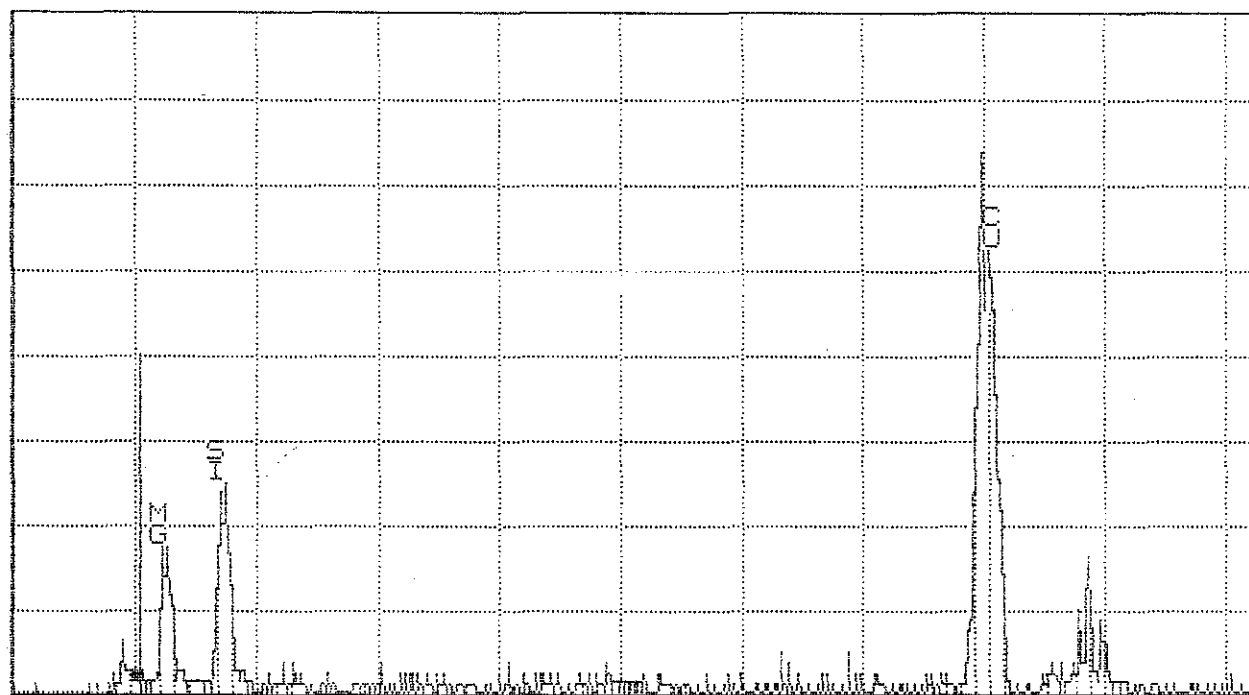
M31835-014 CHRYSOTILE

33

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 12:01

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

M31835-014 CHRYSOTILE

20

MAS Indirect TEM ANALYSIS M31835-015

CLIENT NAME: Materials Analytical Services, Inc.			CLIENT SAMPLE ID: A-1-B		
Sample Area/ Volume:	10	Liters	Date Analyzed:	8/20/2003	
Filter Type:	MCE 47mm		Analyst:	Jayme Callan	
Pore size:	0.45		Scope Number:	4	
Effective Filter Area:	1297		Accelerating Voltage:	100	KV
Sample type:	Indirect Air		Indicated Mag:	25	KX
Analysis type:	MAS indirect		Screen Mag:	20	KX
Grid Acceptance/Loading	YES	1 %	Grid box Number:	6623	

Str < 5um: 94
 Str ≥ 5um: 20
 Total str: 114
 Str / cc > 5: 1222.7198 /cc

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 4 #2: 103 #4: 106

Average Grid Size: 0.010608
 Total Area Analyzed: 0.042

Filter used	Dilution	Dilution Factor	Detect_cc:	61.13599
1 / 2	10	20	Total cc:	6969.50271

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	B4-C2	C	B	12.00	0.35	X	X	Print out
2		C	F	1.80	0.10	X	X	
3		C	F	1.90	0.05	X	X	
4		C	B	3.00	0.20	X	X	
5		C	F	1.80	0.10	X	X	
6		C	M-B	2.00	0.15	X	X	
7		C	M-F	2.30	0.05	X	X	
8		C	B	1.95	0.20	X	X	
9		C	F	1.80	0.15	X	X	
10		C	B	1.90	0.05	X	X	
11		C	F	1.70	0.05	X	X	Print out
12		C	F	2.10	0.20	X	X	
13		C	F	3.00	0.20	X	X	
14		C	B	0.90	0.10	X	X	
15		C	F	0.80	0.05	X	X	
16		C	F	1.60	0.05	X	X	
17		C	B	3.90	0.20	X	X	
18		C	B	9.70	0.10	X	X	
19		C	C-F	2.00	0.05	X	X	
20		C	B	1.60	0.10	X	X	
21		C	B	2.20	0.20	X	X	Print out
22		C	B	1.90	0.15	X	X	
23		C	F	4.00	0.05	X	X	
24		C	F	0.90	0.05	X	X	
25		C	B	6.20	0.20	X	X	
26		C	M-F	7.80	0.15	X	X	
27		C	F	0.50	0.05	X	X	
28		C	F	2.00	0.05	X	X	

MAS Indirect TEM ANALYSIS M31835-015

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-B

29		C	F	1.00	0.10	X	X	
30		C	B	7.90	0.20	X	X	
31		C	B	8.00	0.40	X	X	Print out
32		C	C-F	1.60	0.15	X	X	
33		C	B	1.90	0.20	X	X	
34		C	B	7.70	0.20	X	X	
35		C	F	0.90	0.10	X	X	
36		C	M-F	1.00	0.05	X	X	
37		C	M-F	6.00	2.00	X	X	
38		C	B	7.70	0.80	X	X	
39		C	F	1.00	0.05	X	X	
40		C	M-B	0.80	0.15	X	X	
41	E7	C	B	1.60	0.15	X	X	Print out
42		C	M-F	1.70	0.05	X	X	
43		C	B	10.00	0.30	X	X	
44		C	B	6.10	0.30	X	X	
45		C	F	4.00	0.05	X	X	
46		C	B	4.00	0.40	X	X	
47		C	C-F	2.10	0.15	X	X	
48		C	F	0.70	0.05	X	X	
49		C	C-B	1.00	0.05	X	X	
50		C	F	2.20	0.10	X	X	
51		C	B	1.80	0.15	X	X	Print out
52		C	B	1.70	0.20	X	X	
53		C	M-B	2.00	0.15	X	X	
54		C	F	1.60	0.05	X	X	
55		C	F	2.80	0.05	X	X	
56		C	C-F	3.60	0.10	X	X	
57		C	F	1.60	0.05	X	X	
58		C	F	1.80	0.05	X	X	
59		C	F	1.50	0.05	X	X	
60		C	F	2.10	0.05	X	X	
61		C	C-F	1.70	0.10	X	X	Print out
62		C	F	1.60	0.05	X	X	
63		C	F	1.80	0.05	X	X	
64		C	M-F	0.60	0.05	X	X	
65		C	B	0.80	0.05	X	X	
66	B10	C	B	8.00	0.20	X	X	
67		C	F	0.60	0.05	X	X	
68		C	B	6.00	0.20	X	X	
69		C	C-F	0.70	0.05	X	X	
70		C	M-B	12.00	0.20	X	X	
71		C	F	2.00	0.05	X	X	Print out
72		C	F	0.60	0.05	X	X	
73		C	M-B	2.30	0.15	X	X	
74		C	B	1.60	0.20	X	X	
75		C	F	1.00	0.05	X	X	
76		C	F	2.00	0.05	X	X	
77		C	M-B	1.70	0.10	X	X	

MAS Indirect TEM ANALYSIS M31835-015

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-B

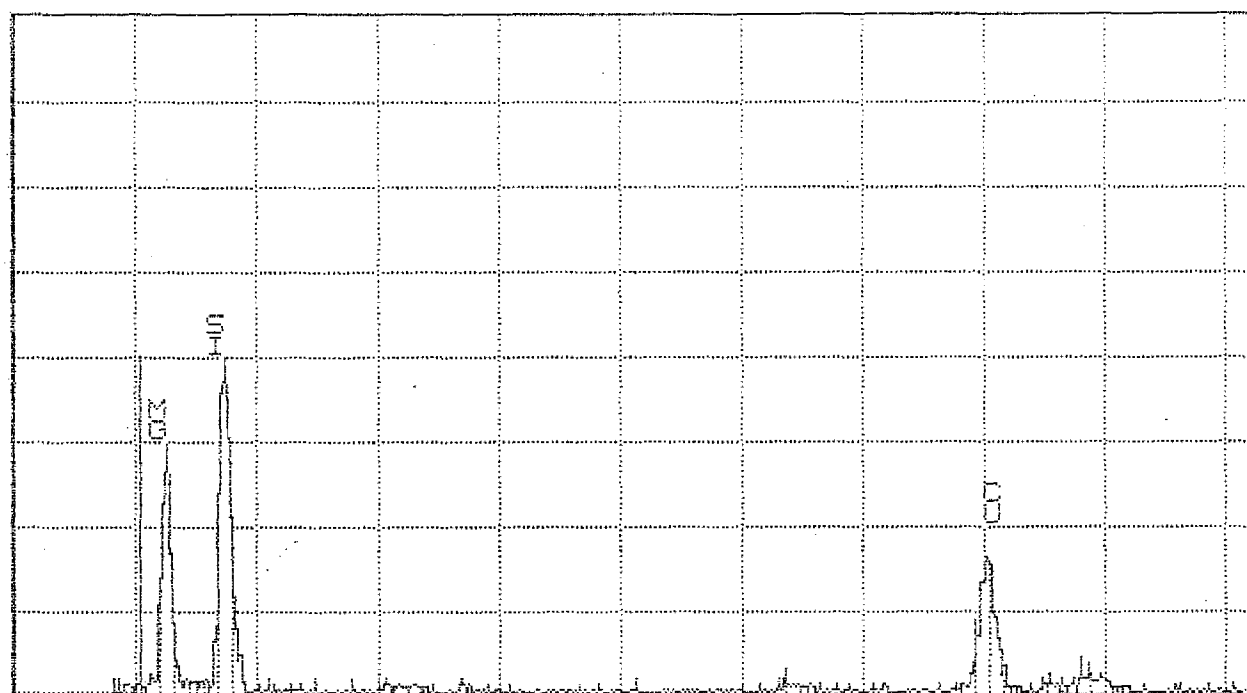
78	C	M-B	3.70	0.40	X	X		
79	C	C-B	4.00	0.10	X	X		
80	C	M-B	4.10	0.20	X	X		
81	C	C-F	0.90	0.10	X	X	Print out	
82	C	F	1.60	0.05	X	X		
83	C	F	2.00	0.05	X	X		
84	C	F	1.50	0.05	X	X		
85	C	B	4.30	0.30	X	X		
86	C	B	3.60	0.20	X	X		
87	C	C-B	6.20	0.20	X	X		
88	C	M-F	2.00	0.20	X	X		
89	C	C-B	4.00	0.20	X	X		
90	C	B	8.00	0.50	X	X		
91	C	B	15.70	0.40	X	X	Print out	
92	J10	C	B	2.10	0.10	X	X	
93	C	M-B	2.20	0.10	X	X		
94	C	B	2.00	0.15	X	X		
95	C	M-F	1.80	0.05	X	X		
96	C	B	5.70	0.20	X	X		
97	C	F	1.90	0.10	X	X		
98	C	B	23.80	0.50	X	X		
99	C	F	1.00	0.05	X	X		
100	C	M-F	2.00	0.10	X	X		
101	C	B	1.90	0.15	X	X	Print out	
102	C	F	4.10	0.20	X	X		
103	C	B	1.50	0.20	X	X		
104	C	B	1.80	0.10	X	X		
105	C	M-F	1.70	0.05	X	X		
106	C	B	8.20	0.30	X	X		
107	C	B	2.00	0.10	X	X		
108	C	B	1.70	0.10	X	X		
109	C	M-B	3.20	0.15	X	X		
110	C	F	1.80	0.05	X	X		
111	C	B	2.20	0.15	X	X	Print out	
112	C	B	2.20	0.20	X	X		
113	C	F	2.40	0.05	X	X		
114	C	C-F	2.00	0.05	X	X		

M31835 015 Sample Comments:

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 13:11

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 128

10.240

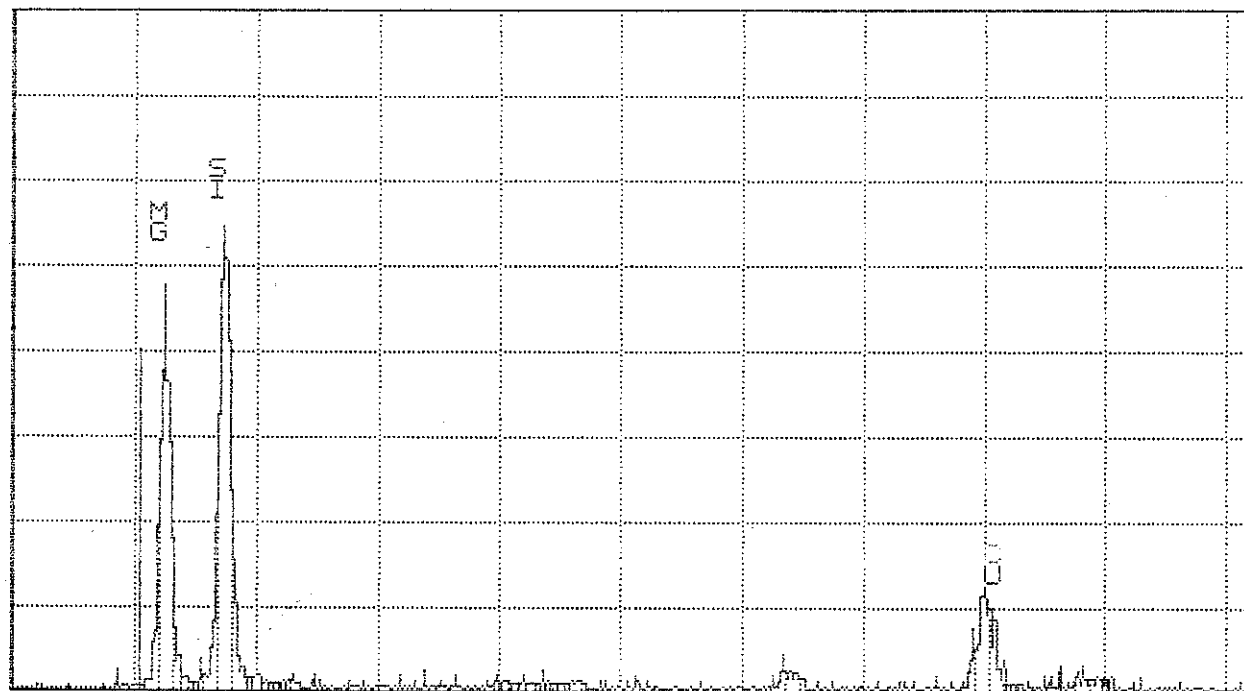
M31835-015 CHRYSOTILE

29

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 13:17

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 128

10.240

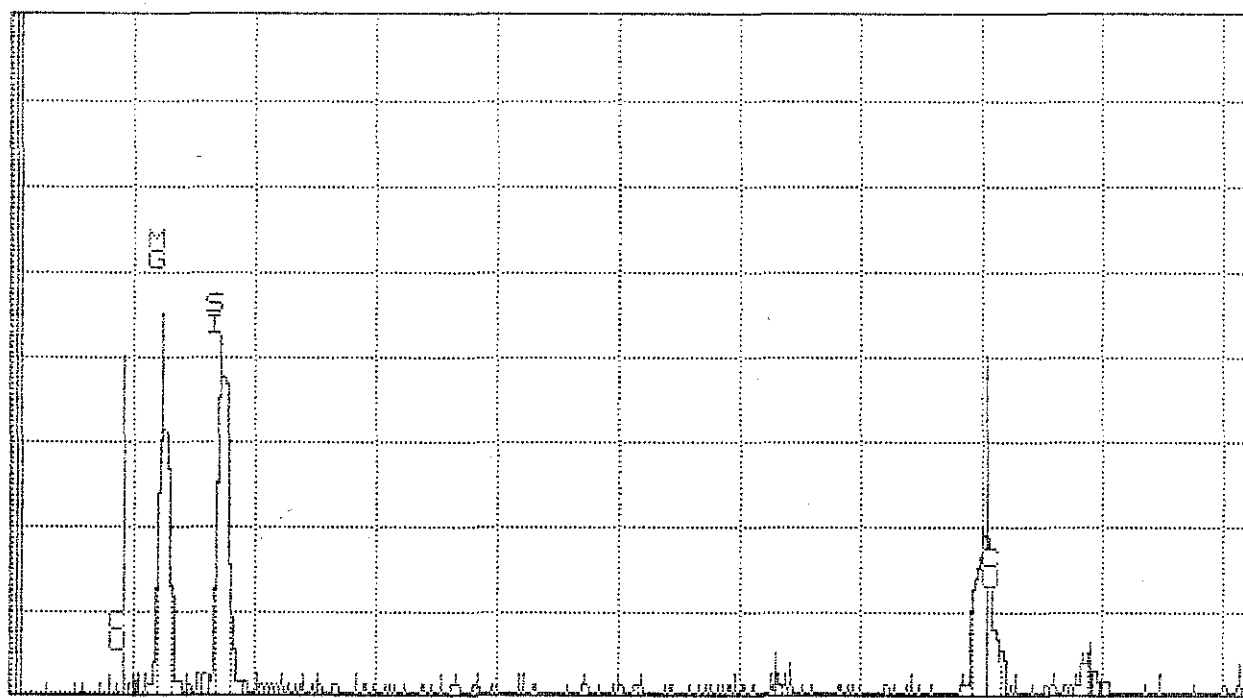
M31835-015 CHRYSOTILE

20

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 13:34

Cursor: 0.040keV = 0



0.000

Cu-29

VFS = 64

10.240

23

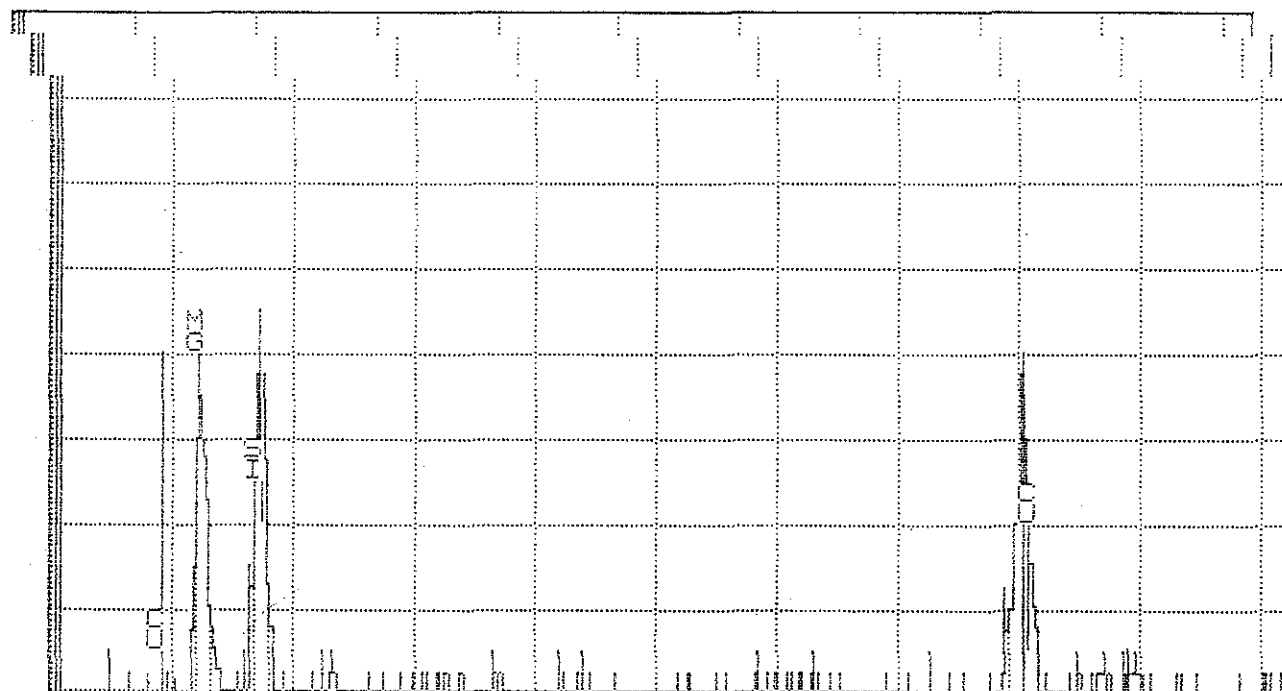
EXEC(7-D) DATA LABEL

M31835-015 Chrysotile

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 13:42

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 32

10.240

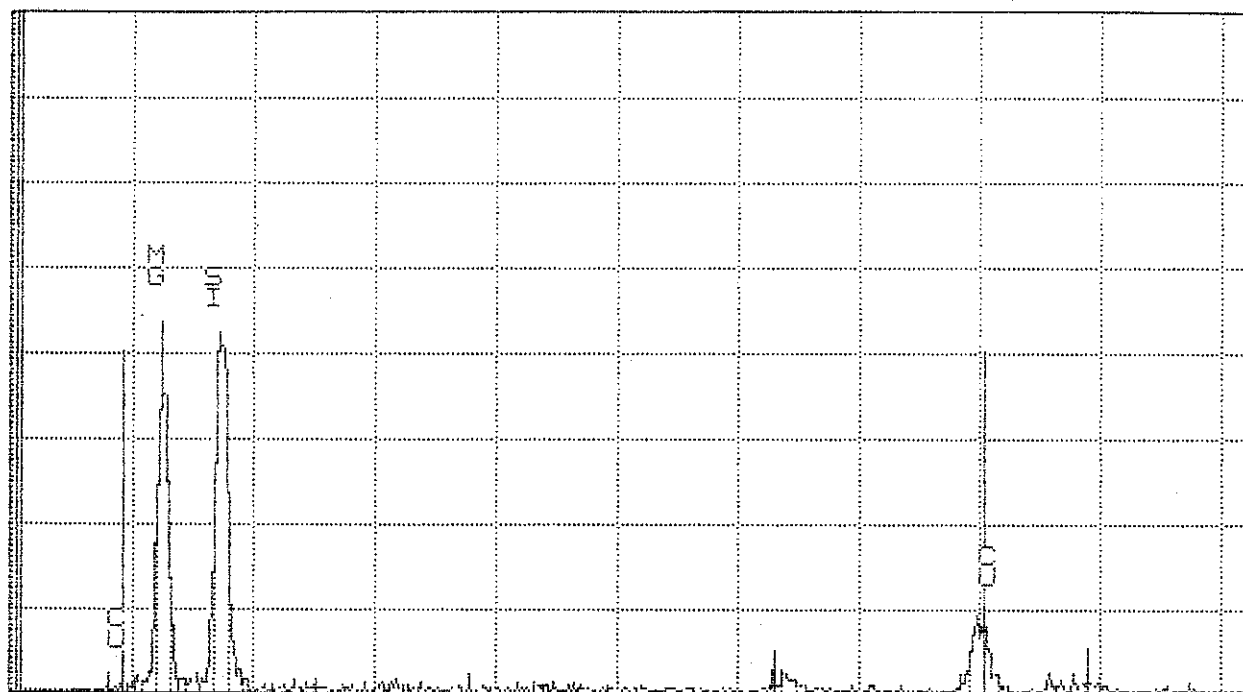
16

M31835-015 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 13:49

Cursor: 0.040keV = 0



0.000

Cu-29

VFS = 256

10.240

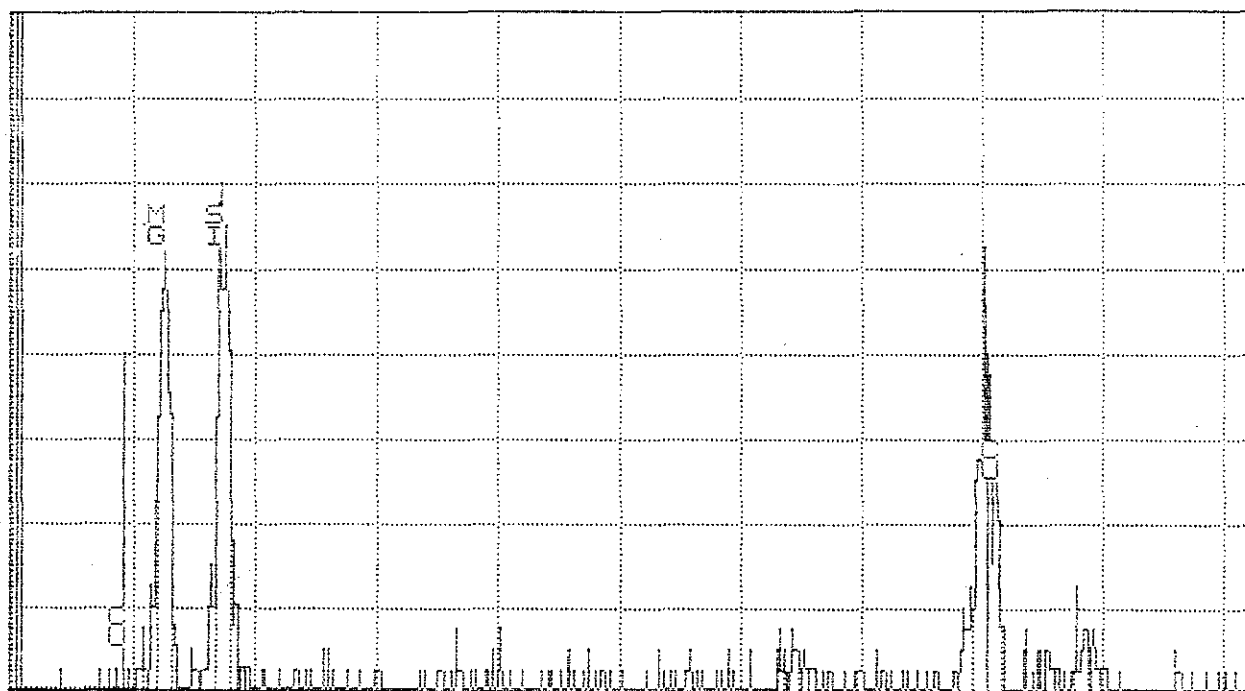
30

M31835-015 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 13:55

Cursor: 0.040KeV = 0



0.000

CU-29

VFS = 32

10.240

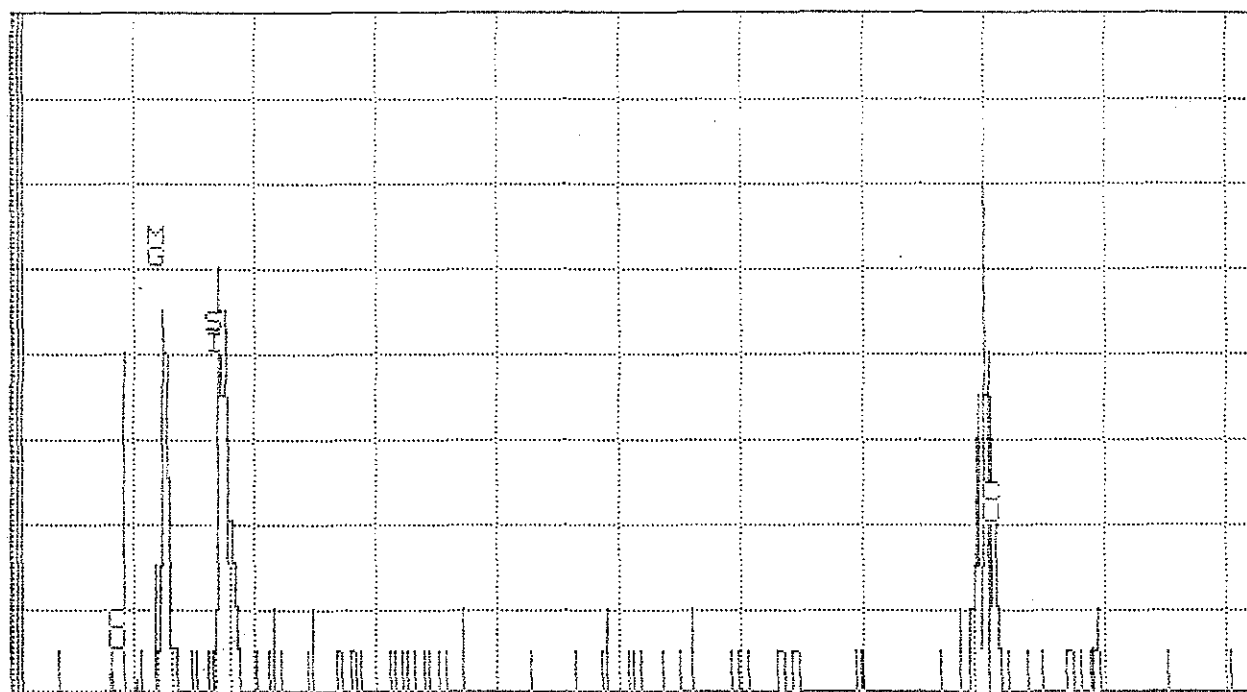
19

M31835-015 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 14:01

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 16

10.240

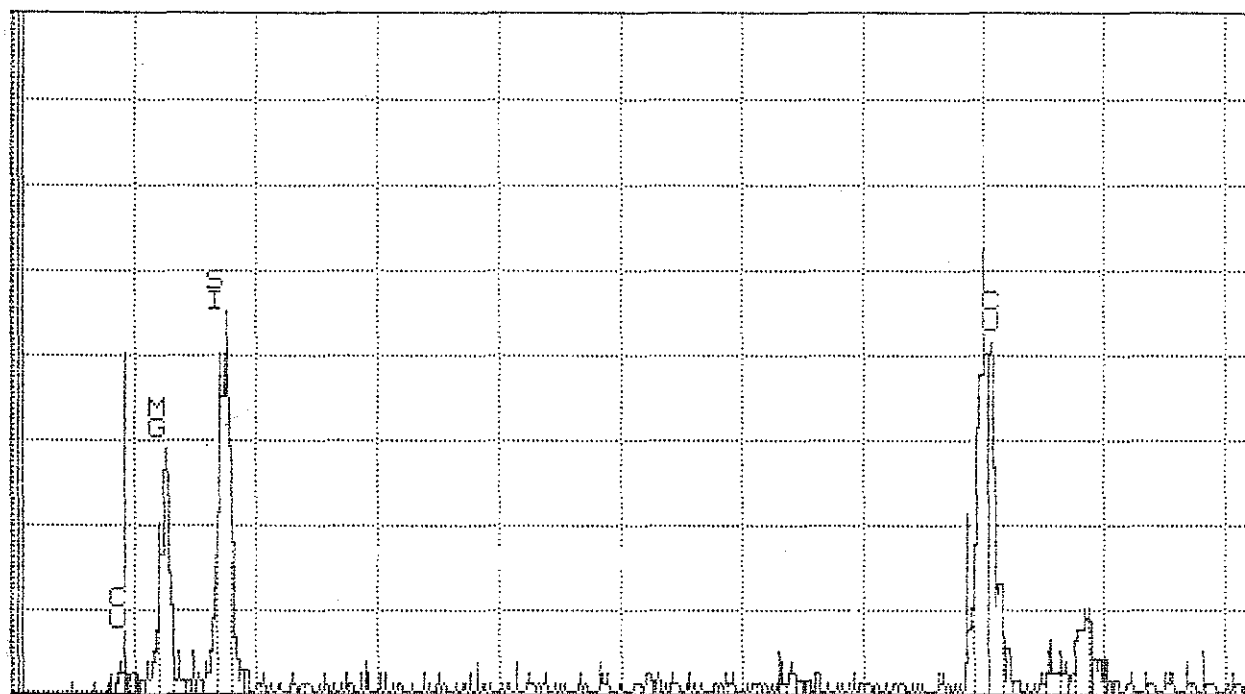
13

M31835-015 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 14:10

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 64

10.240

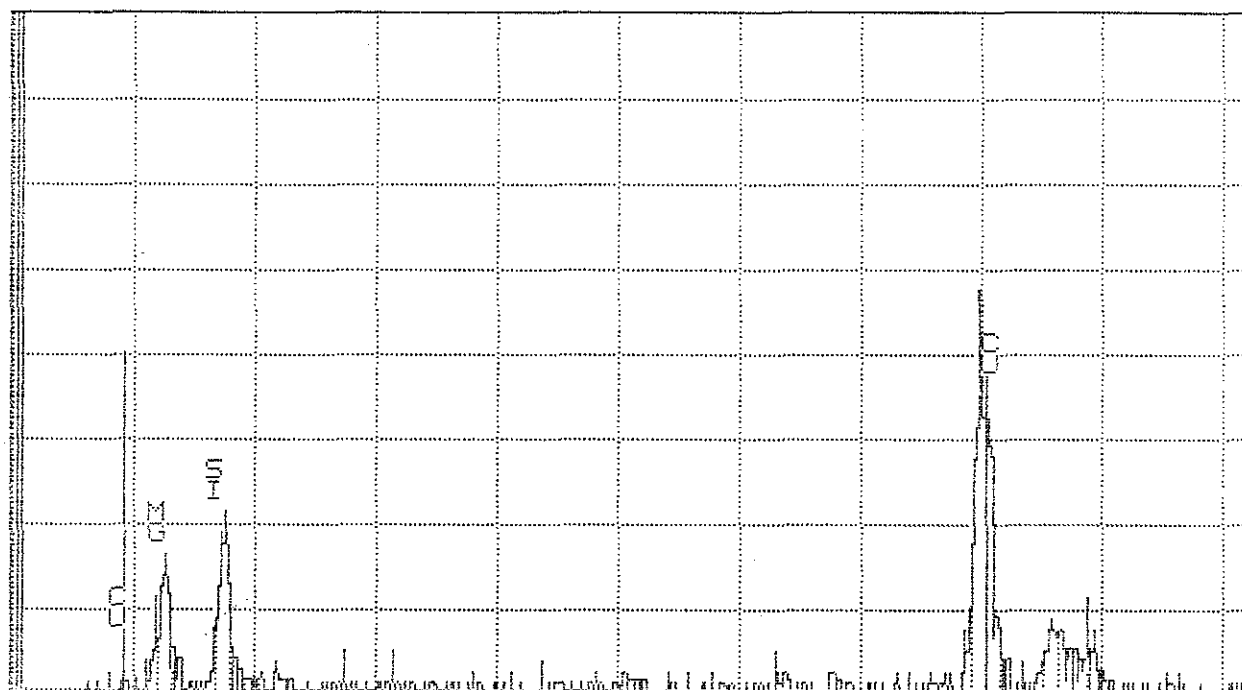
23

M31835-015 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 14:15

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 64

10.240

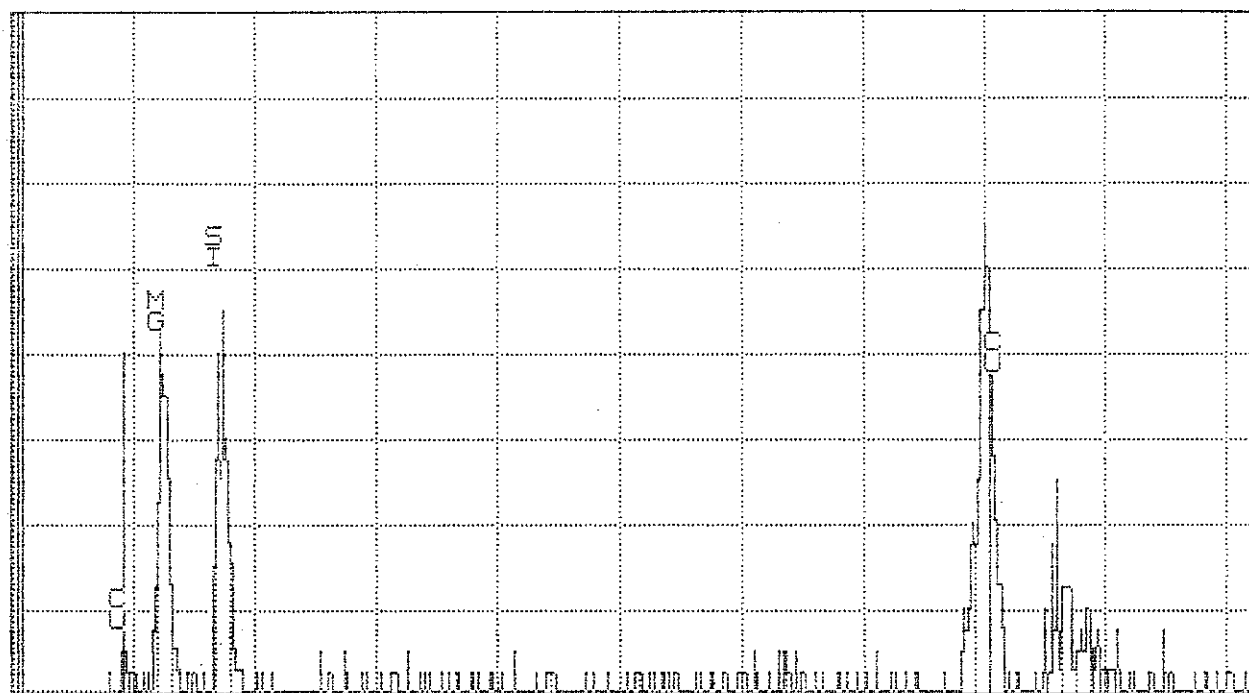
21

M31835-015 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 14:21

Cursor: 0.040keV = 0



0.000

Cu-29

VFS = 32

10.240

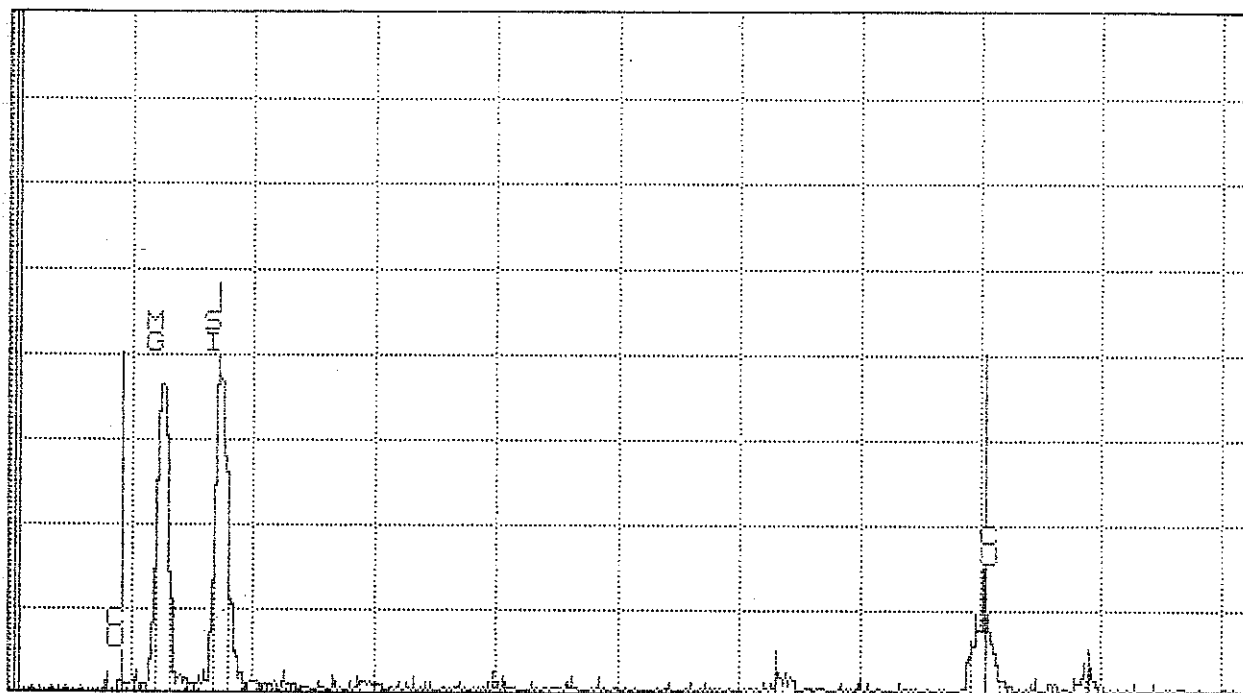
18

M31835-015 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 14:29

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 128

10.240

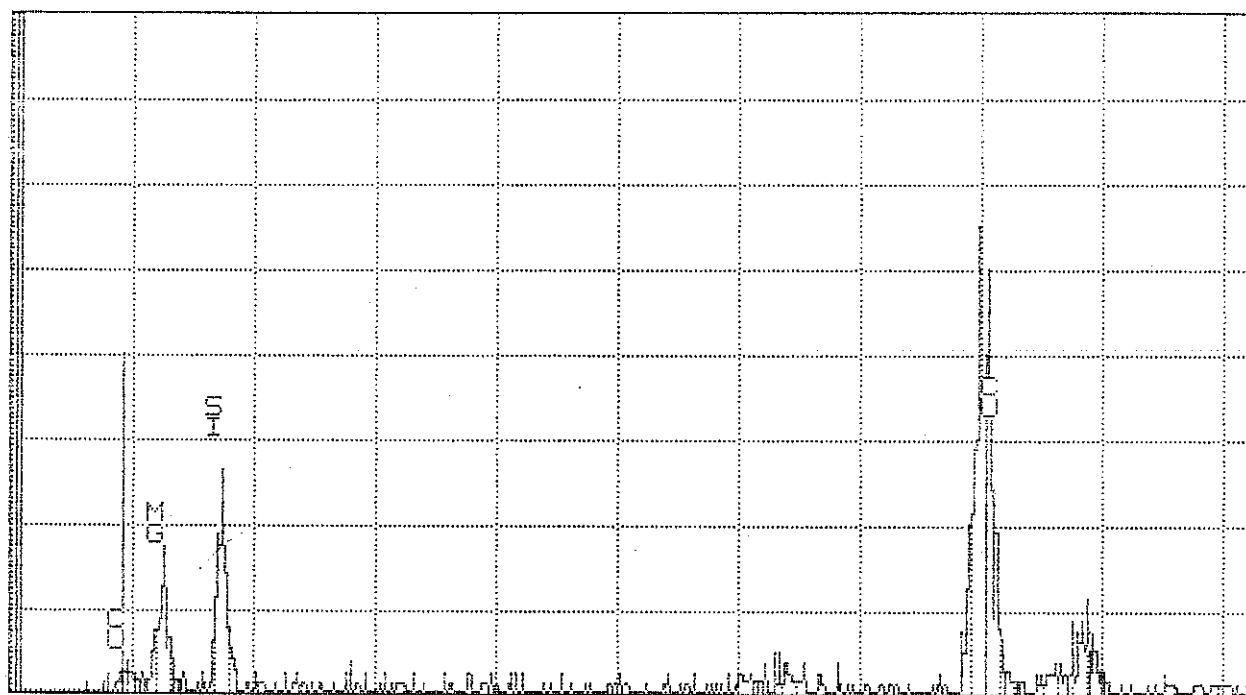
13

M31835-015 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 14:36

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 64

10.240

31

M31835-015 CHRYSOTILE

MAS Indirect TEM ANALYSIS M31835-016

CLIENT NAME: Materials Analytical Services, Inc.			CLIENT SAMPLE ID: A-1-C	
Sample Area/ Volume:	11	Liters	Date Analyzed:	8/20/2003
Filter Type:	MCE 47mm		Analyst:	Jayne Callan
Pore size:	0.45		Scope Number:	4
Effective Filter Area:	1297		Accelerating Voltage:	100
Sample type:	Indirect Air		Indicated Mag:	25
Analysis type:	MAS indirect		Screen Mag:	20
Grid Acceptance/Loading	YES	1 %	Grid box Number:	6623

Str < 5um:	114
Str ≥ 5um:	10
Total str:	124
Str / cc > 5:	317.5896 /cc

Number of grids:	2	#1:	101	#3:	102
Number of openings:	7	#2:	103	#4:	106

Average Grid Size:	0.010608
Total Area Analyzed:	0.074

Filter used	Dilution	Dilution Factor	Detect_cc:	31.75896
1/ 2	10	20	Total cc:	3938.11044

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	D2-G8	C	C-B	10.00	0.20	X	X	Print out
2		C	B	1.90	0.18	X	X	
3		C	F	1.20	0.05	X	X	
4		C	B	2.00	0.20	X	X	
5		C	C-B	1.80	0.15	X	X	
6		C	M-F	2.00	0.05	X	X	
7		C	F	4.00	0.20	X	X	
8		C	F	1.00	0.05	X	X	
9		C	B	1.90	0.20	X	X	
10		C	B	4.50	0.20	X	X	
11		C	F	1.60	0.05	X	X	Print out
12		C	F	0.70	0.05	X	X	
13		C	B	6.20	0.10	X	X	
14	I7	C	B	16.30	1.00	X	X	
15		C	B	4.20	0.60	X	X	
16		C	F	0.50	0.10	X	X	
17		C	M-B	2.00	0.50	X	X	
18		C	F	1.70	0.05	X	X	
19		C	B	1.70	0.20	X	X	
20		C	M-B	2.00	0.20	X	X	
21		C	B	5.70	0.20	X	X	Print out
22		C	B	1.90	0.20	X	X	
23	F4	C	M-F	1.00	0.20	X	X	
24		C	F	1.60	0.05	X	X	
25		C	F	0.70	0.05	X	X	
26		C	F	1.00	0.05	X	X	
27		C	B	3.70	0.25	X	X	
28		C	M-F	0.50	0.05	X	X	

MAS Indirect TEM ANALYSIS M31835-016

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-C

29		C	F	3.60	0.20	X	X	
30		C	M-F	0.70	0.05	X	X	
31		C	F	0.70	0.05	X	X	Print out
32		C	M-B	1.80	0.10	X	X	
33		C	F	0.90	0.05	X	X	
34		C	C-F	3.70	0.10	X	X	
35		C	M-F	1.50	0.05	X	X	
36		C	B	2.50	0.20	X	X	
37		C	B	2.00	0.10	X	X	
38	E1	C	B	6.00	0.20	X	X	
39		C	B	1.60	0.10	X	X	
40		C	C-F	1.60	0.05	X	X	
41		C	M-F	1.60	0.15	X	X	Print out
42		C	C-F	1.00	0.05	X	X	
43		C	M-F	1.60	0.05	X	X	
44		C	B	1.70	0.20	X	X	
45		C	NSD	0.80	0.05	X	X	
46		C	B	5.90	0.20	X	X	
47		C	B	6.30	0.20	X	X	
48		C	F	2.40	0.05	X	X	
49		C	F	1.60	0.05	X	X	
50		C	M-F	1.70	0.15	X	X	
51		C	B	2.00	0.15	X	X	Print out
52		C	C-F	4.00	0.05	X	X	
53		C	M-B	1.20	0.20	X	X	
54		C	F	1.80	0.50	X	X	
55	C5	C	B	2.00	0.20	X	X	
56		C	F	0.80	0.15	X	X	
57		C	B	4.00	1.00	X	X	
58		C	F	1.60	0.10	X	X	
59		C	F	1.70	0.05	X	X	
60		C	M-B	2.50	0.15	X	X	
61		C	B	3.80	0.15	X	X	Print out
62		C	B	6.00	0.40	X	X	
63		C	M-F	1.80	0.10	X	X	
64		C	B	6.30	0.10	X	X	
65		C	B	1.80	0.20	X	X	
66	E2-F1	C	F	1.60	0.05	X	X	
67		C	F	0.60	0.05	X	X	
68		C	M-F	1.00	0.05	X	X	
69		C	F	1.40	0.10	X	X	
70		C	B	3.90	0.30	X	X	
71		C	B	3.90	0.15	X	X	Print out
72		C	F	0.60	0.05	X	X	
73		C	F	1.60	0.10	X	X	
74		C	F	0.80	0.05	X	X	
75		C	F	0.90	0.10	X	X	
76		C	F	1.00	0.05	X	X	
77		C	M-B	1.60	0.10	X	X	

MAS Indirect TEM ANALYSIS M31835-016

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-C

78	C	C-B	1.80	0.20	X	X		
79	C	F	1.00	0.10	X	X		
80	C	F	0.80	0.05	X	X		
81	C	B	2.00	0.15	X	X	Print out	
82	C	F	1.80	0.05	X	X		
83	C	F	1.60	0.05	X	X		
84	C	F	1.90	0.05	X	X		
85	C	F	1.60	0.10	X	X		
86	C	M-F	0.50	0.05	X	X		
87	C	B	1.60	0.10	X	X		
88	C	M-B	4.20	0.20	X	X		
89	C	B	3.60	0.20	X	X		
90	C	C-F	0.60	0.05	X	X		
91	C	M-B	3.00	0.50	X	X	Print out	
92	C	C-B	5.20	0.20	X	X		
93	D3	C	F	1.70	0.05	X	X	
94	C	B	1.90	0.15	X	X		
95	C	F	0.50	0.05	X	X		
96	C	B	1.00	0.20	X	X		
97	C	F	0.70	0.05	X	X		
98	C	B	3.80	0.20	X	X		
99	C	F	0.70	0.05	X	X		
100	C	B	1.60	0.15	X	X		
101	C	B	3.00	0.15	X	X	Print out	
102	C	B	2.00	0.15	X	X		
103	C	F	2.40	0.05	X	X		
104	C	F	1.60	0.10	X	X		
105	C	B	0.60	0.20	X	X		
106	C	F	1.70	0.05	X	X		
107	C	F	1.60	0.05	X	X		
108	C	F	0.90	0.03	X	X		
109	C	B	1.80	0.40	X	X		
110	C	F	1.80	0.05	X	X		
111	C	M-F	1.60	0.10	X	X	Print out	
112	C	B	1.70	0.15	X	X		
113	C	F	2.30	0.05	X	X		
114	C	M-F	1.50	0.05	X	X		
115	C	F	1.80	0.05	X	X		
116	C	B	2.10	0.15	X	X		
117	C	C-F	2.30	0.05	X	X		
118	C	M-B	1.20	0.20	X	X		
119	C	M-B	3.60	0.10	X	X		
120	C	B	2.10	0.15	X	X		
121	C	B	2.00	0.20	X	X	Print out	
122	C	F	1.80	0.10	X	X		
123	C	B	2.20	0.15	X	X		
124	C	F	3.80	0.10	X	X		

MAS Indirect TEM ANALYSIS M31835-016

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID:

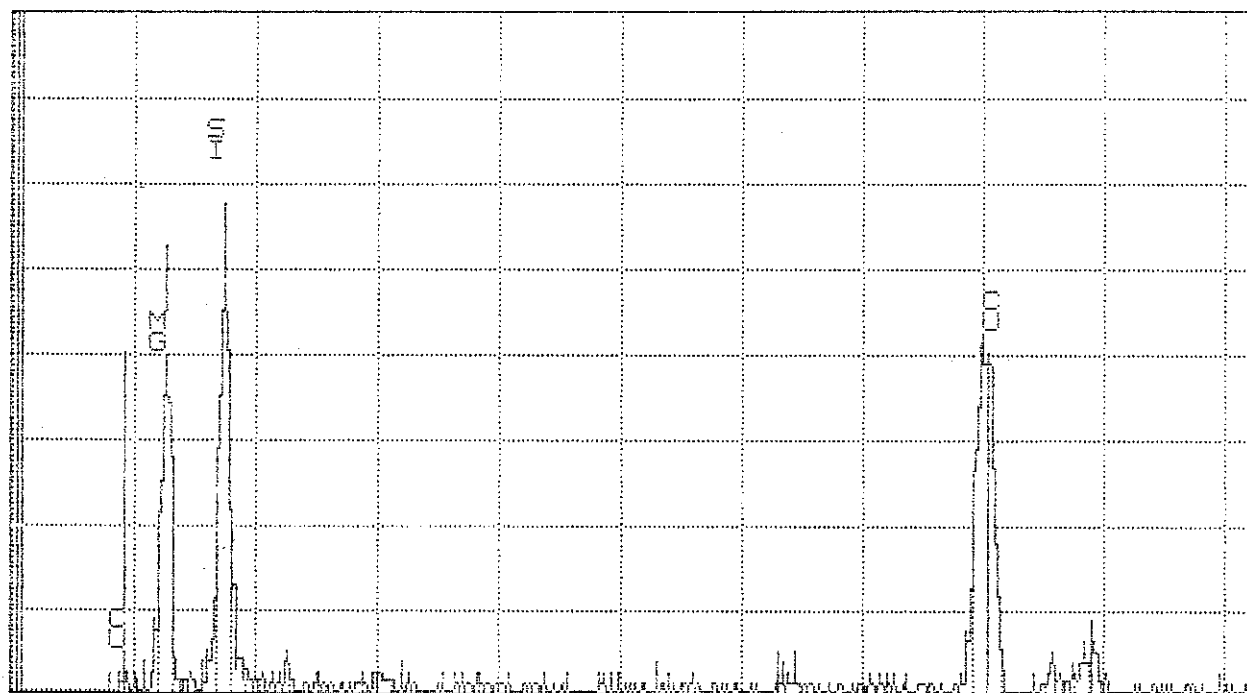
A-1-C

M31835 016 Sample Comments:

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 15:34

Cursor: 0.040keV = 0



0.000

Cu-29

VFS = 64

10.240

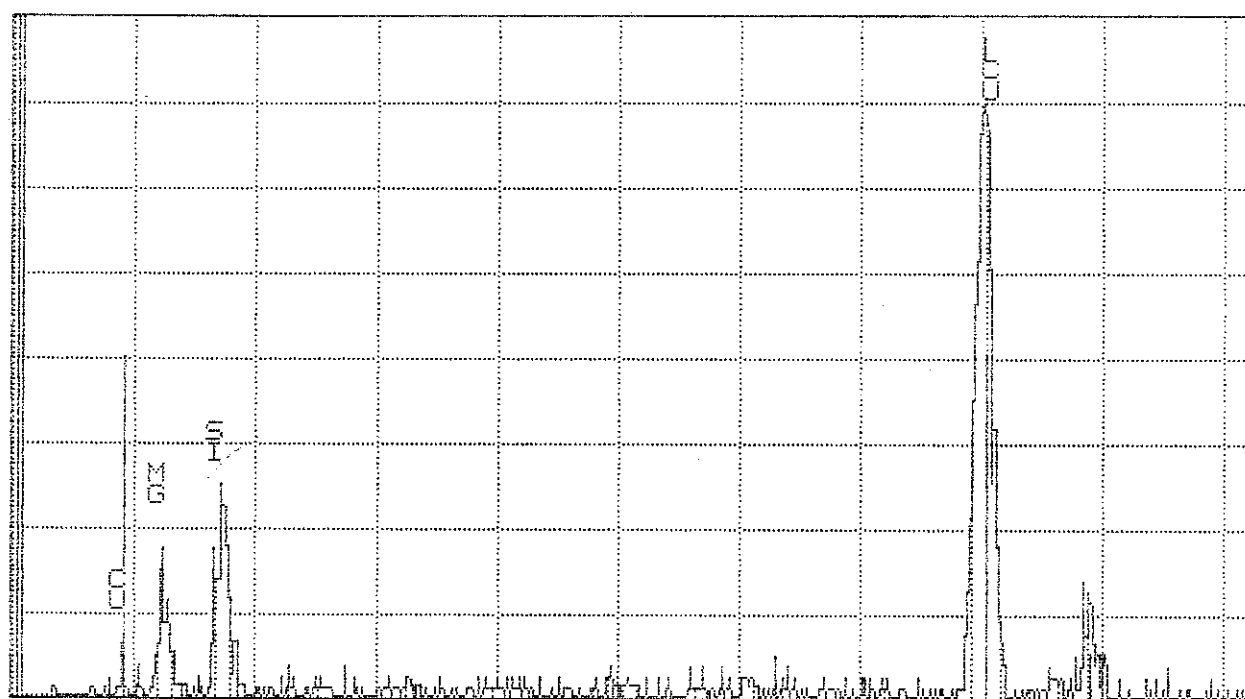
24

M31835-016 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 15:28

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 64

10.240

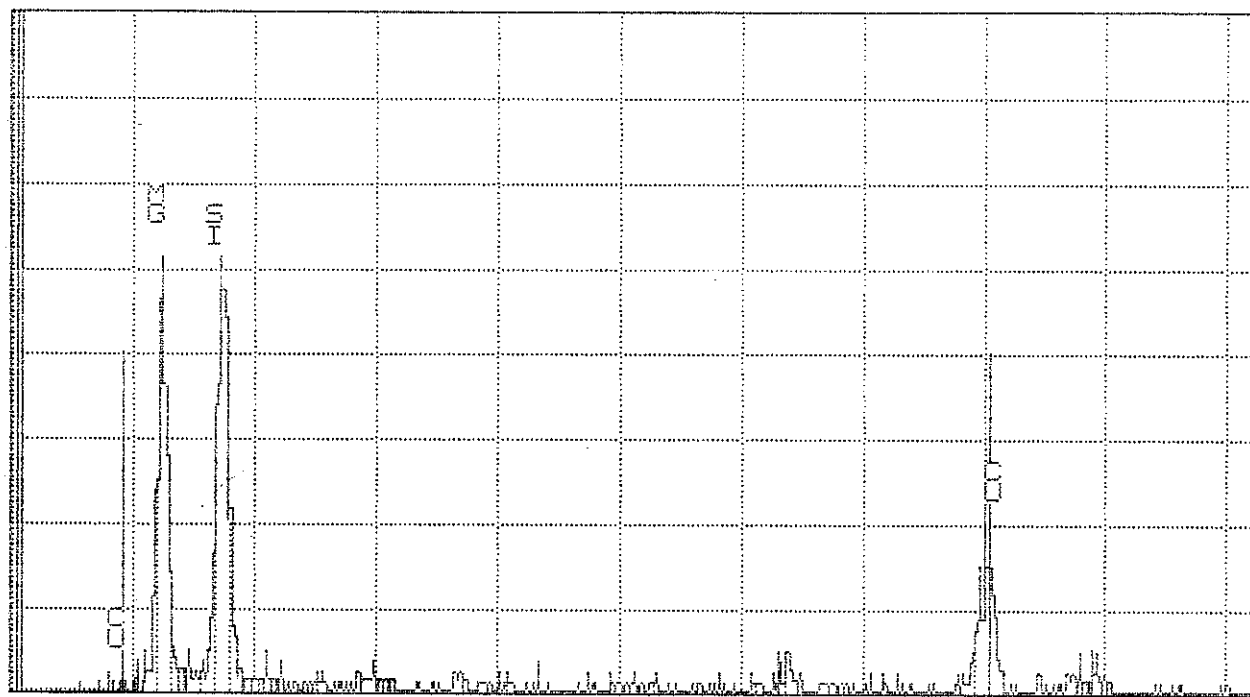
20

M31835-016 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 07:18

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 64

10.240

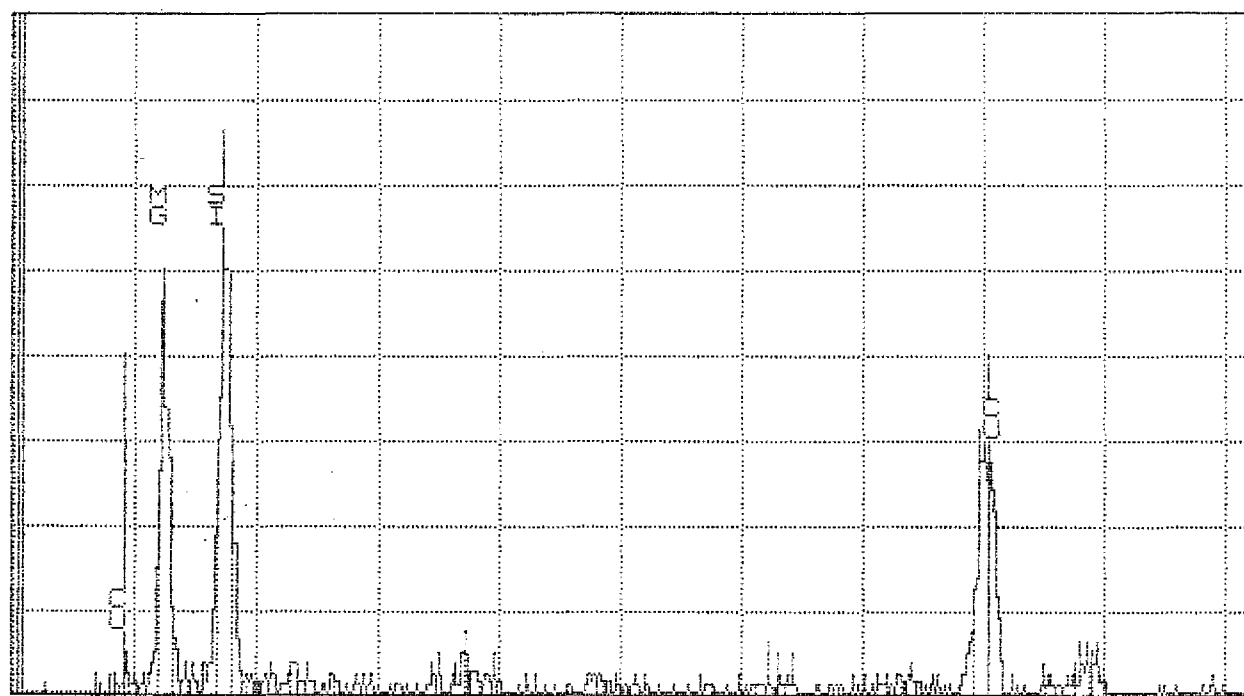
30

M31835-016 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 07:26

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 64

10.240

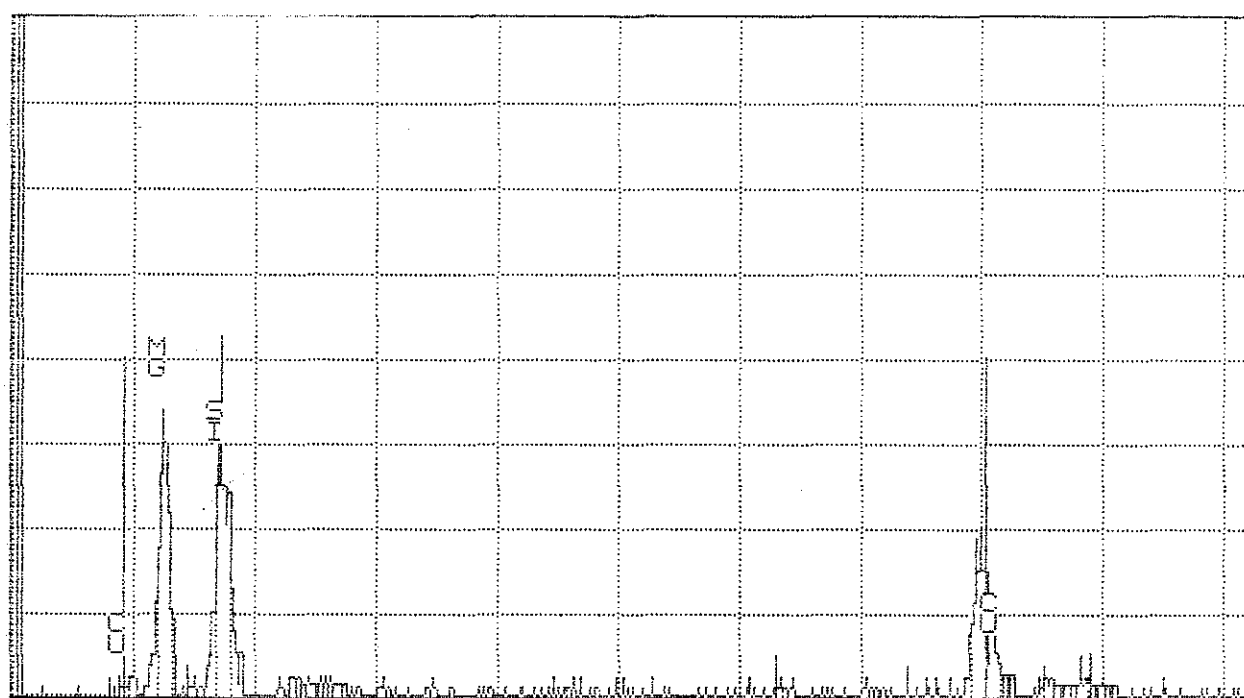
17

M31835-016 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 07:32

Cursor: 0.040keV = 0



0.000

Cu-29

VFS = 64

10.240

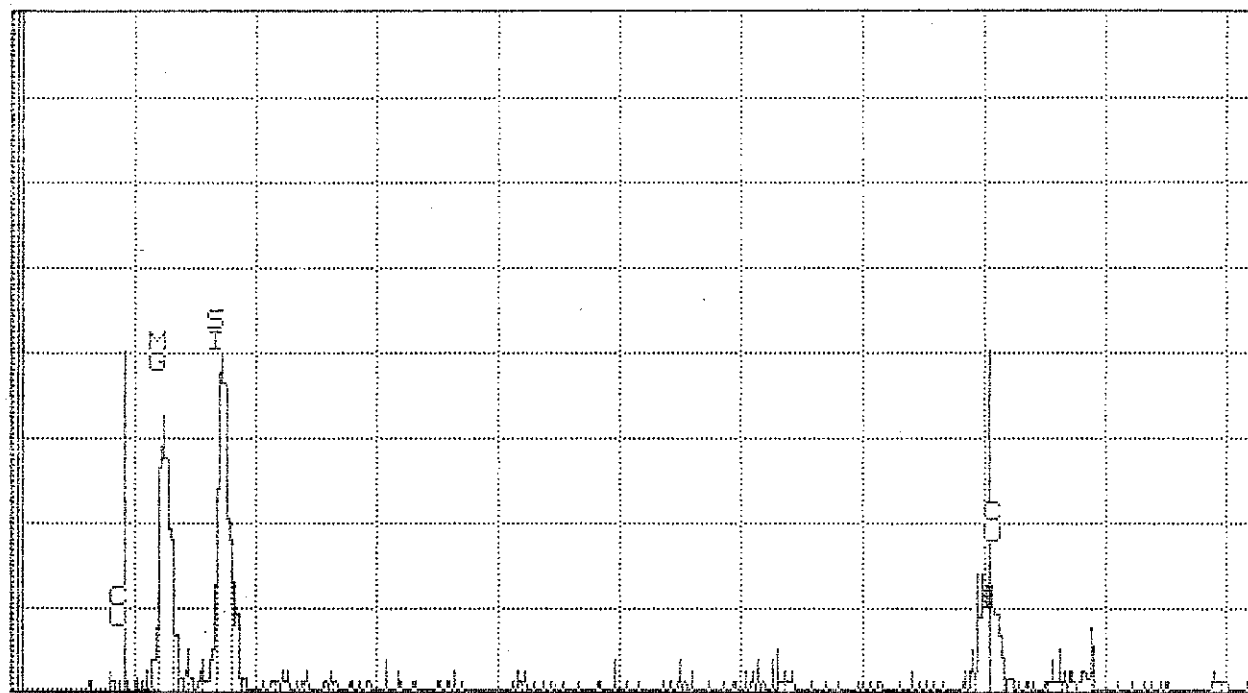
29

M31835-016 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 07:42

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 64

10.240

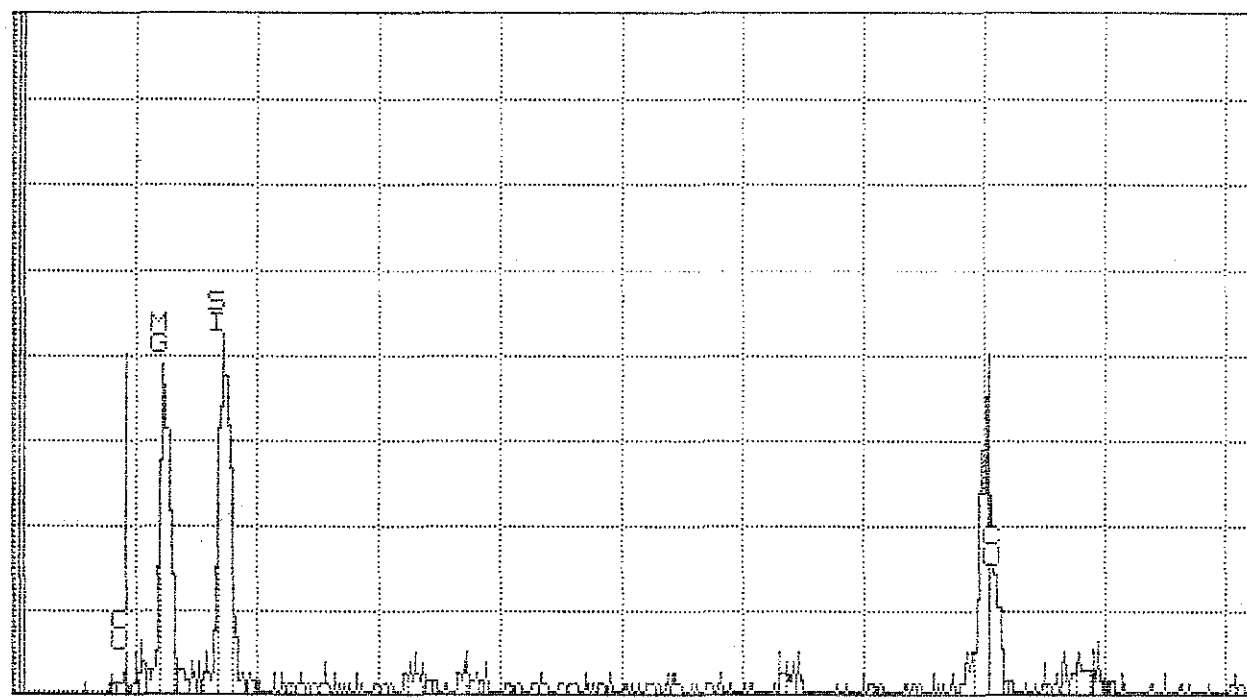
21

M31835-016 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 07:49

Cursor: 0.040keV = 0



0.000

Cu-29

VFS = 64

10.240

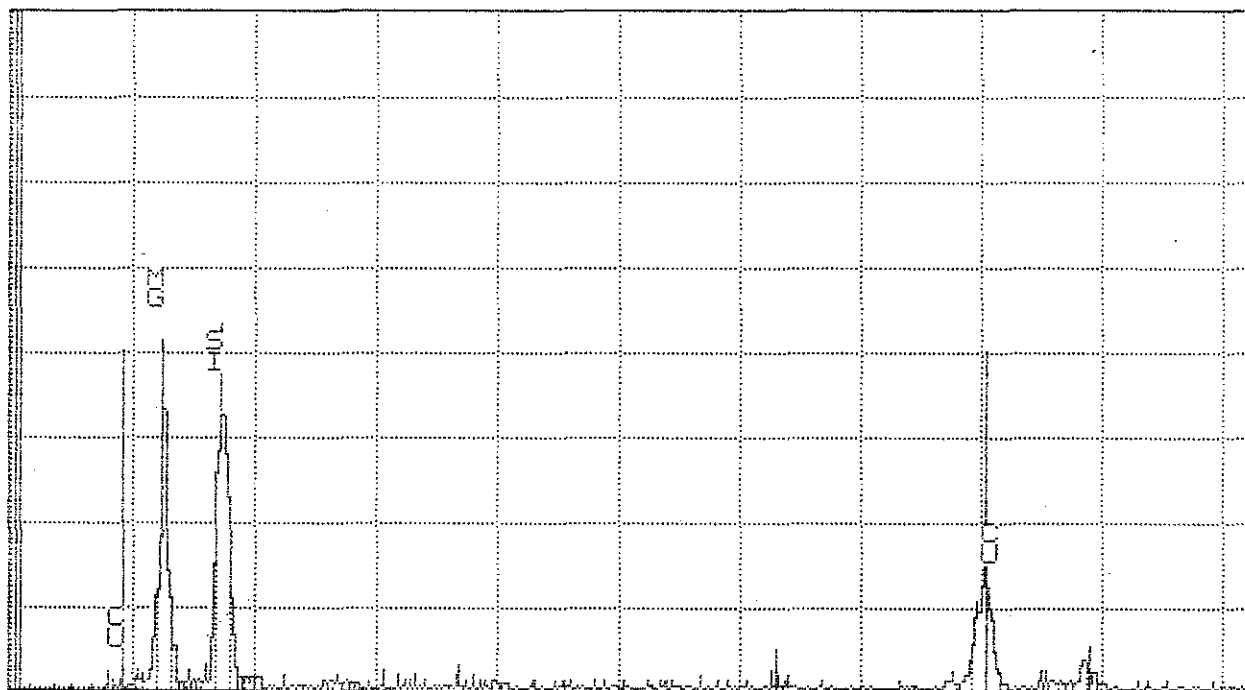
21

M31835-016 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 07:56

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 128

10.240

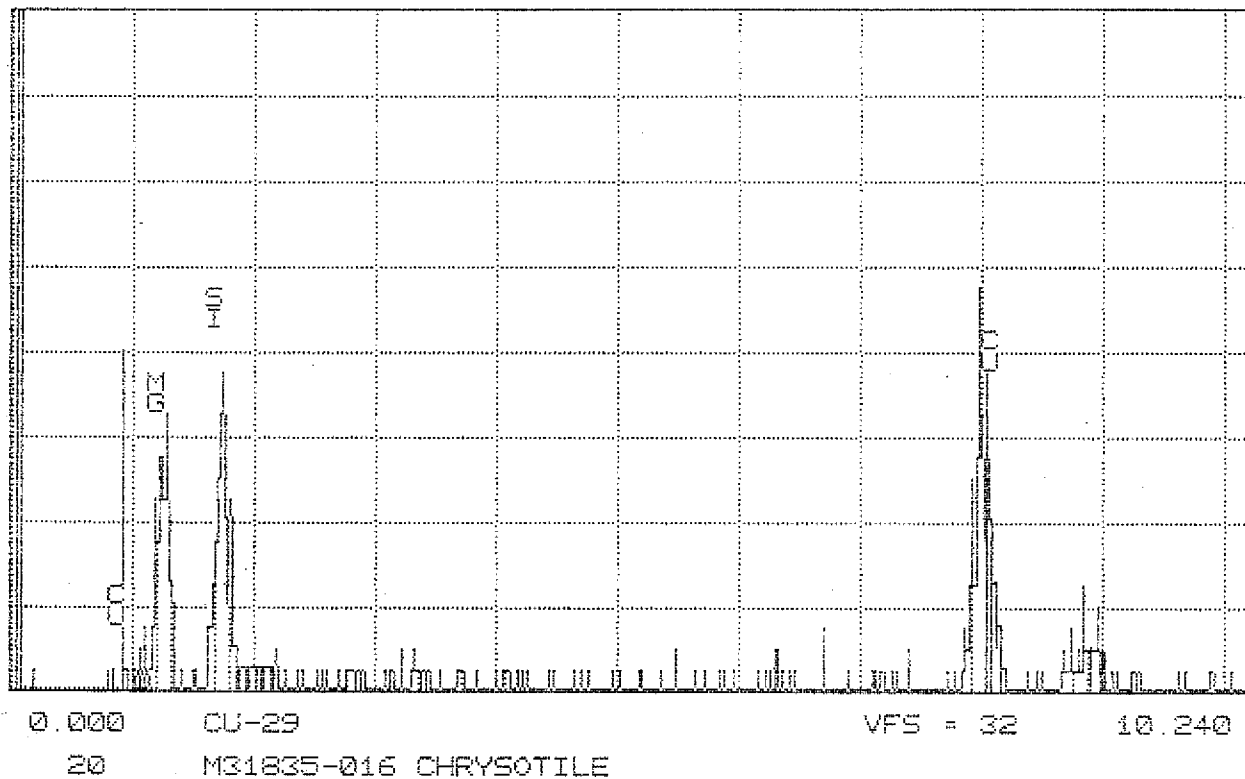
59

M31835-016 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 08:03

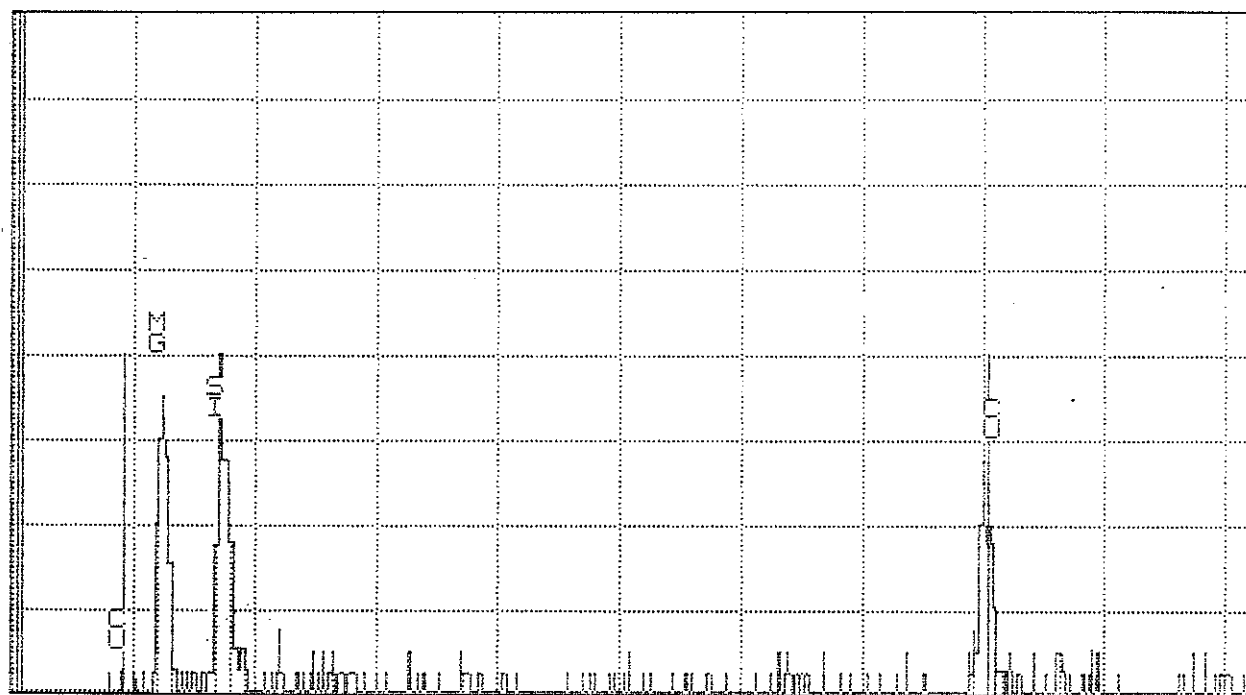
Cursor: 0.040keV = 0



MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 08:15

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 32

10.240

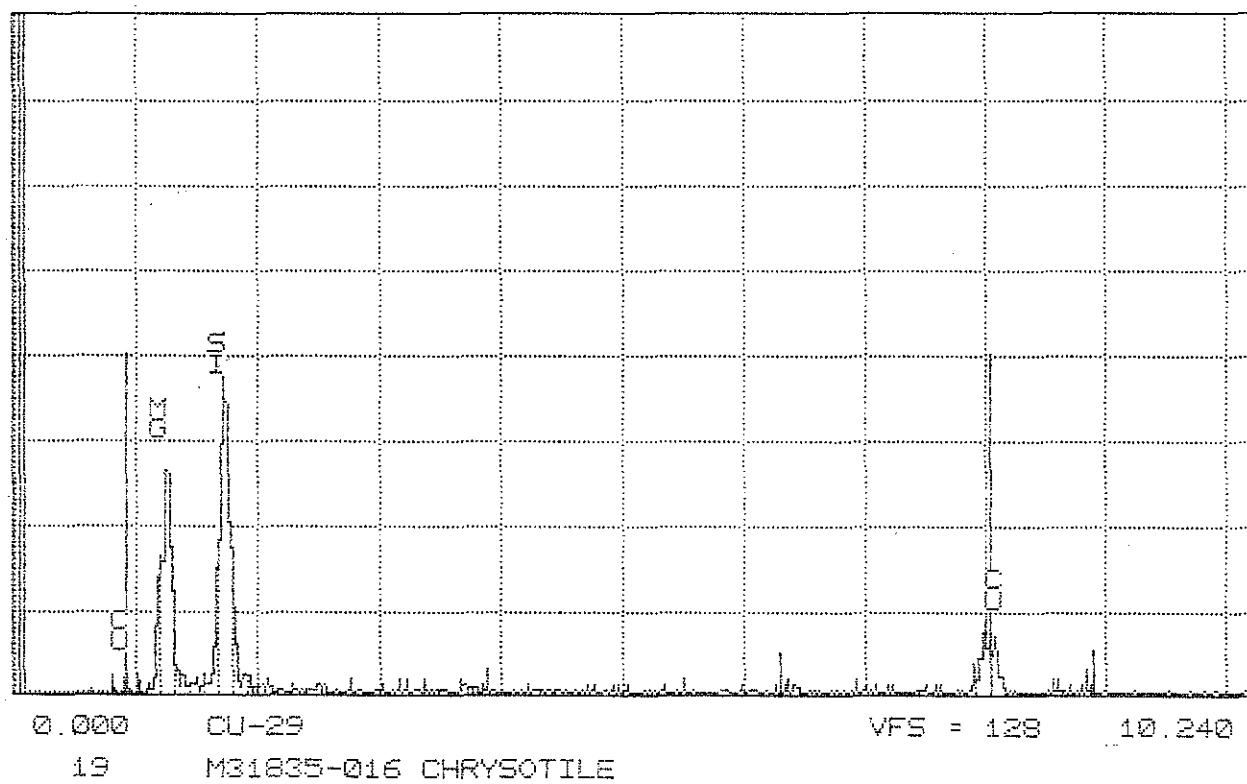
17

M31835-016 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 08:20

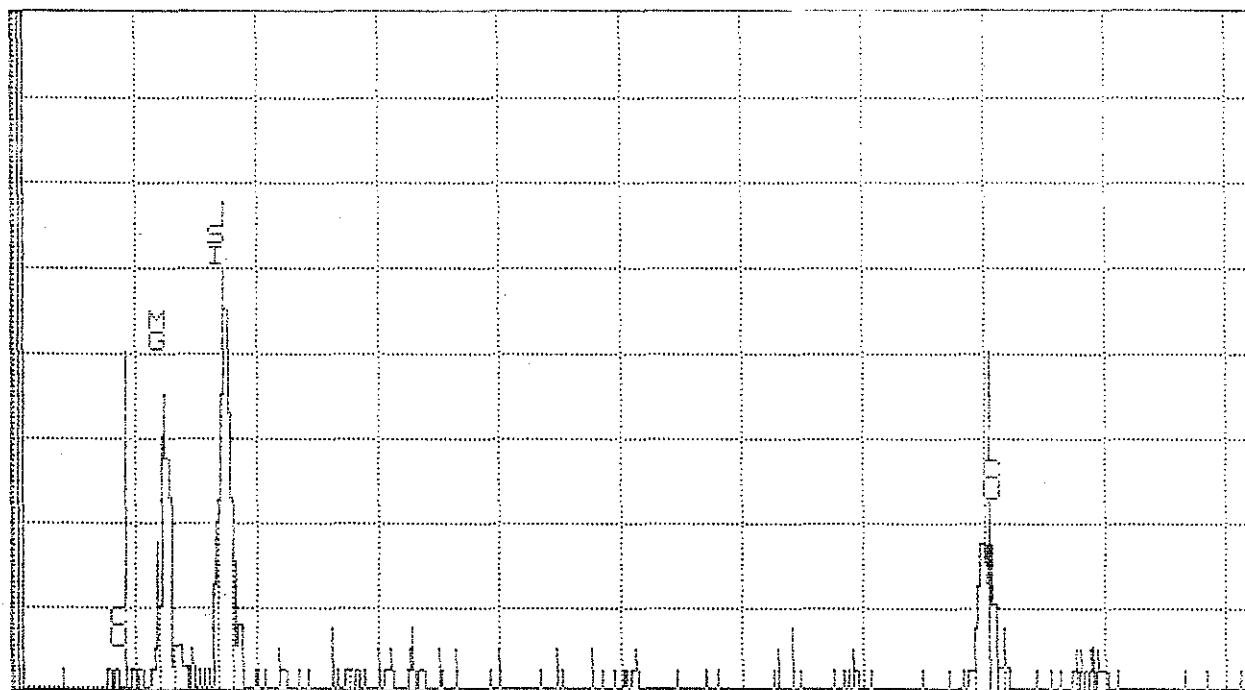
Cursor: 0.040keV = 0



MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 08:28

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 32

10.240

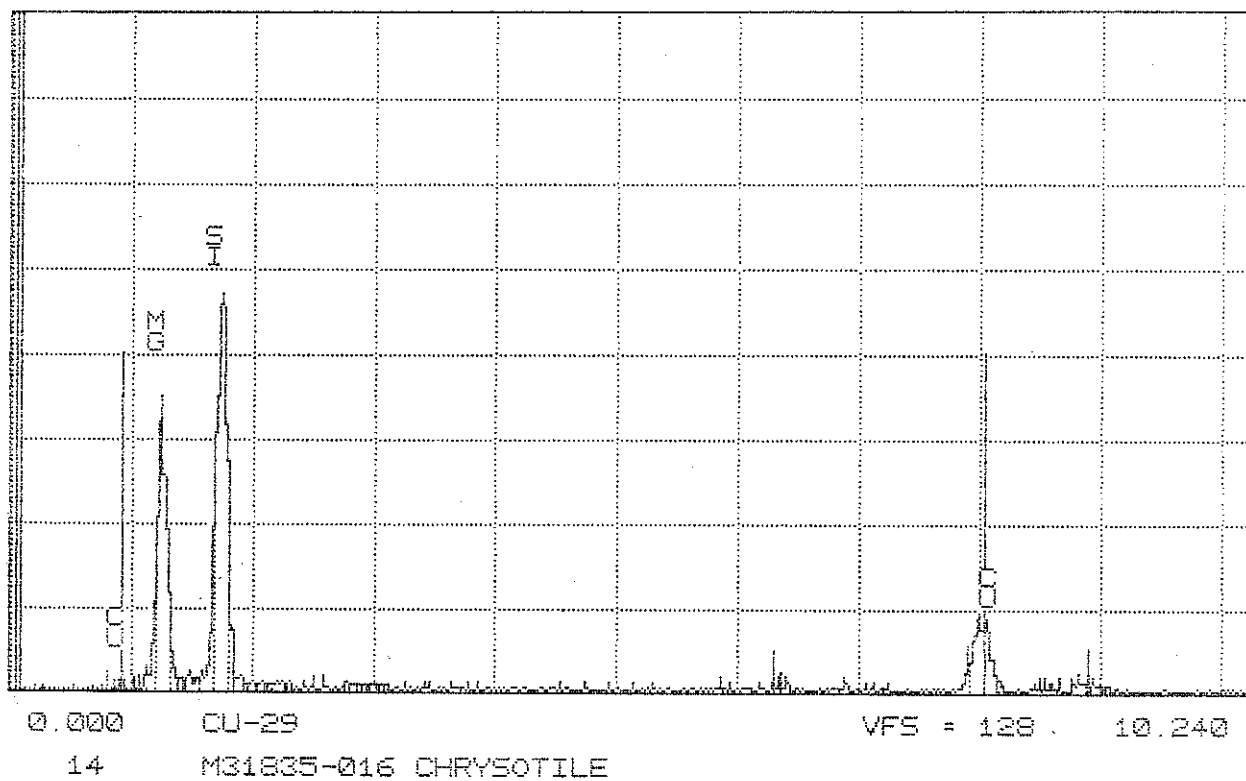
24

M31835-016 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

WED 20-AUG-03 15:18

Cursor: 0.040keV = 0



MAS Indirect TEM ANALYSIS M31835-017

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-D

Sample Area/ Volume: 11 Liters
 Filter Type: MCE 47mm
 Pore size: 0.45
 Effective Filter Area: 1297
 Sample type: Indirect Air
 Analysis type: MAS indirect
 Grid Acceptance/Loading YES 1%

Date Analyzed: 8/21/2003
 Analyst: Jayme Callan
 Scope Number: 4
 Accelerating Voltage: 100 KV
 Indicated Mag: 25 KX
 Screen Mag: 20 KX
 Grid box Number: 6623

Str < 5um: 32
 Str ≥ 5um: 10
 Total str: 42
 Str / cc > 5: 222.3127 /cc

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 106

Average Grid Size: 0.010608
 Total Area Analyzed: 0.106

Filter used Dilution Dilution Factor
 1/ 2 10 20

Detect_cc: 22.23127
 Total cc: 933.71328

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	B2-C4	C	F	1.70	0.05	X	X	Print out
2		C	B	6.90	0.20	X	X	
3		C	F	2.00	0.10	X	X	
4		C	F	1.80	0.05	X	X	
5		CR	B	12.00	1.60	X	X	Print out
6		C	F	7.90	0.10	X	X	
7		C	B	0.80	0.20	X	X	
8	B9	C	F	1.60	0.20	X	X	
9		C	F	1.50	0.05	X	X	
10		CR	F	1.60	0.10	X	X	
11	E10	C	C-B	3.70	0.20	X	X	Print out
12		C	B	25.00	0.20	X	X	
13	H7	C	B	14.50	4.50	X	X	
14		C	B	2.10	0.20	X	X	
15		C	F	1.20	0.05	X	X	
16		C	B	18.00	0.15	X	X	
17		C	F	3.60	0.20	X	X	
18		C	B	6.00	0.20	X	X	
19	F1	C	B	9.80	0.20	X	X	
20		C	F	1.70	0.05	X	X	
21		C	B	12.00	0.40	X	X	Print out
	B2-H5		NSD					
22	E7	C	B	2.40	0.40	X	X	
23		C	F	1.60	0.05	X	X	
24		C	B	2.30	0.25	X	X	
25		C	B	1.70	0.10	X	X	
26	A9	C	M-B	1.70	0.15	X	X	
27		C	M-B	1.00	0.15	X	X	

MAS Indirect TEM ANALYSIS M31835-017

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-D

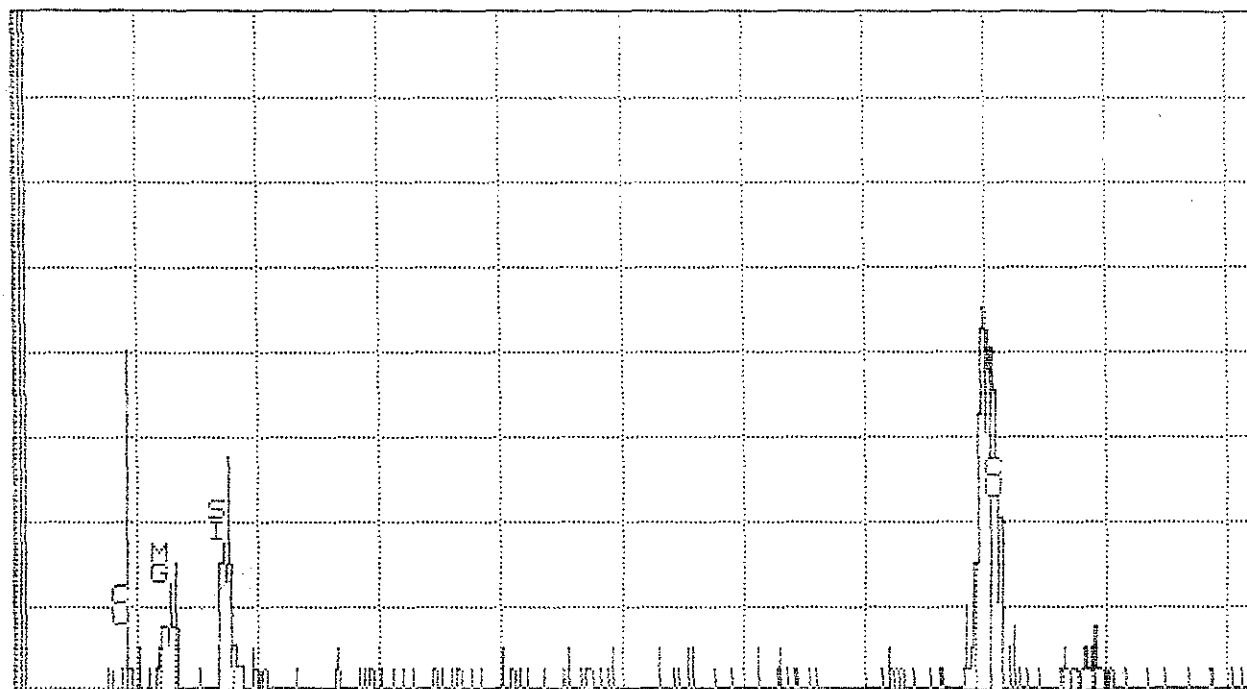
28	C	C-F	1.50	0.05	X	X	
29	C	M-F	2.20	0.20	X	X	
30	C	B	2.00	0.20	X	X	
31	C	F	1.00	0.05	X	X	Print out
32	C	B	1.70	0.10	X	X	
33	C	F	4.00	0.05	X	X	
34	C5	C	M-F	1.00	0.05	X	X
35	C	M-F	1.80	0.05	X	X	
36	C	F	1.60	0.05	X	X	
37	C	B	3.00	0.40	X	X	
38	E2	C	F	3.80	0.05	X	X
39	C	B	2.20	0.10	X	X	
40	C	B	4.10	0.10	X	X	
41	C	B	3.90	0.20	X	X	Print out
42	C	B	7.80	0.20	X	X	

M31835 017 Sample Comments:

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 08:42

Cursor: 0.040keV = 0



0.000

CU-29

VFS = 32

10.240

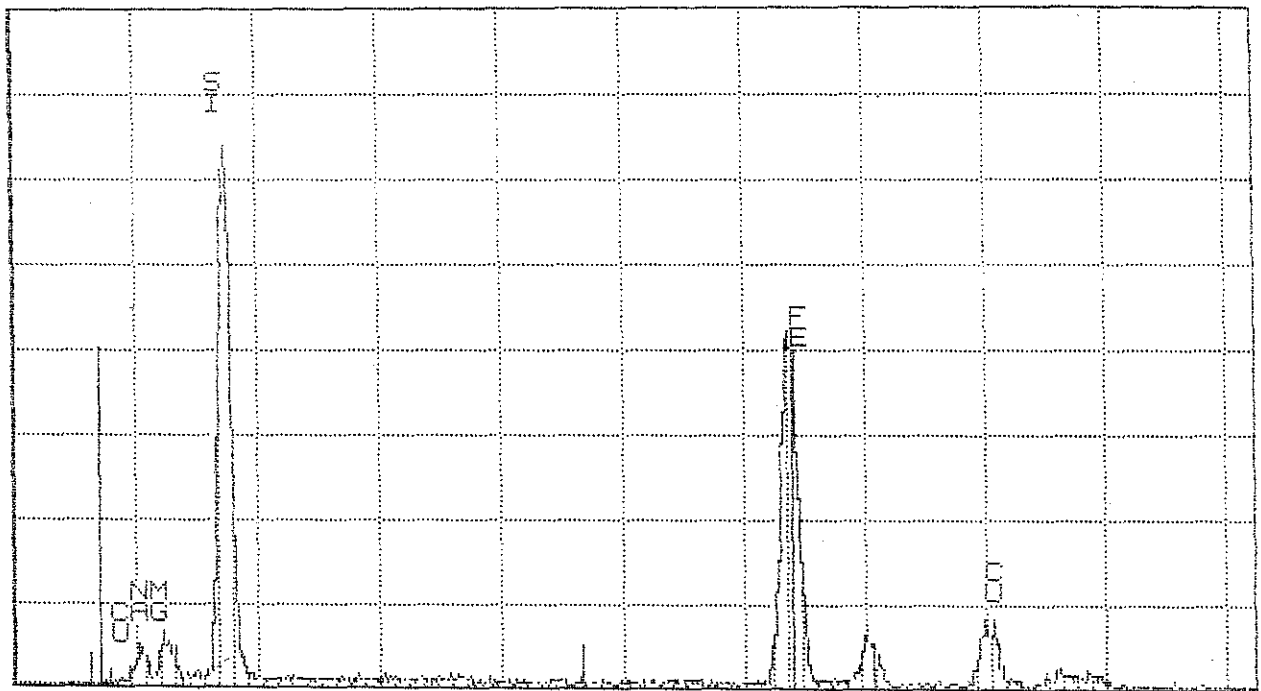
25

M31835-017 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 08:46

Cursor: 0.000keV = 0



0.000

FE-26

VFS = 512

10.240

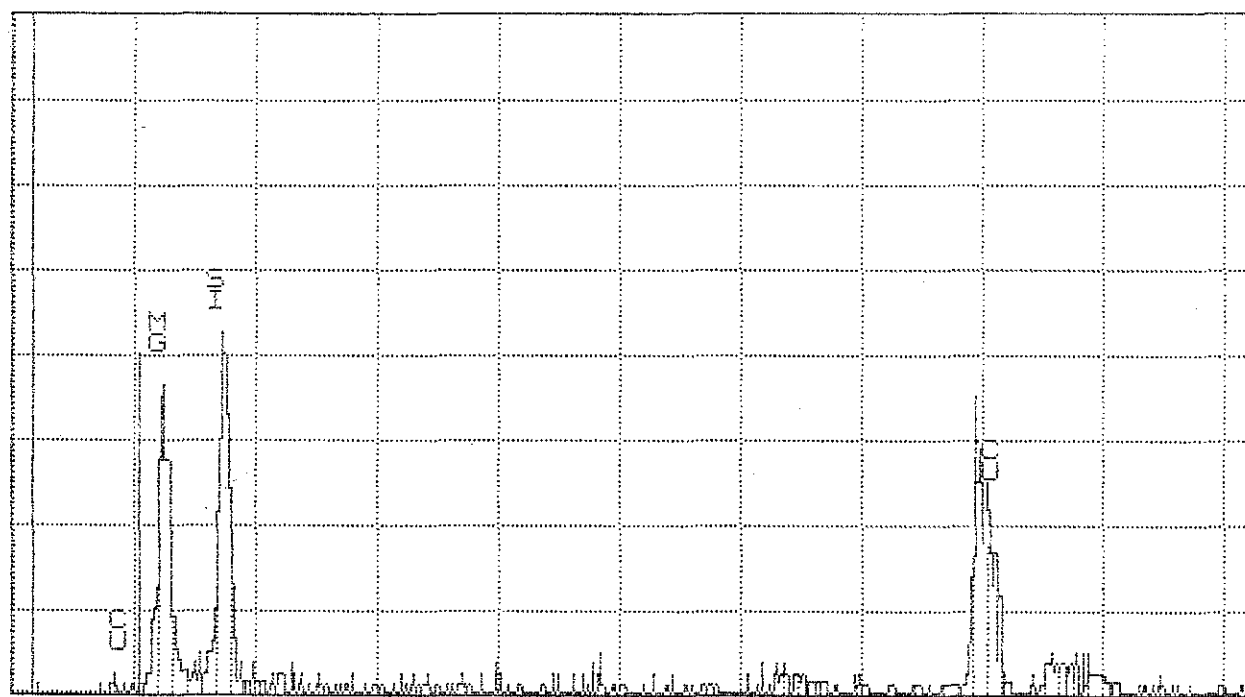
35

M31835-017 CROCIDOLITE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 08:57

Cursor: 0.160keV = 0



0.000

NA-11

VFS = 64

10.240

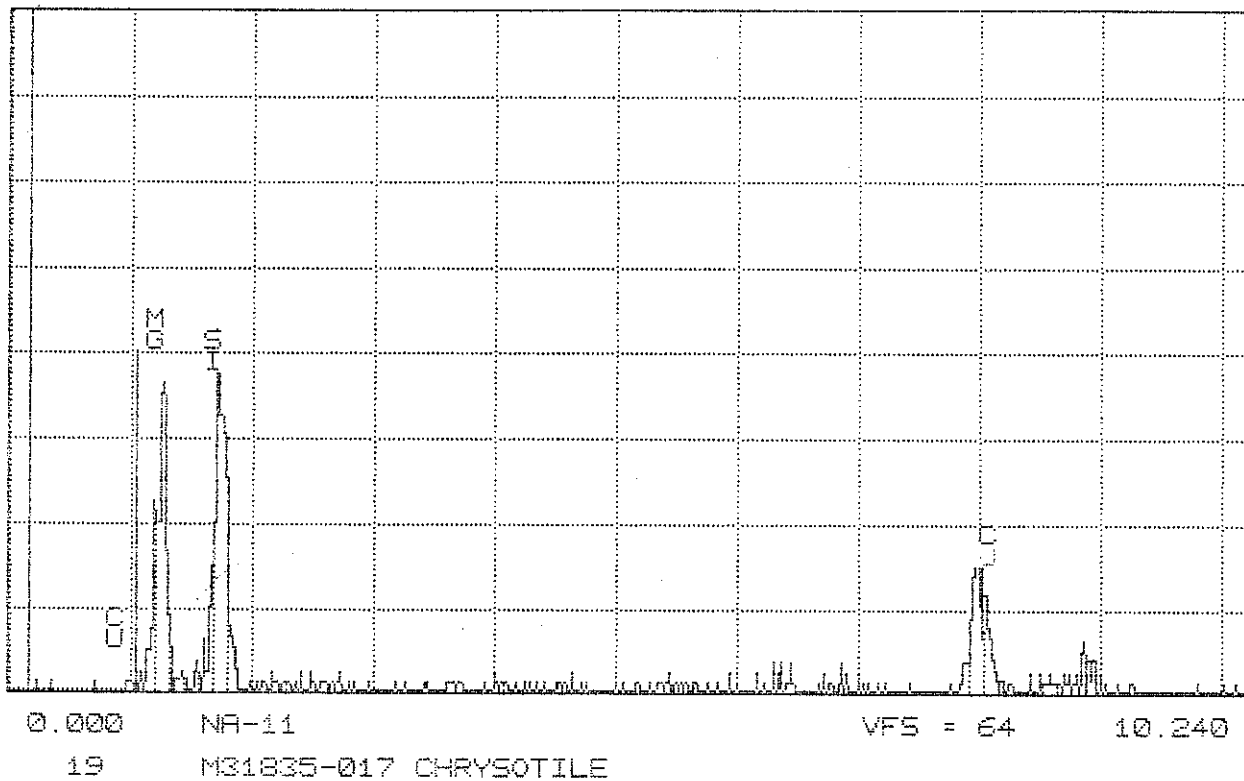
27

M31835-017 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 09:14

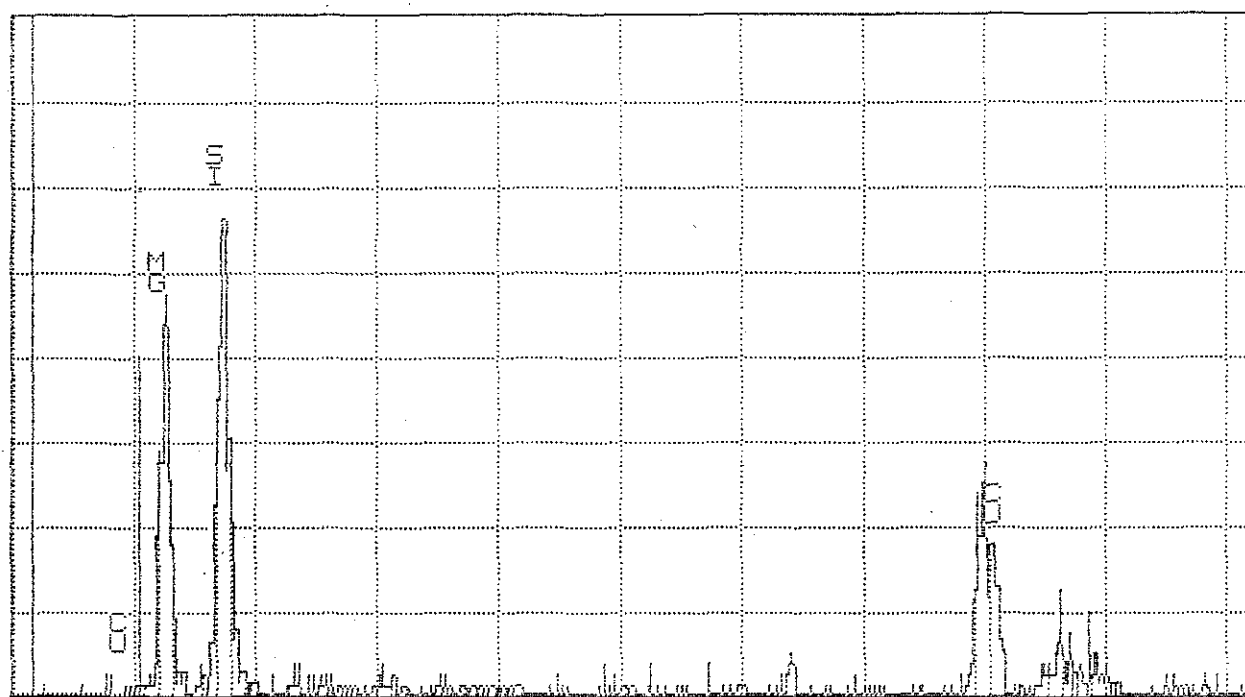
Cursor: 0.160keV = 0



MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 09:27

Cursor: 0.160keV = 0



0.000

NA-11

VFS = 64

10.240

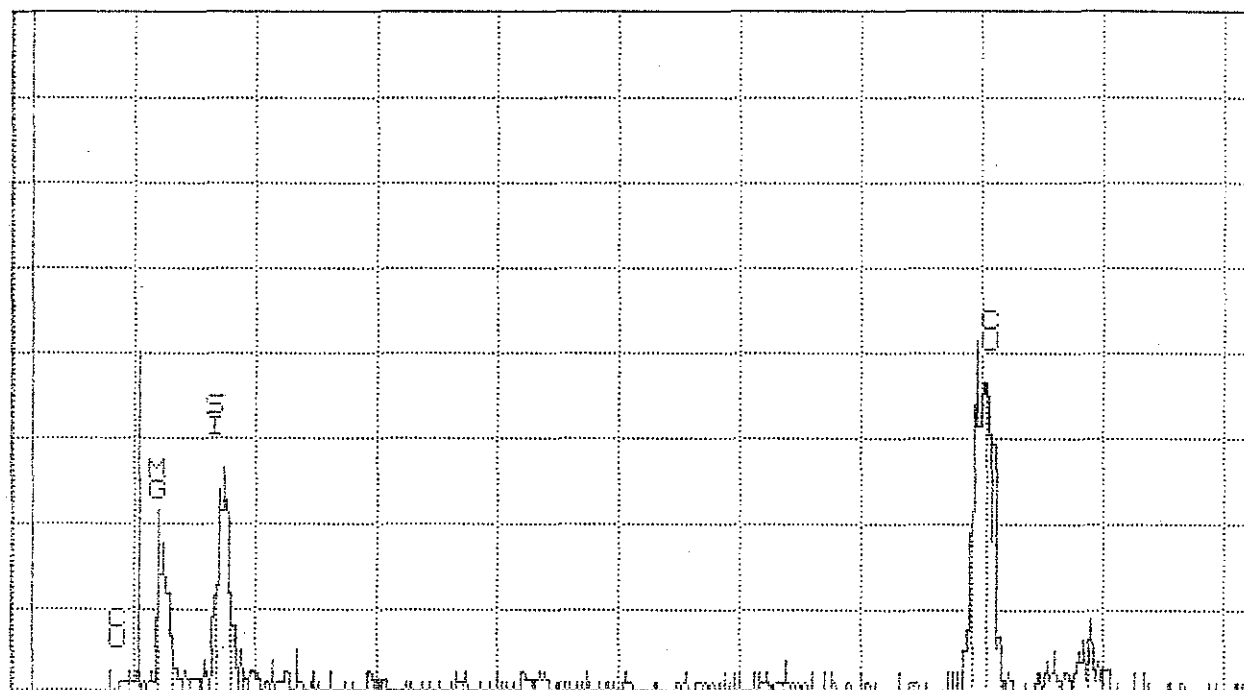
24

M31635-017 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 09:38

Cursor: 0.160keV = 0



0.000

NA-11

VFS = 64

10.240

37

M31835-017 CHRYSOTILE

MAS Indirect TEM ANALYSIS M31835-019

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-2-A

Sample Area/ Volume: 46.2 Liters
 Filter Type: MCE 47mm
 Pore size: 0.45
 Effective Filter Area: 1297
 Sample type: Indirect Air
 Analysis type: MAS indirect
 Grid Acceptance/Loading YES 1 %

Date Analyzed: 8/21/2003
 Analyst: Jayme Callan
 Scope Number: 4
 Accelerating Voltage: 100 KV
 Indicated Mag: 25 KX
 Screen Mag: 20 KX
 Grid box Number: 6623

Str < 5um: 9
 Str ≥ 5um: 3
 Total str: 12
 Str / cc > 5: 15.8795 /cc

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 106

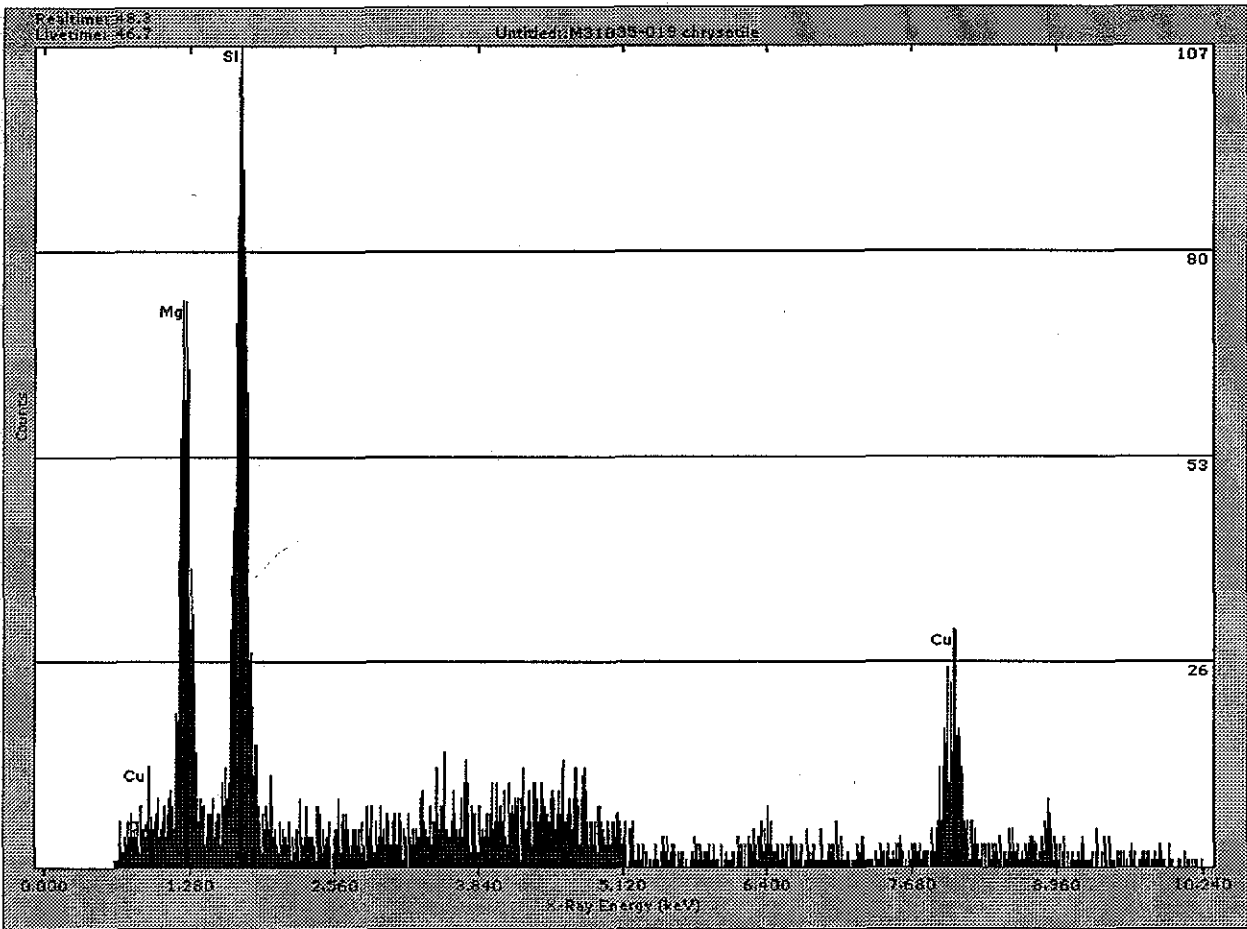
Average Grid Size: 0.010608
 Total Area Analyzed: 0.106

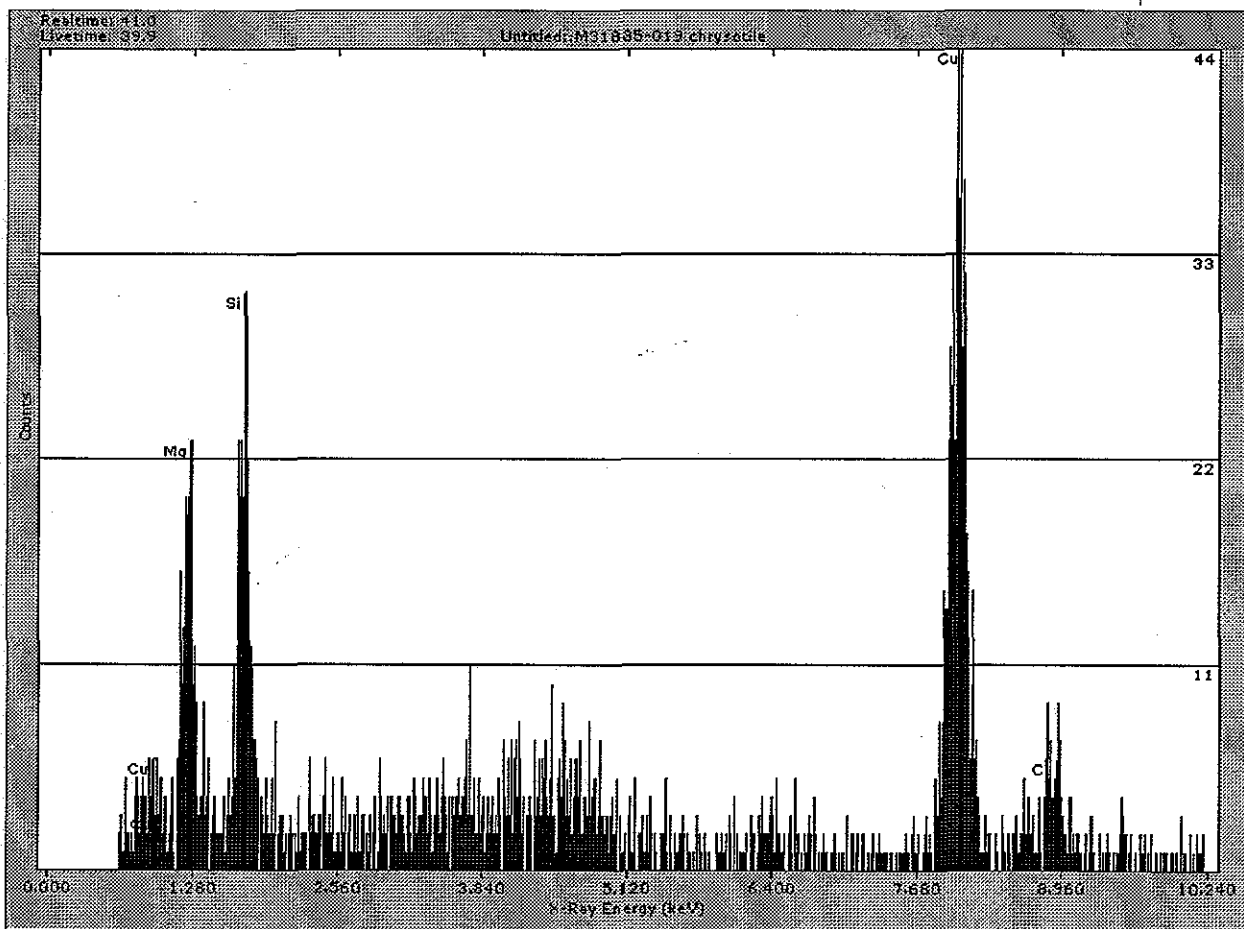
Filter used Dilution Dilution Factor
 1/ 2 10 20

Detect_cc: 5.29316
 Total cc: 63.51791

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	B6-H1	C	B	2.30	0.15	X	X	Print out
2		C	F	1.70	0.05	X	X	
	E1		NSD					
3	D10	C	F	1.60	0.05	X	X	
4		C	M-B	4.30	0.20	X	X	
5	G8	C	F	1.80	0.10	X	X	
6		C	M-F	5.20	0.30	X	X	
7		C	F	0.40	0.05	X	X	
8	J10	C	F	6.00	0.05	X	X	
9	B7-D9	C	F	1.00	0.05	X	X	
10			F	0.60	0.05	X	X	
	F7		NSD					
	H4		NSD					
11	E3	C	F	1.20	0.05	X	X	Print out
12	B6	C	B	13.90	0.80	X	X	

M31835 019 Sample Comments:





MAS Indirect TEM ANALYSIS M31835-020

CLIENT NAME: Materials Analytical Services, Inc.			CLIENT SAMPLE ID: A-2-B	
Sample Area/ Volume:	44	Liters	Date Analyzed:	8/21/2003
Filter Type:	MCE 47mm		Analyst:	Jayne Callan
Pore size:	0.45		Scope Number:	4
Effective Filter Area:	1297		Accelerating Voltage:	100
Sample type:	Indirect Air		Indicated Mag:	25
Analysis type:	MAS indirect		Screen Mag:	20
Grid Acceptance/Loading	YES	1 %	Grid box Number:	6623

Str < 5um: 6
 Str ≥ 5um: 4
 Total str: 10
 Str / cc > 5: 22.3387 /cc

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 105

Average Grid Size: 0.010557
 Total Area Analyzed: 0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	5.58467
1/ 2	10	20	Total cc:	55.84668

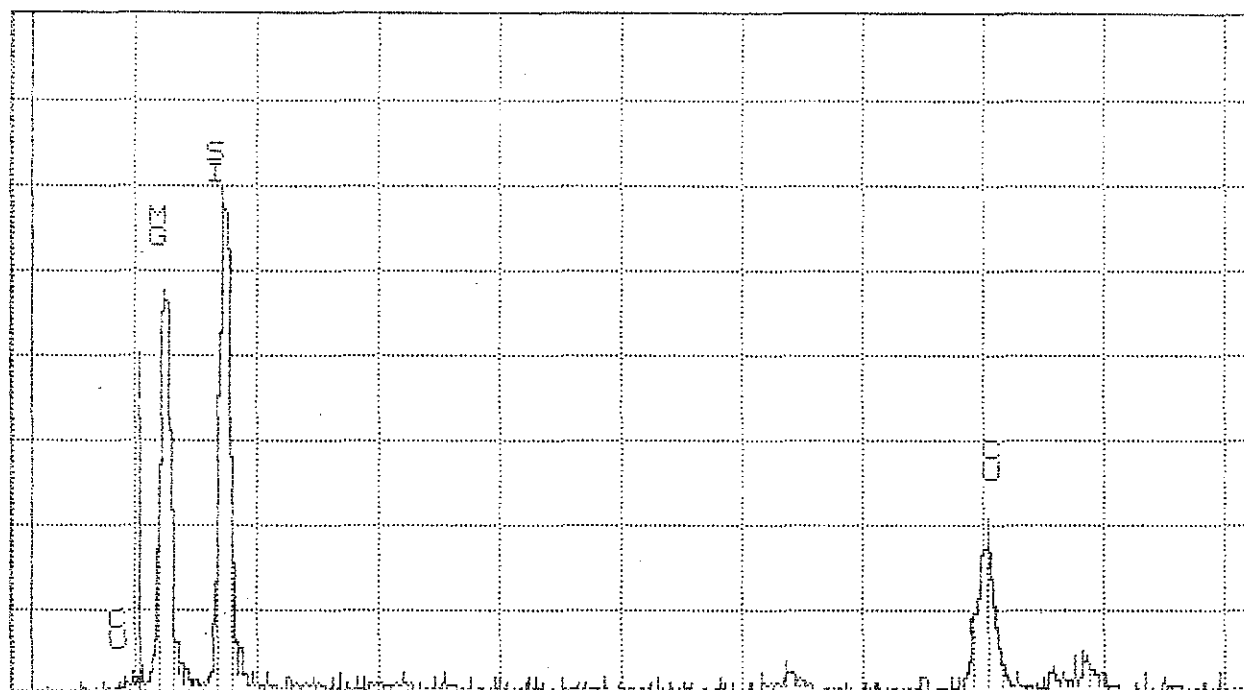
Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	D7-C4	C	B	3.60	0.20	X	X	Print out
2	B6	C	C-B	9.00	0.20	X	X	
	D10		NSD					
	H8		NSD					
3	I4	C	F	0.50	0.05	X	X	
4		C	F	1.00	0.05	X	X	
	D6-A6		NSD					
5	D6	C	B	16.00	0.25	X	X	
6		C	B	3.70	0.15	X	X	
7		C	C-B	4.00	0.30	X	X	
8		C	B	20.00	0.40	X	X	
9		C	B	12.20	0.80	X	X	
10	B4	C	C-F	1.50	0.10	X	X	Print out
	G3		NSD					
	J5		NSD					

M31835 020 Sample Comments:

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 15:35

Cursor: 0.160keV = 0



0.000

NA-11

VFS = 128

10.240

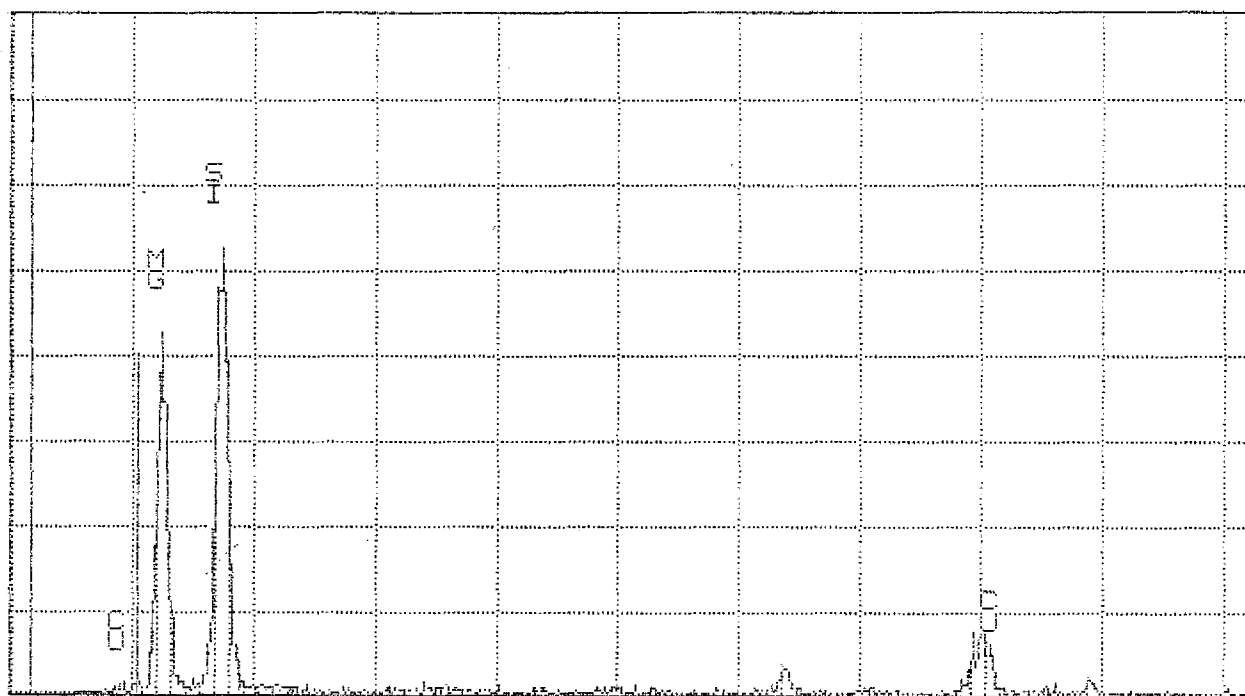
23

M31835-020 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 21-AUG-03 15:55

Cursor: 0.160keV = 0



0.000

NA-11

VFS = 256

10.240

530

M31635-020 CHRYSOTILE

MAS Indirect TEM ANALYSIS M31835-021

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-2-C	
Sample Area/ Volume:	48.4 Liters	Date Analyzed:	8/22/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	MAS indirect	Screen Mag:	20 KX
Grid Acceptance/Loading	YES 1 %	Grid box Number:	6623

Str < 5um: 6
 Str ≥ 5um: 2
 Total str: 8
 Str / cc > 5: 10.1539 /cc

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 105

Average Grid Size: 0.010557
 Total Area Analyzed: 0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	5.07697
1/ 2	10	20	Total cc:	40.61577

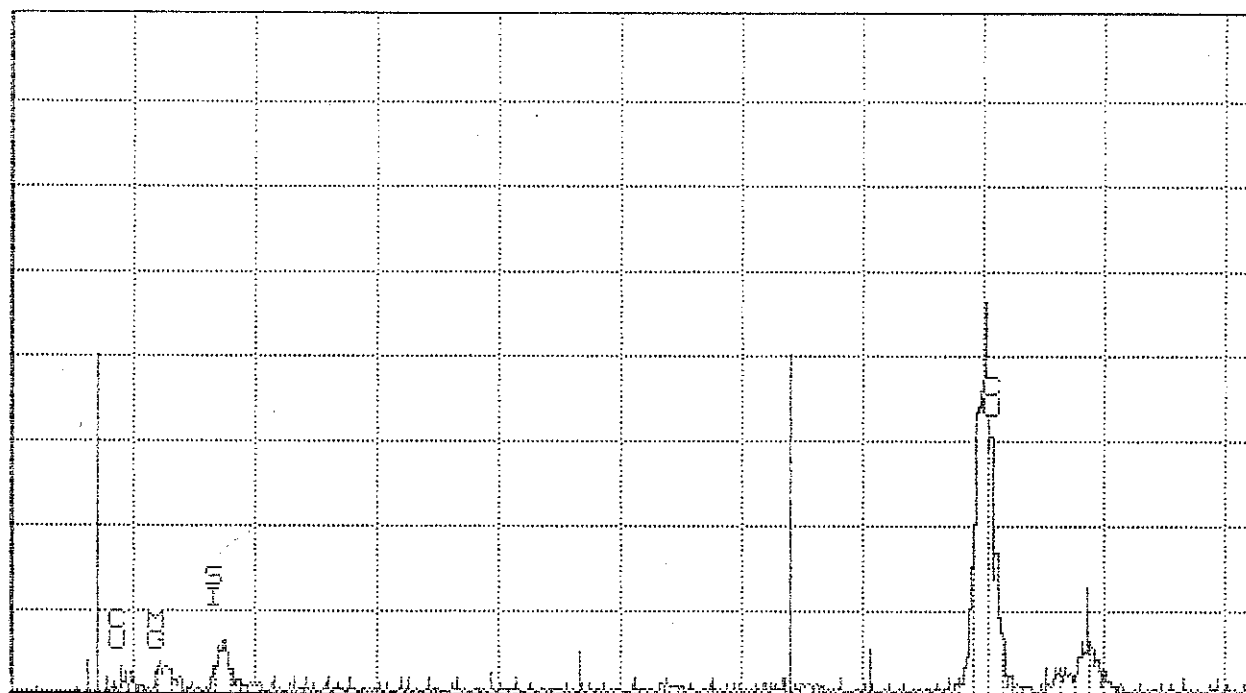
Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	A9-H9		NSD					
1	J7	C	B	1.00	0.10	X	X	Print out
	I3		NSD					
2	C4	C	F	2.00	0.10	X	X	
3		C	B	2.30	0.20	X	X	
4	A7	C	B	6.10	0.15	X	X	
5		C	B	2.40	0.10	X	X	
	B9-H9		NSD					
	I6		NSD					
6	G2	C	F	1.00	0.05	X	X	
	E4		NSD					
7	B2	C	B	0.80	0.10	X	X	
8		C	B	17.00	0.20	X	X	

M31835 021 Sample Comments:

MATERIALS ANALYTICAL SERVICES

FRI 22-AUG-03 07:33

Cursor: 0.000keV = 0



0.000

FE-26

VFS = 128

10.240

30

M31835-021 CHRYSOTILE

MAS Indirect TEM ANALYSIS M31835-022

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-2-D

Sample Area/ Volume: 48.4 Liters
 Filter Type: MCE 47mm
 Pore size: 0.45
 Effective Filter Area: 1297
 Sample type: Indirect Air
 Analysis type: MAS indirect
 Grid Acceptance/Loading YES 1%

Date Analyzed: 8/22/2003
 Analyst: Jayme Calian
 Scope Number: 4
 Accelerating Voltage: 100 KV
 Indicated Mag: 25 KX
 Screen Mag: 20 KX
 Grid box Number: 6623

Str < 5um: 11
 Str ≥ 5um: 1
 Total str: 12
 Str / cc > 5: 5.0526 /cc

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 106

Average Grid Size: 0.010608
 Total Area Analyzed: 0.106

Filter used Dilution Dilution Factor
 1/ 2 10 20

Detect_cc: 5.05256
 Total cc: 60.63073

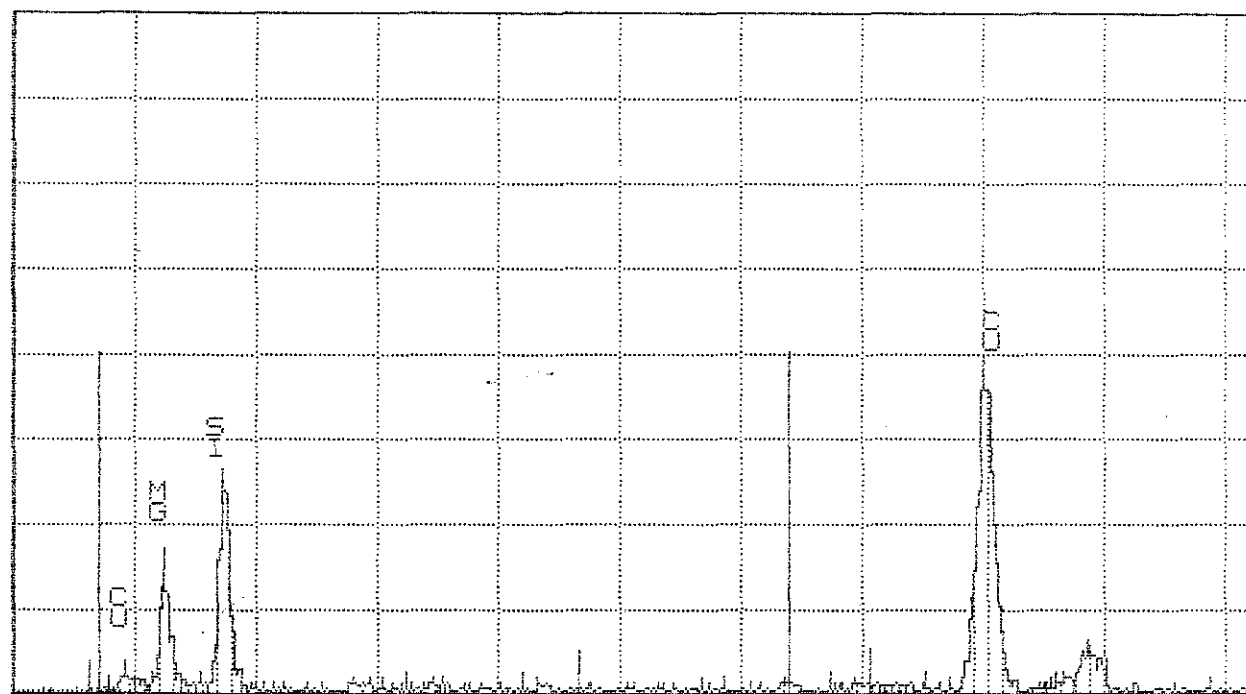
Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	D10-D8	C	M-B	1.60	0.05	X	X	Print out
2		C	F	0.80	0.05	X	X	
3		C	C-F	1.50	0.05	X	X	
4	H10	C	F	1.60	0.10	X	X	
	I7		NSD					
5	C5	C	M-F	2.20	0.15	X	X	
6	F1	C	B	3.90	0.45	X	X	
7	D9-C5	C	M-B	5.80	0.20	X	X	
8	B9	C	F	0.80	0.05	X	X	
9		CR	F	1.80	0.20	X	X	Print out
10		C	B	2.10	0.10	X	X	
	F8		NSD					
11	H6	C	B	1.90	0.20	X	X	Print out
12	I3	C	M-F	0.60	0.10	X	X	

M31835 022 Sample Comments:

MATERIALS ANALYTICAL SERVICES

FRI 22-AUG-03 08:11

Cursor: 0.000keV = 0



0.000

FE-26

VFS = 128

10.240

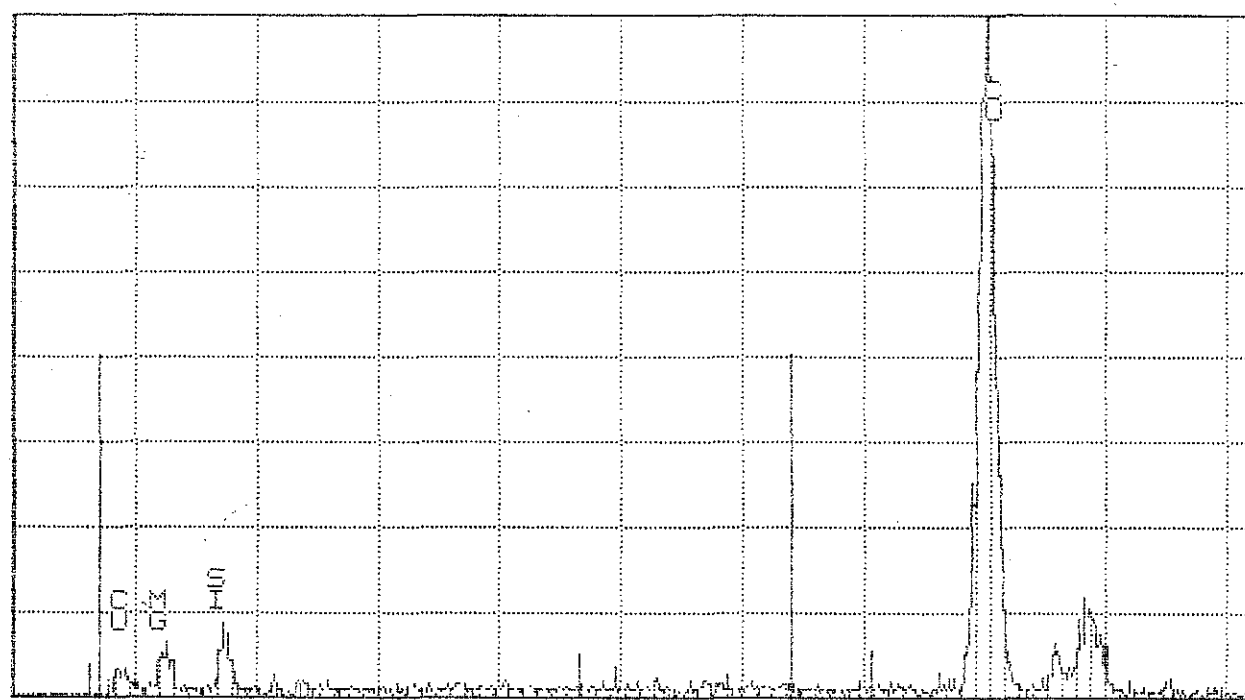
34

M31835-022 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

FRI 22-AUG-03 08:37

Cursor: 0.000keV = 0



0.000

FE-26

VFS = 256

10.240

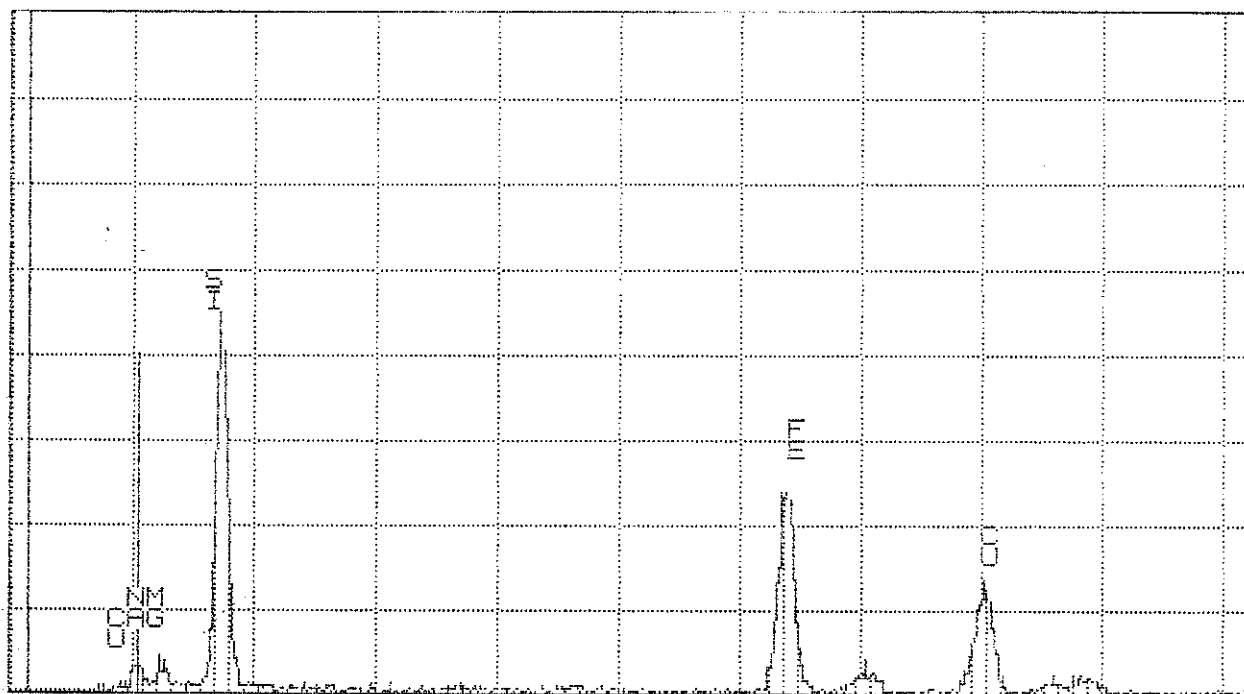
896

M31835-022 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

FRI 22-AUG-03 08:29

Cursor: 0.140keV = 0



0.000

NA-11

VFS = 512

10.240

30

M31835-022 CROCIDOLITE

MAS Indirect TEM ANALYSIS M31835-023

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: ASFB-1	
Sample Area/ Volume:	0 Liters	Date Analyzed:	8/19/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	MAS indirect	Screen Mag:	20 KX
Grid Acceptance/Loading	YES 1%	Grid box Number:	6623

Str < 5um:	0
Str ≥ 5um:	0
Total str:	0
Str / cc > 5:	#Error /cc

Number of grids:	2	#1:	101	#3:	102
Number of openings:	10	#2:	103	#4:	106

Average Grid Size:	0.010608
Total Area Analyzed:	0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	#Div/0!
1/ 2	30	6.666667	Total cc:	#Error

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	D10-E4		NSD					
	B3		NSD					
	A6		NSD					
	D7		NSD					
	F8		NSD					
	D9-H6		NSD					
	J5		NSD					
	G8		NSD					
	C7		NSD					
	B4		NSD					

M31835 023 Sample Comments:

MAS Indirect TEM ANALYSIS M31835-024

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: ASBF-2	
Sample Area/ Volume:	0	Liters	
Filter Type:	MCE 47mm		
Pore size:	0.45		
Effective Filter Area:	1297		
Sample type:	Indirect Air		
Analysis type:	MAS Indirect		
Grid Acceptance/Loading	YES	1 %	
Date Analyzed:	8/19/2003		
Analyst:	Jayme Callan		
Scope Number:	4		
Accelerating Voltage:	100		
Indicated Mag:	25		
Screen Mag:	20		
Grid box Number:	6623		

Str < 5um:	0
Str ≥ 5um:	0
Total str:	0
Str / cc > 5:	#Error /cc

Number of grids:	2	#1:	101	#3:	102
Number of openings:	10	#2:	103	#4:	105

Average Grid Size:	0.010557
Total Area Analyzed:	0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	#Div/0!
1/ 2	30	6.666667	Total cc:	#Error

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	C9-F2		NSD					
	D2		NSD					
	H9		NSD					
	C10-D7		NSD					
	E8		NSD					
	G8		NSD					
	G6		NSD					
	I4		NSD					
	J2		NSD					
	D2		NSD					

M31835 024 Sample Comments:

SECTION 5

MATERIALS ANALYTICAL SERVICES PROJECT LOG

Client Code: **MASCORP**

MAS ID: M31850
Client Name: Materials Analytical Services, Inc.
Project Name: Cutting CA Pipe JM
Logged By: dmazzaferro

Client Job No: _____
Client PO: _____
Date In: 8/6/03

TRANSPORT INFORMATION:

Submitted By: <u>Mike Mount</u>	Documents: <u>COC</u>
Delivery By: <u>Hand Delivery</u>	
Received By: <u>dmazzaferro</u>	Comments for COC: _____
Condition: <u>good</u>	

CONTACT INFORMATION:

Contact: <u>Richard Hatfield</u>	Work Phone: <u>(770) 866-3204</u>	Ext: _____
Title: <u>First Name: Last Name: Suffix</u>	Other Phone: _____	Ext: _____
Mr. <u>Richard Hatfield</u>	Fax: <u>(770) 866-3259</u>	

Page 1 of 1

M31850

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
001	F-1-RH	56			
002	F-1-MM	60			
003	F-2-MM	67			
004	F-2-RH	50			

SIGNATURES

RECEIVED BY: *dmazzaferro*

REVIEWED BY: *dmazzaferro*

PREPARED BY: *dmazzaferro*

ANALYZED BY: *James Cella*

REPORTED BY: _____

DEPOSED BY: _____

INDUSTRIAL HYGIENE AIR SAMPLING CHAIN OF CUSTODY



3945 Lakefield Court
Suwanee, GA 30024
PH: (770) 866-3200
FAX: (770) 866-3259

Co. Name

Address

PH:

FAX:

Project Number:

Project Name:

Work Area Description:

Project Representative:

Sampling Date:

Sheet 2 of 2

Date	Sample No.	Sample Location	Sample Media	Analysis Desired	Start Time	Stop Time	Total Time (Minutes)	Average Flow Rate (LPM)	Air Volume (Liters)
8/6	A-2-A	NE Quad - After	MCE	PCM / TEM	16:15	16:37	22	2.1	46.
	A-2-B	SE						2.0	44
	A-2-C	SW						2.2	48.4
	A-2-D	NW						2.2	48.4
	ASFB-1	Blank	MCE	PCM / TEM	-	-	0	0	0
	ASFB-2				-	-	0	0	0
8/6	DS-B	NA	MCE	TEM	-	-	-	-	0
8/6	DS-1	from pipe before	MCE		-	-	2	2.0	80cm ²
8/6	DS-2	from pipe after	MCE		-	-	2	2.0	80cm ²
8/6	F-1-RH	from shirt before	fabric	TEM	-	-	-	-	
8/6	F-1-MM				-	-	-	-	
8/6	F-2-MM	after			-	-	-	-	
8/6	F-2-RH				-	-	-	-	

First Transfer By: *Michael D. Nantz*
Second Transfer By:
Third Transfer By:

CHAIN OF CUSTODY

Initial Shipment Date:

Mode of Transfer

Log-in Date

Received By

8/6/03

[Signature]

TEM SAMPLE DATA

M31850

Page 1 of 1

Prep SOP#: MT-017
Prep Status: Complete
Sample Type: Fabric
Analysis type: Dust

prep_date: 8/13/03 Prep Tech: dmazzaferro

Archival Information

Slides: 180 Filters: Bottles: 946 Gld_box: 6622

Archive Comments:

Disposal Comments:

Reprep Dates

Sample Number	Sample ID	Area		Filter Portion	Total Susp	Filtered Volumes in m					Filter Type:		
						#1	#2	#3	#4	#5			
000	lab blank	0	cm2	1/	1	200							
						Dilution Factors	100						MCE 47
							2						1297
001	F-1-RH	56	cm2	1/	1	250							
						Dilution Factors	100						MCE 47
							2.5						1297
002	F-1-MM	60	cm2	1/	1	250							
						Dilution Factors	100						MCE 47
							2.5						1297
003	F-2-MM	67	cm2	1/	1	250							
						Dilution Factors	10	30					MCE 47
							25	8.333					1297
004	F-2-RH	50	cm2	1/	1	250							
						Dilution Factors	10	30					MCE 47
							25	8.333					1297

TEM DUST ANALYSIS

M31850 000

Materials Analytical Services, Inc.
Cutting CA Pipe JM

Client Sample ID: lab blank

Sample Area/ Volume: 0 cm²

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Fabric

Analysis type: Dust

Grid Acceptance YES 1 %

Date Analyzed: 8/28/2003

Analyst: Jayme Callan

Scope Number: 4

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6622

Str < 5um: 0
Str ≥ 5um: 0
Total Str: 0

Number of grids: 2

#1: 101

#3:

Average Grid Size: 0.010557

Number of openings: 10

#2: 103

#4:

Total Area Analyzed: 0.106

Volume Filtered 100 ml

Dilution Factor 2

Str / sq ft 0.000E+00

Str / cm² 0.000E+00

Str / sq ft ≥ 5 0.000E+00

Str / cm² ≥ 5 0.000E+00

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:	Photo:	Sketch:
	A2-C4		NSD					☐	☐	☐
	D2		NSD					☐	☐	☐
	H1		NSD					☐	☐	☐
	J9		NSD					☐	☐	☐
	F8		NSD					☐	☐	☐
	A1-F4		NSD					☐	☐	☐
	C2		NSD					☐	☐	☐
	A5		NSD					☐	☐	☐
	E7		NSD					☐	☐	☐
	G6		NSD					☐	☐	☐

M31850 000

TEM DUST ANALYSIS

M31850 001

Materials Analytical Services, Inc.
Cutting CA Pipe JM

Client Sample ID: F-1-RH

Sample Area/ Volume: 56 cm2

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Fabric

Analysis type: Dust

Grid Acceptance YES 1 %

Date Analyzed: 8/28/2003

Analyst: Jayme Callan

Scope Number: 4

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6622

Str < 5um: 0
Str ≥ 5um: 0
Total Str: 0

Number of grids: 2

#1: 101

#3: 102

Average Grid Size: 0.010608

Number of openings: 10

#2: 103

#4: 106

Total Area Analyzed: 0.106

Volume Filtered 100 ml

Dilution Factor 2.5

Str / sq ft 0.000E+00

Str / cm2 0.000E+00

Str / sq ft ≥ 5 0.000E+00

Str / cm2 ≥ 5 0.000E+00

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:	Photo:	Sketch:
	B1-C5		NSD					☐	☐	☐
	B2		NSD					☐	☐	☐
	E4		NSD					☐	☐	☐
	F7		NSD					☐	☐	☐
	I9		NSD					☐	☐	☐
	B2-H5		NSD					☐	☐	☐
	F4		NSD					☐	☐	☐
	E7		NSD					☐	☐	☐
	C4		NSD					☐	☐	☐
	I10		NSD					☐	☐	☐

M31850 001

TEM DUST ANALYSIS

M31850 002

Materials Analytical Services, Inc.
Cutting CA Pipe JM

Client Sample ID: F-1-MM

Sample Area/ Volume: 60 cm²
Filter Type: MCE 47mm
Pore size: 0.45
Effective Filter Area: 1297
Sample type: Fabric
Analysis type: Dust
Grid Acceptance YES 1 %

Date Analyzed: 8/28/2003
Analyst: Jayme Callan
Scope Number: 4
Accelerating Voltage: 100 KV
Indicated Mag: 25 KX
Screen Mag: 20 KX
Grid_box: 6622

Str < 5um: 0
Str ≥ 5um: 0
Total Str: 0

Number of grids: 2 #1: 101 #3: 102
Number of openings: 10 #2: 103 #4: 105

Average Grid Size: 0.018557
Total Area Analyzed: 0.106

Volume Filtered 100 ml
Dilution Factor 2.5

Str / sq ft 0.000E+00

Str / cm² 0.000E+00

Str / sq ft ≥ 5 0.000E+00

Str / cm² ≥ 5 0.000E+00

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:	Photo:	Sketch:
	C5-B1		NSD					☐	☐	☐
	A2		NSD					☐	☐	☐
	C4		NSD					☐	☐	☐
	A5		NSD					☐	☐	☐
	D1		NSD					☐	☐	☐
	C4-I9		NSD					☐	☐	☐
	G10		NSD					☐	☐	☐
	D8		NSD					☐	☐	☐
	B6		NSD					☐	☐	☐
	C4		NSD					☐	☐	☐

M31850 002

TEM DUST ANALYSIS

M31850 003

Materials Analytical Services, Inc.
Cutting CA Pipe JM

Client Sample ID: F-2-MM

Sample Area/ Volume: 67 cm²

Date Analyzed: 8/28/2003

Filter Type: MCE 47mm

Analyst: Jayne Callan

Pore size: 0.45

Scope Number: 4

Effective Filter Area: 1297

Accelerating Voltage: 100 KV

Sample type: Fabric

Indicated Mag: 25 KX

Analysis type: Dust

Screen Mag: 20 KX

Grid Acceptance: YES 1 %

Grid box: 6622

Str < 5um: 12

Number of grids: 2

#1: 101

#3: 102

Average Grid Size: 0.010557

Str ≥ 5um: 4

Number of openings: 10

#2: 103

#4: 105

Total Area Analyzed: 0.106

Total Str: 16

Volume Filtered 10 ml

Str / sq ft 6.815E+07

Str / cm² 7.335E+04

Dilution Factor 25

Str / sq ft ≥ 5 1.704E+07

Str / cm² ≥ 5 1.834E+04

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:	Photo:	Sketch:
1	D1-E9	C	F	1.00	0.05	X	X	☒	☐	☐
2		C	B	14.20	0.40	X	X	☐	☐	☐
3	G10	C	F	2.40	0.05	X	X	☐	☐	☐
4	I6	C	F	1.80	0.15	X	X	☐	☐	☐
5	D5	C	F	3.50	0.20	X	X	☐	☐	☐
	J4		NSD					☐	☐	☐
6	D2-G2	C	B	6.00	0.40	X	X	☐	☐	☐
	J6		NSD					☐	☐	☐
7	H8	C	F	1.95	0.05	X	X	☐	☐	☐
8		C	F	4.20	0.05	X	X	☐	☐	☐
9		C	F	1.60	0.05	X	X	☐	☐	☐
10		C	F	3.60	0.03	X	X	☐	☐	☐
5.7	C7	C	B	4.00	0.15	X	X	☒	☐	☐
12		C	B	5.70	0.20	X	X	☐	☒	☐
13	E5	C	B	8.20	0.20	X	X	☐	☐	☐
14		C	C-B	2.10	0.15	X	X	☐	☐	☐

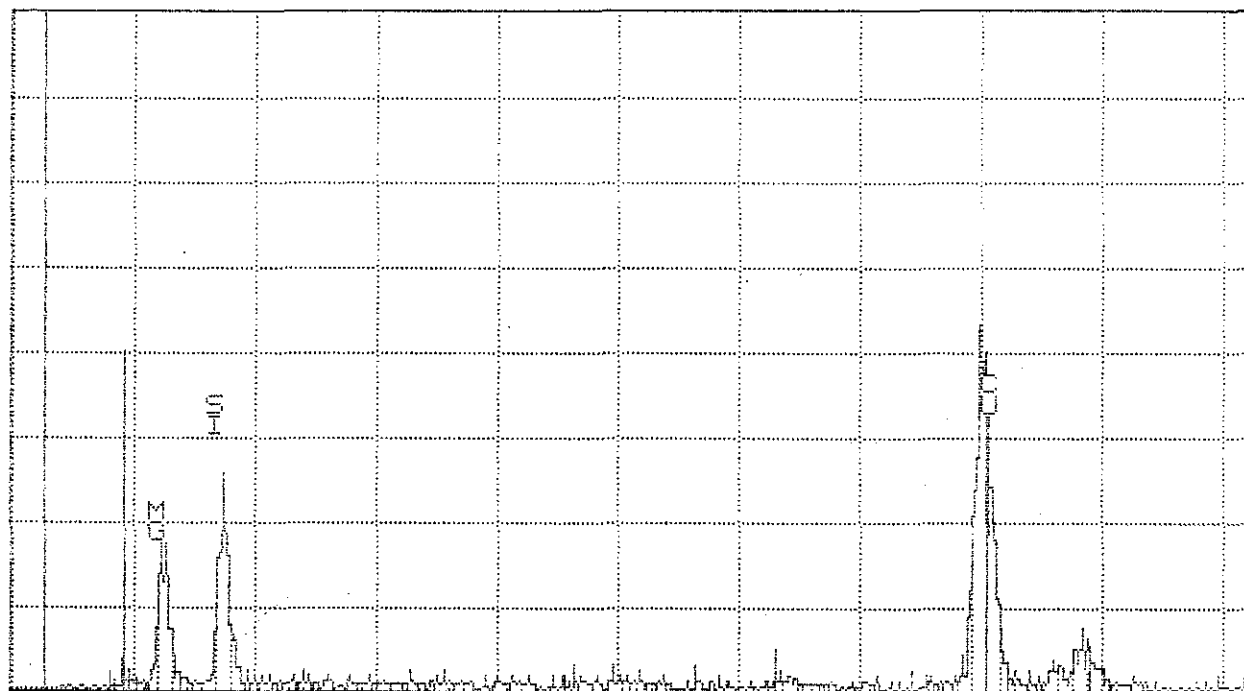
15	C	F	1.00	0.05	X	X	☐	☐	☐
16	C	F	2.10	0.05	X	X	☐	☐	☐

M31850 003

MATERIALS ANALYTICAL SERVICES

THU 28-AUG-03 05:58

Cursor: 0.260keV = 0



0.000

Cu-29

VFS = 128

10.240

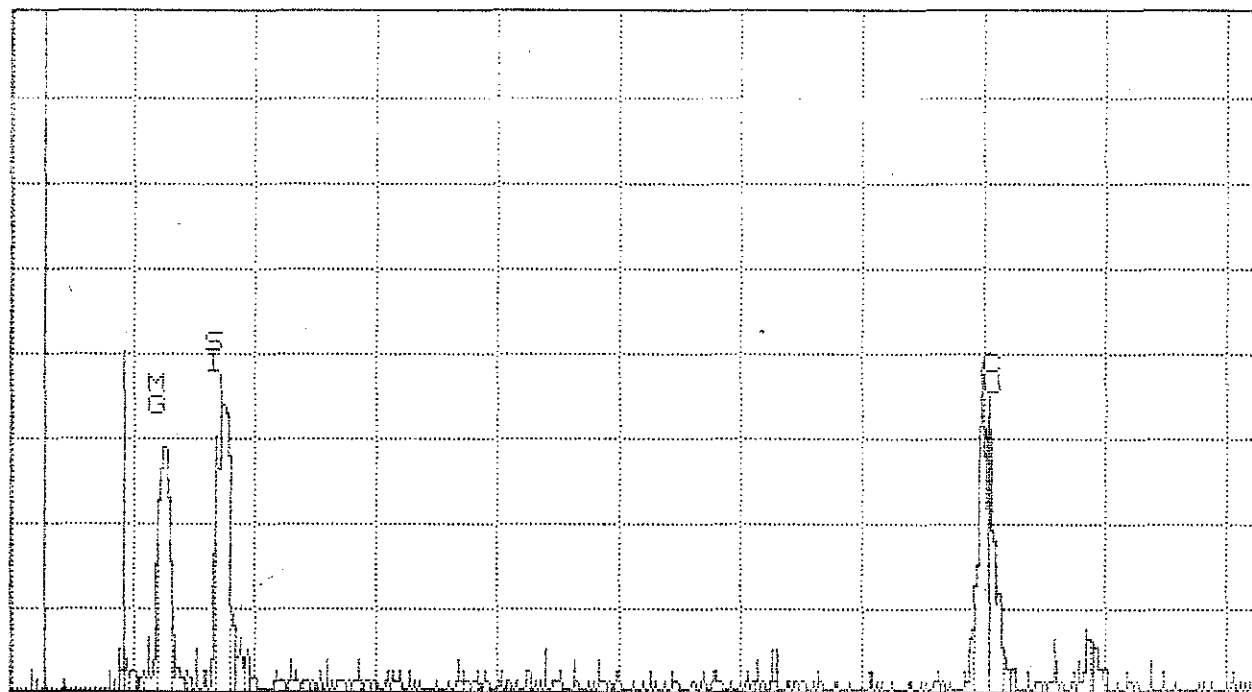
41

M31850-003 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

THU 28-AUG-03 06:25

Cursor: 0.260keV = 0



0.000

CU-29

VFS = 64

10.240

23

M31650-003 CHRYSOTILE

TEM DUST ANALYSIS

M31850 004

Materials Analytical Services, Inc.
Cutting CA Pipe JM

Client Sample ID: F-2-RH

Sample Area/ Volume: 50 cm²

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Fabric

Analysis type: Dust

Grid Acceptance YES 1 %

Date Analyzed: 8/28/2003

Analyst: Jayne Callan

Scope Number: 4

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6622

Str < 5um: 21

Str ≥ 5um: 5

Total Str: 26

Number of grids: 2

#1: 101

#3: 102

Average Grid Size: 0.010557

Number of openings: 10

#2: 103

#4: 105

Total Area Analyzed: 0.106

Volume Filtered 10 ml

Dilution Factor 25

Str / sq ft 1.484E+08

Str / cm² 1.597E+05

Str / sq ft ≥ 5 2.854E+07

Str / cm² ≥ 5 3.072E+04

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:	Photo:	Sketch:
1	B4-F4	C	F	2.20	0.40	X	X	☒	☐	☐
2		C	F	1.90	0.05	X	X	☐	☐	☐
3		C	B	1.00	0.15	X	X	☐	☐	☐
4	H2	C	F	3.80	0.05	X	X	☐	☐	☐
5		C	F	2.10	0.05	X	X	☐	☐	☐
6	I5	C	F	3.30	0.05	X	X	☐	☐	☐
7		C	C-F	1.70	0.03	X	X	☐	☐	☐
8		C	B	4.40	0.15	X	X	☐	☐	☐
9		C	F	2.00	0.05	X	X	☐	☐	☐
10		C	B	2.00	0.10	X	X	☐	☐	☐
11	J7	C	F	1.00	0.05	X	X	☒	☐	☐
12		C	F	4.10	0.10	X	X	☐	☐	☐
13	H10	C	C-F	2.00	0.10	X	X	☐	☐	☐
14		C	B	5.70	0.40	X	X	☐	☐	☐
15		C	B	4.80	0.15	X	X	☐	☐	☐
16	A4-J4	C	F	2.00	0.20	X	X	☐	☐	☐

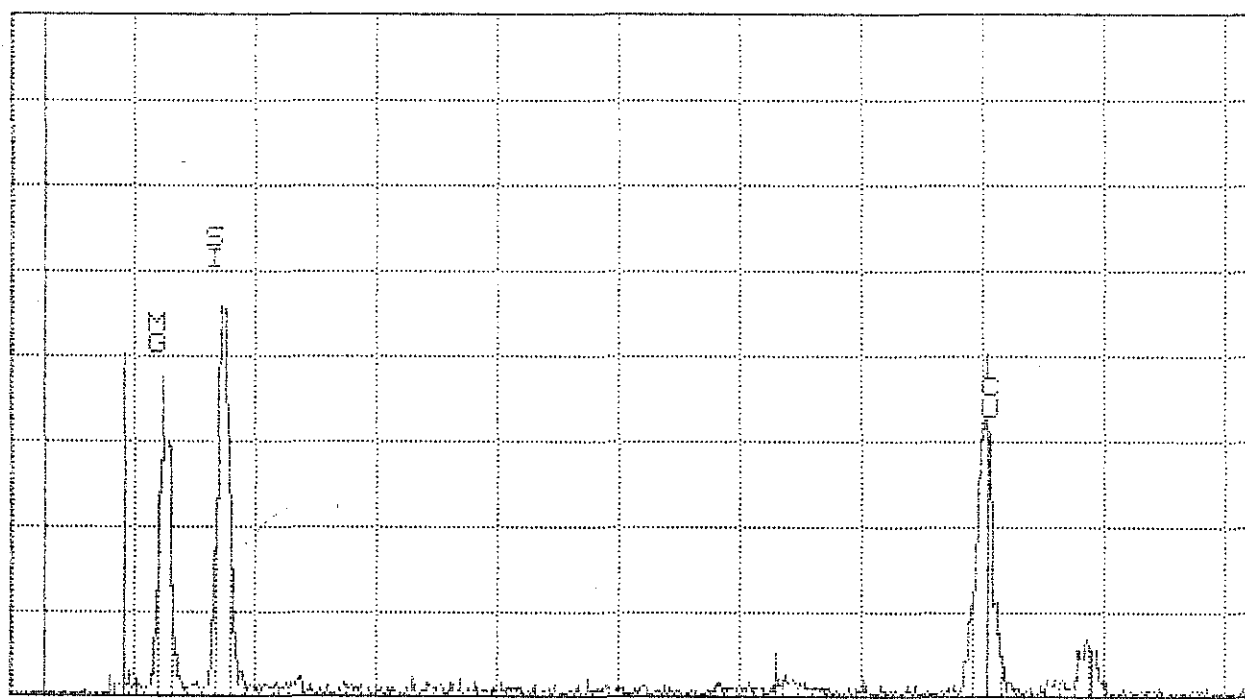
17		C	B	2.00	0.15	X	X	☐	☐	☐
18		C	F	1.20	0.05	X	X	☐	☐	☐
19		C	F	2.20	0.05	X	X	☐	☐	☐
20	H3	C	B	9.00	0.15	X	X	☐	☐	☐
21	J2	C	B	3.00	0.20	X	X	☒	☐	☐
22		C	B	8.20	0.20	X	X	☐	☐	☐
23		C	F	2.00	0.10	X	X	☐	☐	☐
24	II	C	F	1.80	0.05	X	X	☐	☐	☐
25		C	B	8.30	0.40	X	X	☐	☐	☐
26	F1	C	B	13.00	0.40	X	X	☐	☐	☐

M31850 004

MATERIALS ANALYTICAL SERVICES

THU 28-AUG-03 06:41

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0.000

CU-29

VFS = 256

10.240

32

M31850-004 CHRYSOTILE

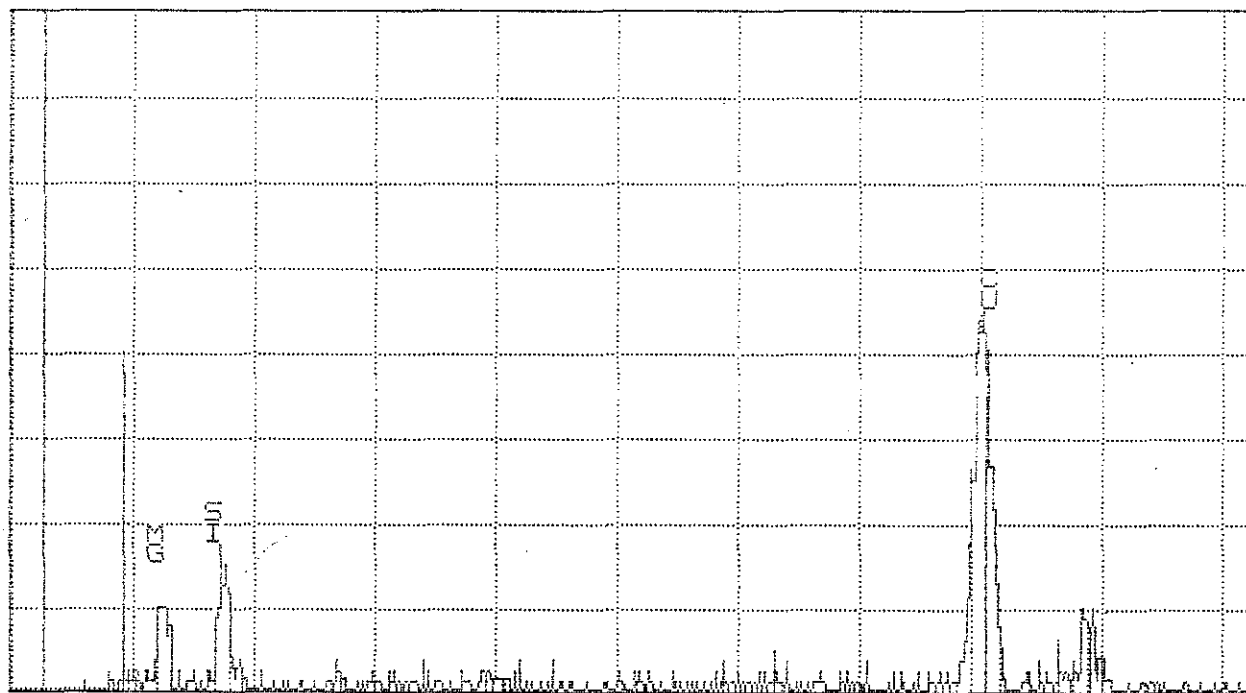
THU 28-AUG-03 07:01

VFS = 64 10.240

CU-29

323

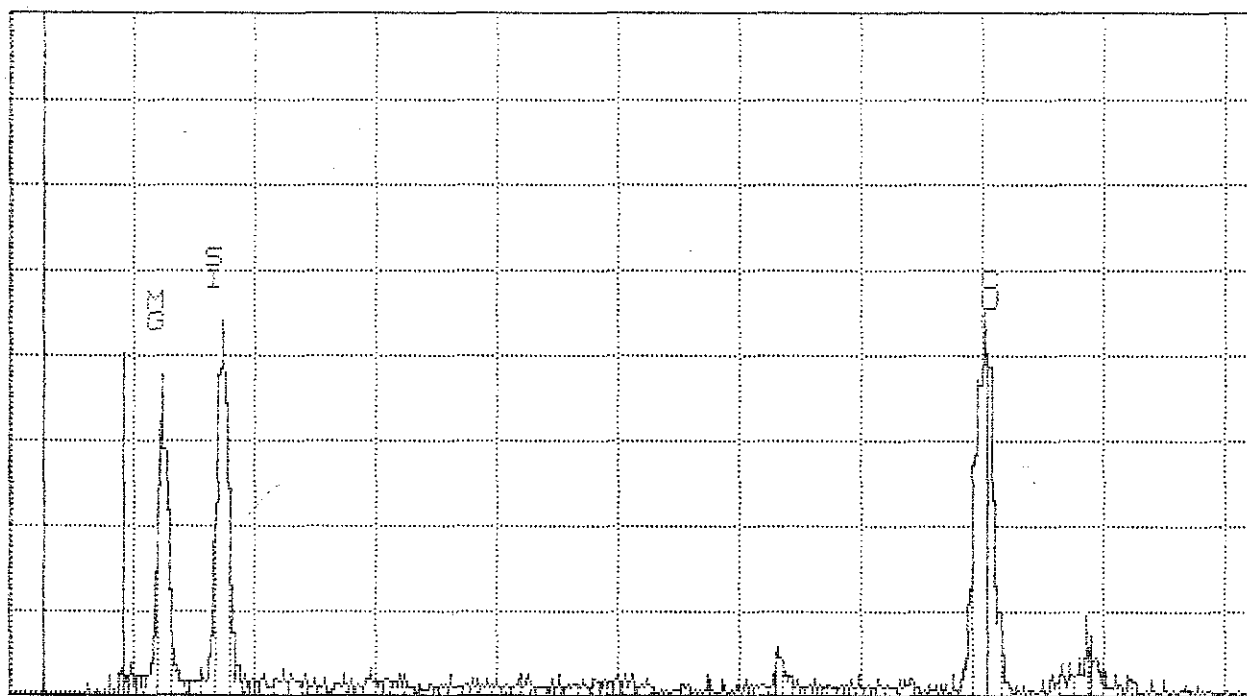
M31850-004 CHRYSOTILE



MATERIALS ANALYTICAL SERVICES

THU 28-AUG-03 07:15

Cursor: 0.260keV = 0



0.000

CU-29

VFS = 128

10.240

24

M31850-004 CHRYSOTILE

SECTION 6

MATERIALS ANALYTICAL SERVICES PROJECT LOG

Client Code: MASCORP

MAS ID: M31851
Client Name: Materials Analytical Services, Inc.
Project Name: Cutting CA Pipe JM
Logged By: dmazzaferro

Client Job No: _____
Client PO: _____
Date In: 8/6/03

TRANSPORT INFORMATION:

Submitted By:	<u>Mike Mount</u>	Documents:	<u>COC</u>
Delivery By:	<u>Hand Delivery</u>		
Received By:	<u>dmazzaferro</u>	Comments for COC:	
Condition:	<u>good</u>		

CONTACT INFORMATION:

Contact:	<u>Richard Hatfield</u>	Work Phone:	<u>(770) 866-3204</u>	Ext:	
Title:	First Name: Last Name:	Suffix	Other Phone:	Ext:	
Mr.	Richard Hatfield		Fax:	<u>(770) 866-3259</u>	

Page 1 of 1

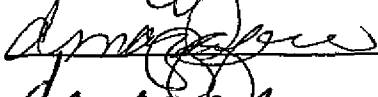
M31851

SAMPLE INFORMATION:

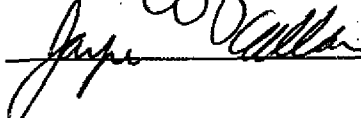
#	Client ID	Volume	#	Client ID	Volume
001	DS-B	0			
002	DS-1	80			
003	DS-2	80			

SIGNATURES

RECEIVED BY: 

REVIEWED BY: 

PREPARED BY: 

ANALYZED BY: 

REPORTED BY: _____

DEPOSED BY: _____

TEM SAMPLE DATA

M31851

Page 1 of 1

Prep SOP#: MT-003
Prep Status: Complete
Sample Type: Dust
Analysis type: Dust

prep_date: 8/13/03 Prep Tech: dmazzaferro

Archival Information

Slides: 180 Filters: Bottles: 946 Gld_box: 6615

Archive Comments:

Disposal Comments:

Reprep Dates

Sample Number	Sample ID	Area	Filter Portion	Total Susp	#1	#2	#3	#4	#5	Filter Type:
000	lab blank	0	cm2 1/ 1	100	30					MCE 47mm
					Dilution Factors	3.333				1297
001	DS-B	0	cm2 1/ 1	100	30					MCE 47mm
					Dilution Factors	3.333				1297
002	DS-1	80	cm2 1/ 1	100	10	30				MCE 47mm
					Dilution Factors	10	3.333			1297
003	DS-2	80	cm2 1/ 1	100	10	30				MCE 47mm
					Dilution Factors	10	3.333			1297

INDUSTRIAL HYGIENE AIR SAMPLING CHAIN OF CUSTODY



3945 Lakefield Court
Suwanee, GA 30024
PH: (770) 866-3200
FAX: (770) 866-3259

Co. Name _____

Address _____

PH: _____

FAX: _____

Project Number: _____

Project Name: _____

Work Area Description: _____

Project Representative: _____

Sampling Date: _____

Sheet 2 of 2

Date	Sample No.	Sample Location	Sample Media	Analysis Desired	Start Time	Stop Time	Total Time (Minutes)	Average Flow Rate (LPM)	Air Volume (Liters)
8/6	A-2-A	NE Quad - After	MCE	PCM / TEM	16:15	16:37	22	2.1	46.
	A-2-B	SE	↓					2.0	44
	A-2-C	SW	↓					2.2	48.4
	A-2-D	NW	↓					2.2	48.4
	AS2FB-1	Blank	MCE	PCM / TEM	-	-	0	0	0
	ASFB-2	↓	↓	↓	-	-	0	0	0
8/6	DS-B	NA	MCE	TEM	-	-	-	-	0
8/6	DS-1	from pipe before	MCE	↓	-	-	2	2.0	80cm ²
8/6	DS-2	from pipe after	MCE	↓	-	-	2	2.0	80cm ²
8/6	F-1 - RH	from shirt before	fabric	TEM	-	-	-	-	
8/6	F-1 - MM	↓ ↓ ↓	↓	↓	-	-	-	-	
8/6	F-2 - MM	↓ ↓ after	↓	↓	-	-	-	-	
8/6	F-2 - RH	↓ ↓ ↓	↓	↓	-	-	-	-	

SC81CW

1581CW

M2050

CM2

First Transfer By: Michael D. Naud
Second Transfer By: _____
Third Transfer By: _____

CHAIN OF CUSTODY

Initial Shipment Date:	Mode of Transfer	Log-In Date	Received By
		8/6/03	<u>[Signature]</u>

TEM DUST ANALYSIS

M31851 000

Materials Analytical Services, Inc.
Cutting CA Pipe JM

Client Sample ID: lab blank

Sample Area/ Volume: 0 cm²

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Dust

Analysis type: Dust

Grid Acceptance YES 1 %

Date Analyzed: 8/25/2003

Analyst: Jayme Callan

Scope Number: 4

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6615

Str < 5um: 0
Str ≥ 5um: 0
Total Str: 0

Number of grids: 2 #1: 101 #3: 102
Number of openings: 10 #2: 103 #4: 105
Average Grid Size: 0.010557
Total Area Analyzed: 0.106

Volume Filtered 30 ml
Dilution Factor 3.333333

Str / sq ft 0.000E+00 Str / cm² 0.000E+00
Str / sq ft ≥ 5 0.000E+00 Str / cm² ≥ 5 0.000E+00

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:	Photo:	Sketch:
	A3-H9		NSD					☐	☐	☐
	J10		NSD					☐	☐	☐
	I7		NSD					☐	☐	☐
	F4		NSD					☐	☐	☐
	B7		NSD					☐	☐	☐
	A4-E10		NSD					☐	☐	☐
	C8		NSD					☐	☐	☐
	I3		NSD					☐	☐	☐
	J7		NSD					☐	☐	☐
	G4		NSD					☐	☐	☐

TEM DUST ANALYSIS

M31851 001

Materials Analytical Services, Inc.
Cutting CA Pipe JM

Client Sample ID: DS-B

Sample Area/ Volume: 0 cm²

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Dust

Analysis type: Dust

Grid Acceptance YES 1 %

Date Analyzed: 8/25/2003

Analyst: Jayme Callan

Scope Number: 4

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6615

Str < 5um: 0
Str ≥ 5um: 0
Total Str: 0

Number of grids: 2

#1: 101

#3: 102

Average Grid Size: 0.010557

Number of openings: 10

#2: 103

#4: 105

Total Area Analyzed: 0.106

Volume Filtered 30 ml

Dilution Factor 3.333333

Str / sqr ft 0.000E+00

Str / cm² 0.000E+00

Str / sqr ft ≥ 5 0.000E+00

Str / cm² ≥ 5 0.000E+00

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:	Photo:	Sketch:
	B4-C3		NSD					☐	☐	☐
	D7		NSD					☐	☐	☐
	A10		NSD					☐	☐	☐
	I9		NSD					☐	☐	☐
	J3		NSD					☐	☐	☐
	B3-B9		NSD					☐	☐	☐
	F10		NSD					☐	☐	☐
	J7		NSD					☐	☐	☐
	H4		NSD					☐	☐	☐
	E4		NSD					☐	☐	☐

TEM DUST ANALYSIS

M31851 002

Materials Analytical Services, Inc.
Cutting CA Pipe JM

Client Sample ID: DS-1

Sample Area/ Volume: 80 cm2

Date Analyzed: 8/25/2003

Filter Type: MCE 47mm

Analyst: Jayme Callan

Pore size: 0.45

Scope Number: 4

Effective Filter Area: 1297

Accelerating Voltage: 100 KV

Sample type: Dust

Indicated Mag: 25 KX

Analysis type: Dust

Screen Mag: 20 KX

Grid Acceptance YES 1 %

Grid_box: 6615

Str < 5um: 73
Str ≥ 5um: 63
Total Str: 136

Number of grids: 2 #1: 101 #3: 102

Average Grid Size: 0.010608

Number of openings: 2 #2: 103 #4: 106

Total Area Analyzed: 0.021

Volume Filtered 10 ml

Str / sq ft 9.656E+08

Str / cm2 1.039E+06

Dilution Factor 10

Str / sq ft ≥ 5 4.473E+08

Str / cm2 ≥ 5 4.814E+05

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:	Photo:	Sketch:
1	C3-H4	C	F	1.40	0.10	X	X	☒	☐	☐
2		C	B	10.50	0.40	X	X	☐	☐	☐
3		C	B	20.00	0.10	X	X	☐	☐	☐
4		C	F	1.70	0.10	X	X	☐	☐	☐
5		C	C-F	17.00	0.10	X	X	☐	☐	☐
6		C	F	5.90	0.05	X	X	☐	☐	☐
7		C	F	2.00	0.05	X	X	☐	☐	☐
8		C	F	4.20	0.05	X	X	☐	☐	☐
9		C	F	5.80	0.05	X	X	☐	☐	☐
10		C	B	2.10	0.15	X	X	☐	☐	☐
11		C	F	2.00	0.05	X	X	☒	☐	☐
12		C	M-B	2.00	0.05	X	X	☐	☐	☐
13		C	F	3.80	0.05	X	X	☐	☐	☐
14		C	F	6.40	0.05	X	X	☐	☐	☐
15		C	NSD	3.80	0.05	X	X	☐	☐	☐
16		CR	F	8.10	0.20	X	X	☒	☐	☐

17	C	F	5.40	0.04	X	X	☐	☐	☐
18	C	C-B	58.40	0.20	X	X	☐	☐	☐
19	C	C-F	12.00	0.10	X	X	☐	☐	☐
20	C	C-F	3.80	0.05	X	X	☐	☐	☐
21	C	C-F	13.80	0.05	X	X	☒	☐	☐
22	C	F	2.30	0.05	X	X	☐	☐	☐
23	C	F	3.00	0.05	X	X	☐	☐	☐
24	C	F	3.60	0.05	X	X	☐	☐	☐
25	C	F	5.70	0.05	X	X	☐	☐	☐
26	C	B	5.70	0.10	X	X	☐	☐	☐
27	C	F	11.40	0.05	X	X	☐	☐	☐
28	C	B	8.00	0.15	X	X	☐	☐	☐
29	C	F	0.60	0.05	X	X	☐	☐	☐
30	C	F	1.80	0.05	X	X	☐	☐	☐
31	C	F	2.00	0.05	X	X	☒	☐	☐
32	C	F	1.40	0.05	X	X	☐	☐	☐
33	C	B	8.10	0.15	X	X	☐	☐	☐
34	C	F	1.80	0.05	X	X	☐	☐	☐
35	C	M-F	6.10	0.05	X	X	☐	☐	☐
36	C	F	8.20	0.05	X	X	☐	☐	☐
37	C	C-F	18.00	0.05	X	X	☐	☐	☐
38	C	F	7.90	0.05	X	X	☐	☐	☐
39	C	F	3.00	0.10	X	X	☐	☐	☐
40	C	F	2.40	0.05	X	X	☐	☐	☐
41	C	C-F	1.90	0.05	X	X	☒	☐	☐
42	C	F	8.00	0.10	X	X	☐	☐	☐

43	C	F	1.80	0.05	X	X	☐	☐	☐
44	C	C-F	9.00	0.05	X	X	☐	☐	☐
45	C	M-F	3.90	0.10	X	X	☐	☐	☐
46	C	B	6.10	0.30	X	X	☐	☐	☐
47	C	F	3.80	0.05	X	X	☐	☐	☐
48	C	F	3.00	0.10	X	X	☐	☐	☐
49	C	F	10.20	0.10	X	X	☐	☐	☐
50	C	F	2.10	0.05	X	X	☐	☐	☐
51	C	F	3.70	0.05	X	X	☒	☐	☐
52	C	F	1.60	0.05	X	X	☐	☐	☐
53	C	F	4.30	0.05	X	X	☐	☐	☐
54	C	B	2.00	0.15	X	X	☐	☐	☐
55	C	F	3.90	0.05	X	X	☐	☐	☐
56	C	F	3.90	0.05	X	X	☐	☐	☐
57	C	B	3.80	0.15	X	X	☐	☐	☐
58	C	F	6.30	0.05	X	X	☐	☐	☐
59	C	F	2.10	0.05	X	X	☐	☐	☐
60	C	C-F	6.70	0.05	X	X	☐	☐	☐
61	C	F	6.00	0.05	X	X	☒	☐	☐
62	C	B	1.70	0.10	X	X	☐	☐	☐
63	C5	C	B	7.90	0.15	X	X	☐	☐
64	C	F	2.00	0.05	X	X	☐	☐	☐
65	C	F	1.70	0.10	X	X	☐	☐	☐
66	C	C-F	5.70	0.05	X	X	☐	☐	☐
67	C	F	7.00	0.05	X	X	☐	☐	☐
68	C	F	3.00	0.05	X	X	☐	☐	☐

69	C	C-F	7.00	0.05	X	X	☐	☐	☐
70	C	F	2.00	0.05	X	X	☐	☐	☐
71	C	F	3.80	0.05	X	X	☒	☐	☐
72	C	B	5.20	0.15	X	X	☐	☐	☐
73	C	B	2.00	0.15	X	X	☐	☐	☐
74	C	B	7.70	0.30	X	X	☐	☐	☐
75	C	B	7.40	0.10	X	X	☐	☐	☐
76	C	F	5.90	0.10	X	X	☐	☐	☐
77	C	F	3.70	0.05	X	X	☐	☐	☐
78	C	C-B	16.00	0.20	X	X	☐	☐	☐
79	C	C-F	5.90	0.05	X	X	☐	☐	☐
80	C	F	8.10	0.05	X	X	☐	☐	☐
81	C	F	14.00	0.05	X	X	☒	☐	☐
82	C	B	2.40	0.10	X	X	☐	☐	☐
83	C	F	6.10	0.05	X	X	☐	☐	☐
84	C	F	4.00	0.05	X	X	☐	☐	☐
85	C	F	2.00	0.05	X	X	☐	☐	☐
86	C	C-B	6.10	0.15	X	X	☐	☐	☐
87	C	F	2.00	0.05	X	X	☐	☐	☐
88	C	B	16.40	0.20	X	X	☐	☐	☐
89	C	F	19.00	0.05	X	X	☐	☐	☐
90	C	F	2.20	0.05	X	X	☐	☐	☐
91	C	M-F	6.40	0.05	X	X	☒	☐	☐
92	C	C-F	12.20	0.10	X	X	☐	☐	☐
93	C	C-B	6.10	0.10	X	X	☐	☐	☐
94	C	F	6.40	0.05	X	X	☐	☐	☐

95	C	B	23.90	0.20	X	X	☐	☐	☐
96	C	F	3.90	0.05	X	X	☐	☐	☐
97	C	C-F	14.00	0.05	X	X	☐	☐	☐
98	C	B	4.00	0.20	X	X	☐	☐	☐
99	C	B	3.00	0.15	X	X	☐	☐	☐
100	C	B	7.90	0.15	X	X	☐	☐	☐
101	C	F	3.60	0.05	X	X	☒	☐	☐
102	C	M-F	2.00	0.05	X	X	☐	☐	☐
103	C	F	2.40	0.10	X	X	☐	☐	☐
104	C	F	6.30	0.05	X	X	☐	☐	☐
105	C	F	3.80	0.05	X	X	☐	☐	☐
106	C	F	4.30	0.05	X	X	☐	☐	☐
107	C	F	4.00	0.05	X	X	☐	☐	☐
108	C	F	1.80	0.05	X	X	☐	☐	☐
109	C	F	4.20	0.05	X	X	☐	☐	☐
110	C	B	5.90	0.15	X	X	☐	☐	☐
111	C	F	1.80	0.05	X	X	☒	☐	☐
112	C	B	19.80	0.20	X	X	☐	☐	☐
113	C	F	20.00	0.05	X	X	☐	☐	☐
114	C	B	5.30	0.10	X	X	☐	☐	☐
115	C	F	2.00	0.05	X	X	☐	☐	☐
116	C	M-F	7.90	0.05	X	X	☐	☐	☐
117	C	F	1.90	0.05	X	X	☐	☐	☐
118	C	F	3.80	0.10	X	X	☐	☐	☐
119	C	F	6.10	0.05	X	X	☐	☐	☐
120	C	F	5.80	0.05	X	X	☐	☐	☐

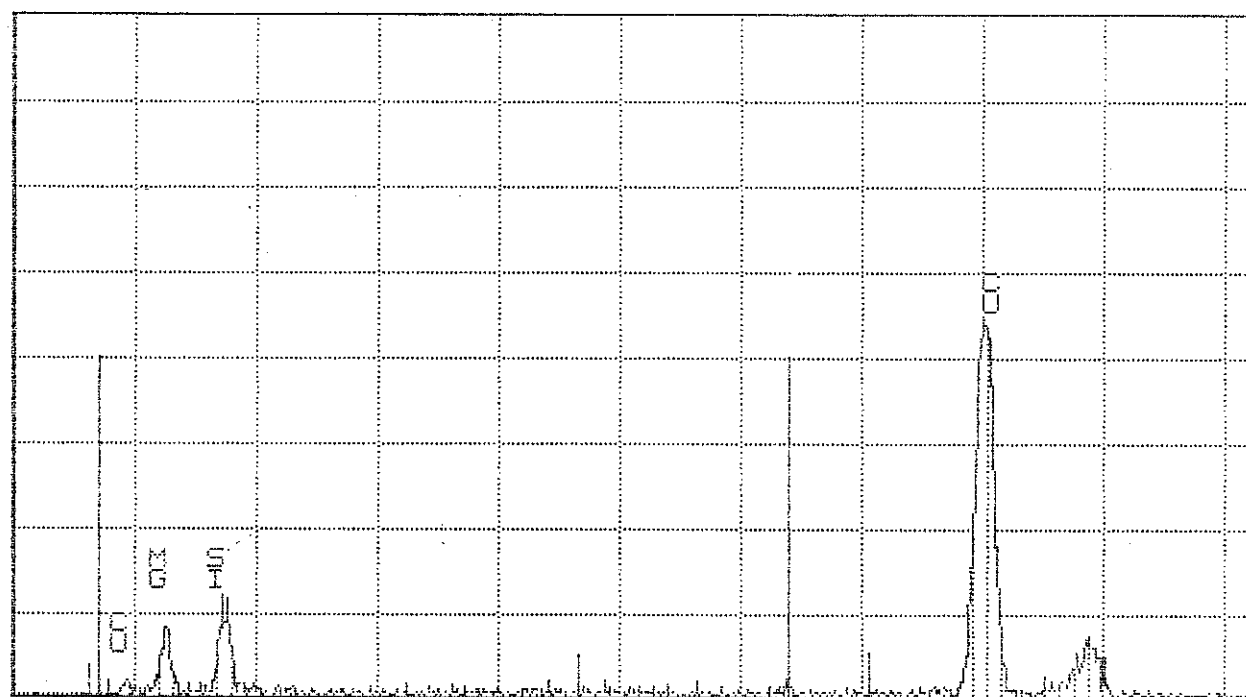
121	C	F	2.00	0.05	X	X	☒	☐	☐
122	C	F	2.20	0.05	X	X	☐	☐	☐
123	C	F	2.00	0.05	X	X	☐	☐	☐
124	C	F	7.90	0.05	X	X	☐	☐	☐
125	C	B	11.90	0.10	X	X	☐	☐	☐
126	C	F	1.80	0.05	X	X	☐	☐	☐
127	C	F	2.00	0.05	X	X	☐	☐	☐
128	C	C-F	2.10	0.05	X	X	☐	☐	☐
129	C	F	8.10	0.10	X	X	☐	☐	☐
130	C	F	7.60	0.05	X	X	☐	☐	☐
131	C	F	2.10	0.05	X	X	☒	☐	☐
132	C	F	2.30	0.05	X	X	☐	☐	☐
133	C	B	8.50	0.15	X	X	☐	☐	☐
134	C	F	3.80	0.10	X	X	☐	☐	☐
135	C	F	4.00	0.05	X	X	☐	☐	☐
136	C	F	1.90	0.05	X	X	☐	☐	☐

M31851 002

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 08:06

Cursor: 0.000keV = 0



0.000

FE-26

VFS = 256

10.240

32

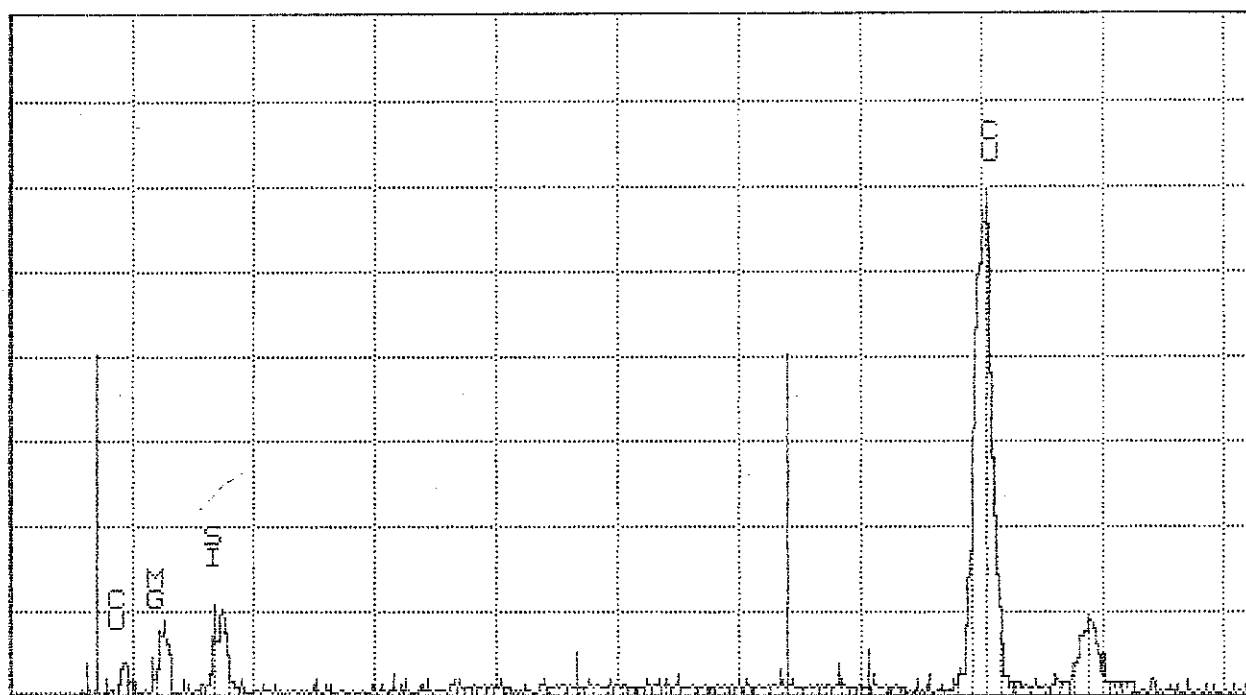
M31851 CHRYSOTILE

-601-

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 08:15

Cursor: 0.000keV = 0



0.000

FE-26

VFS = 128

10.240

22

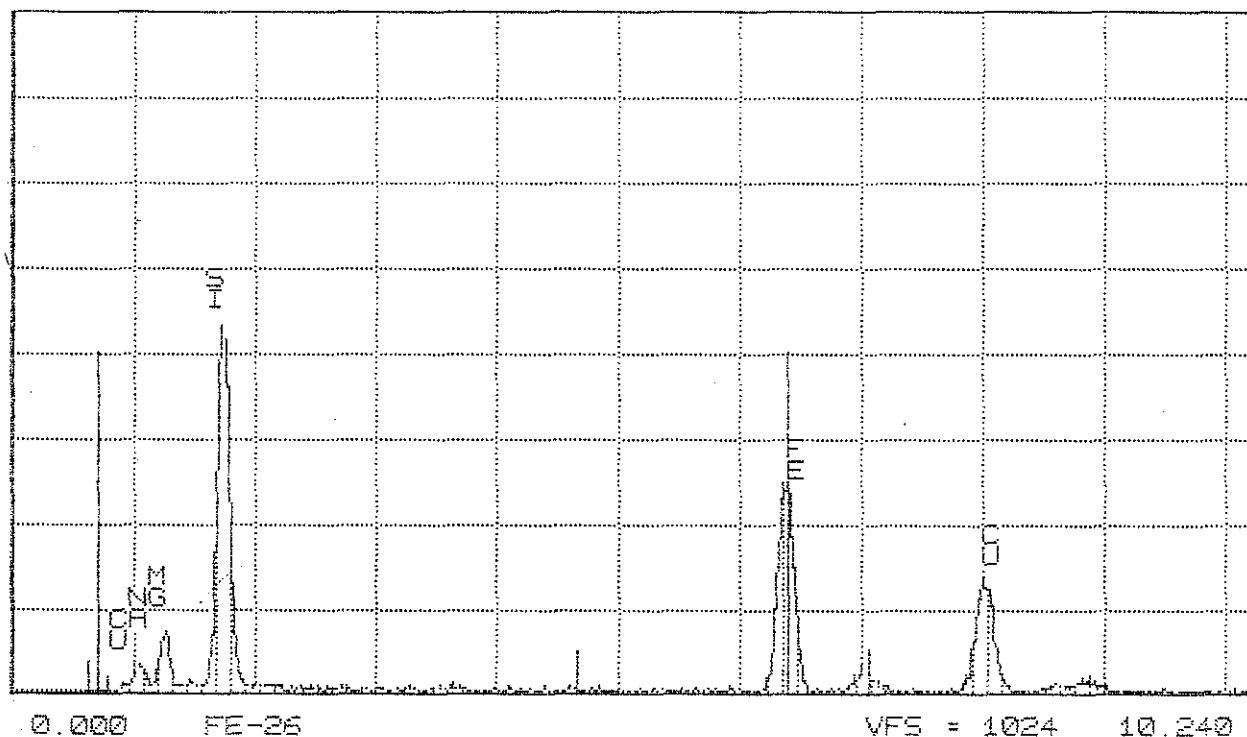
M31851 CHRYSOTILE

-007

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 08:22

Cursor: 0.000keV = 0



0.000

FE-26

VFS = 1024

10.240

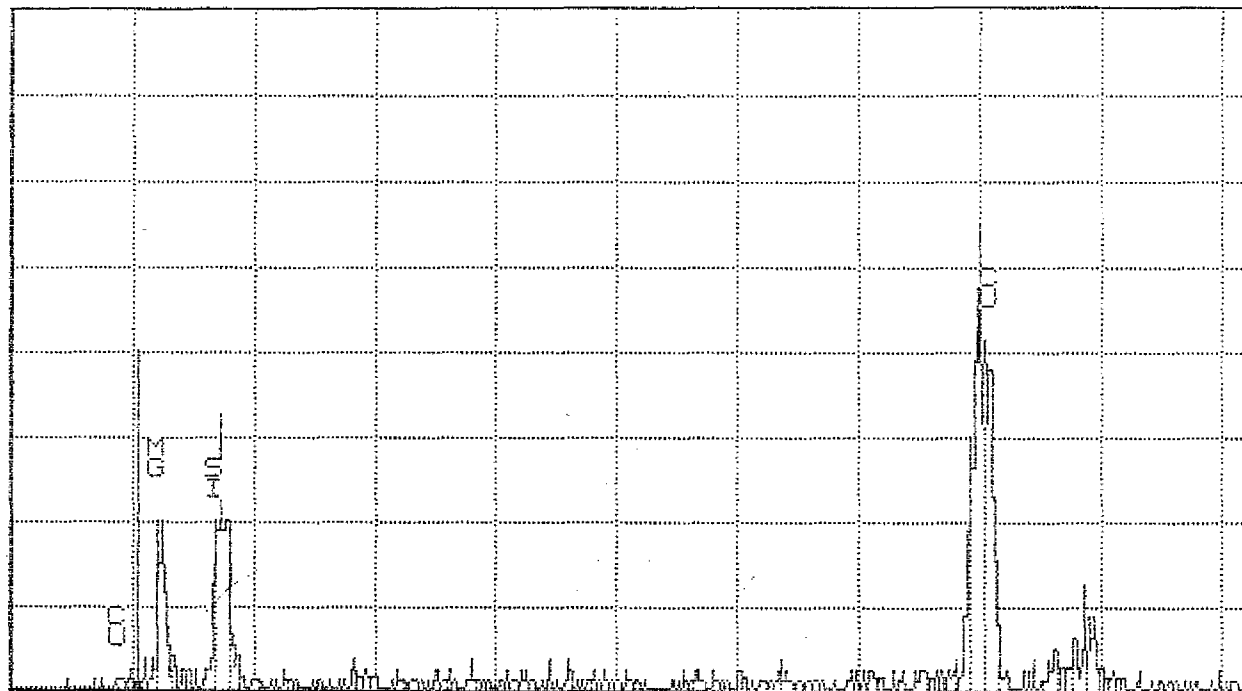
99

M31851-002 CROCIDOLITE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 08:27

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

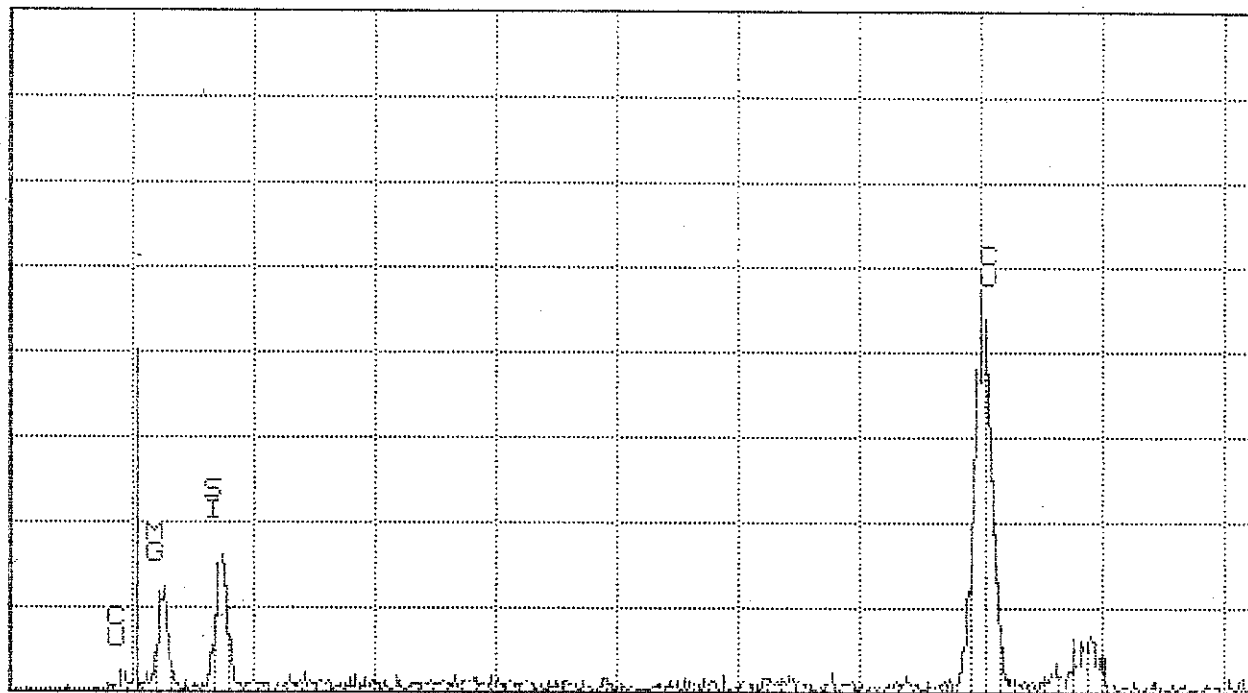
27

M31851-002 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 08:41

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 256

10.240

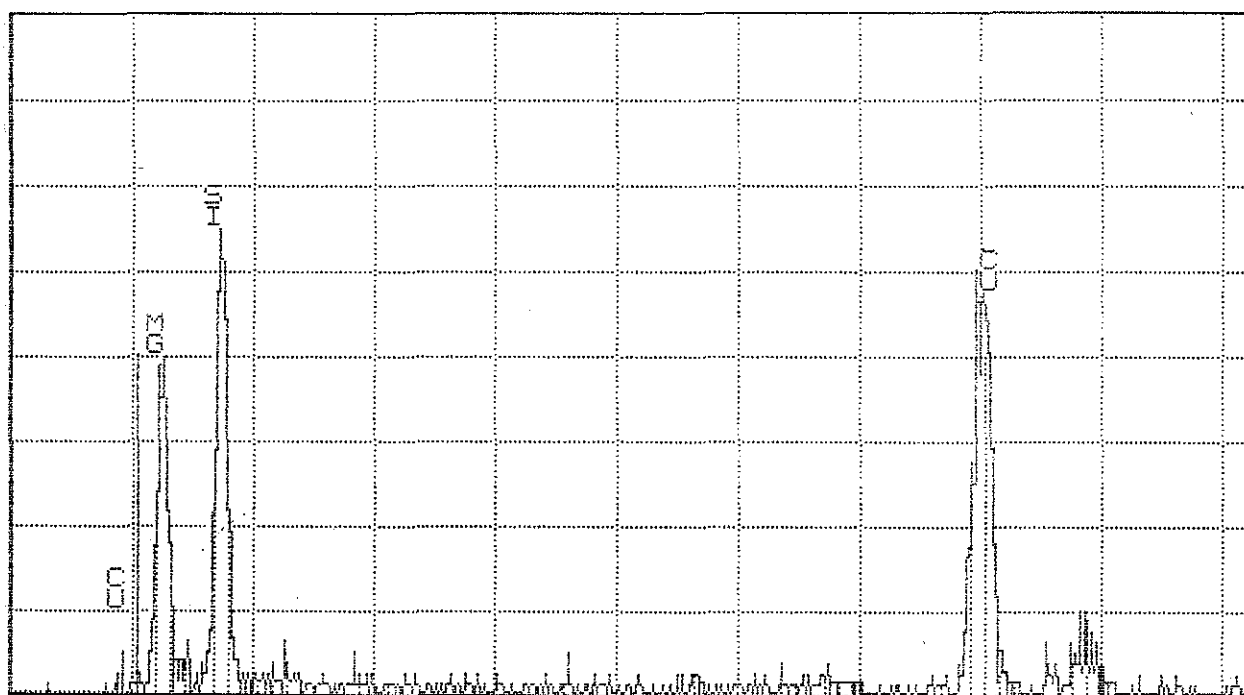
116

M31851-002 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 08:50

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

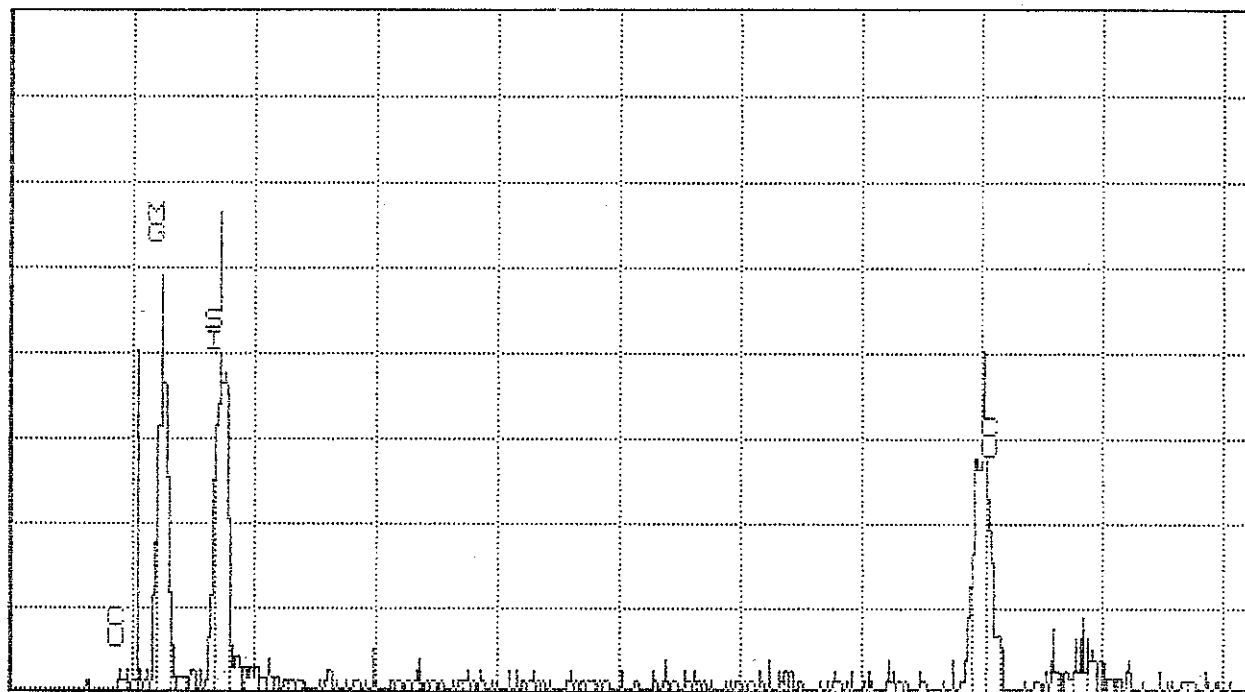
32

M31851-002 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 08:57

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

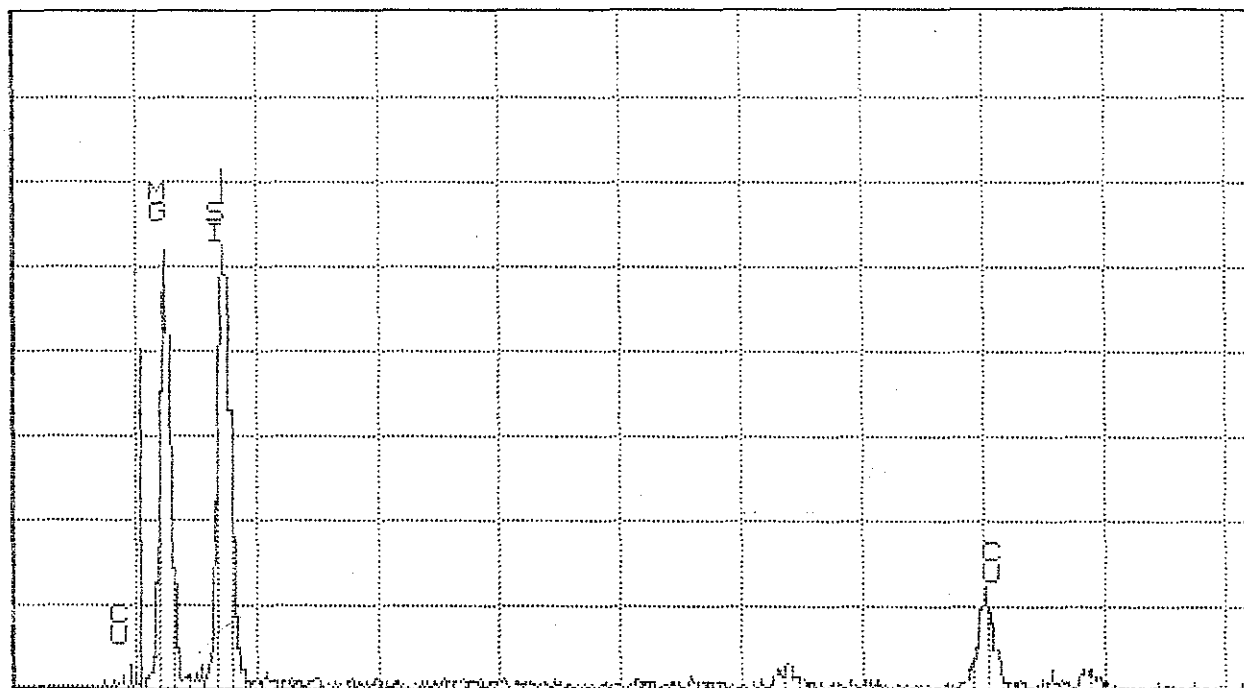
38

M31851-002 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 09:04

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 256

10.240

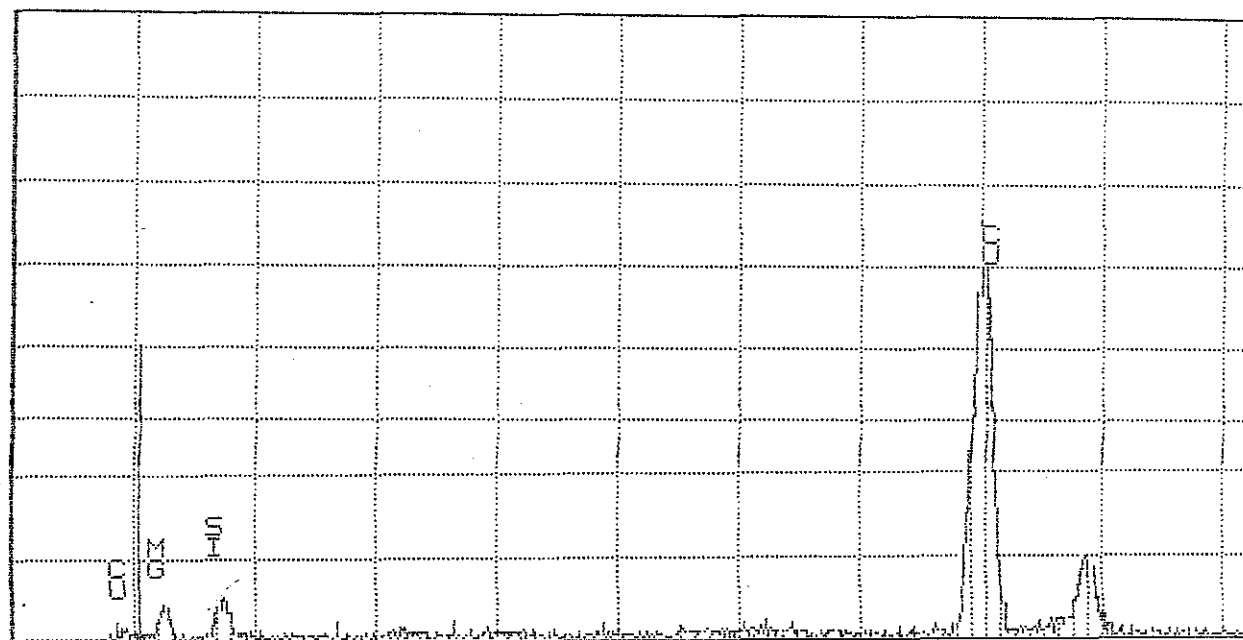
15

M31851-002 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 09:18

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 256

10.240

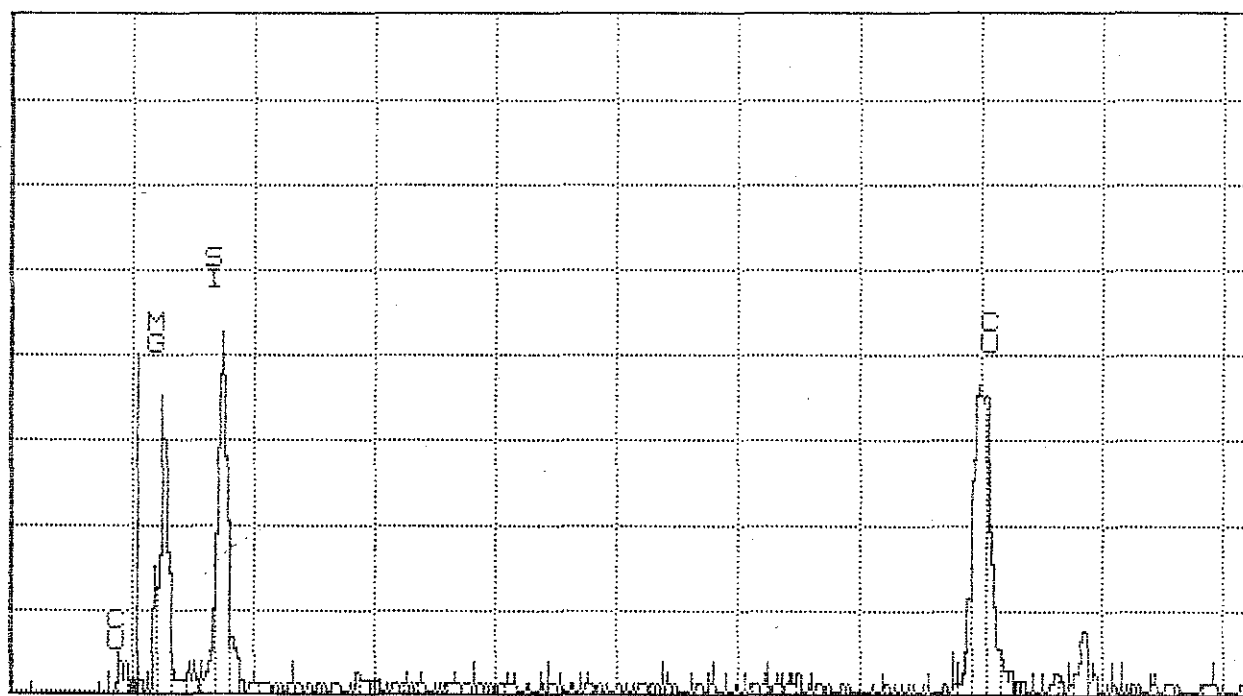
31

M31851-002 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 09:26

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

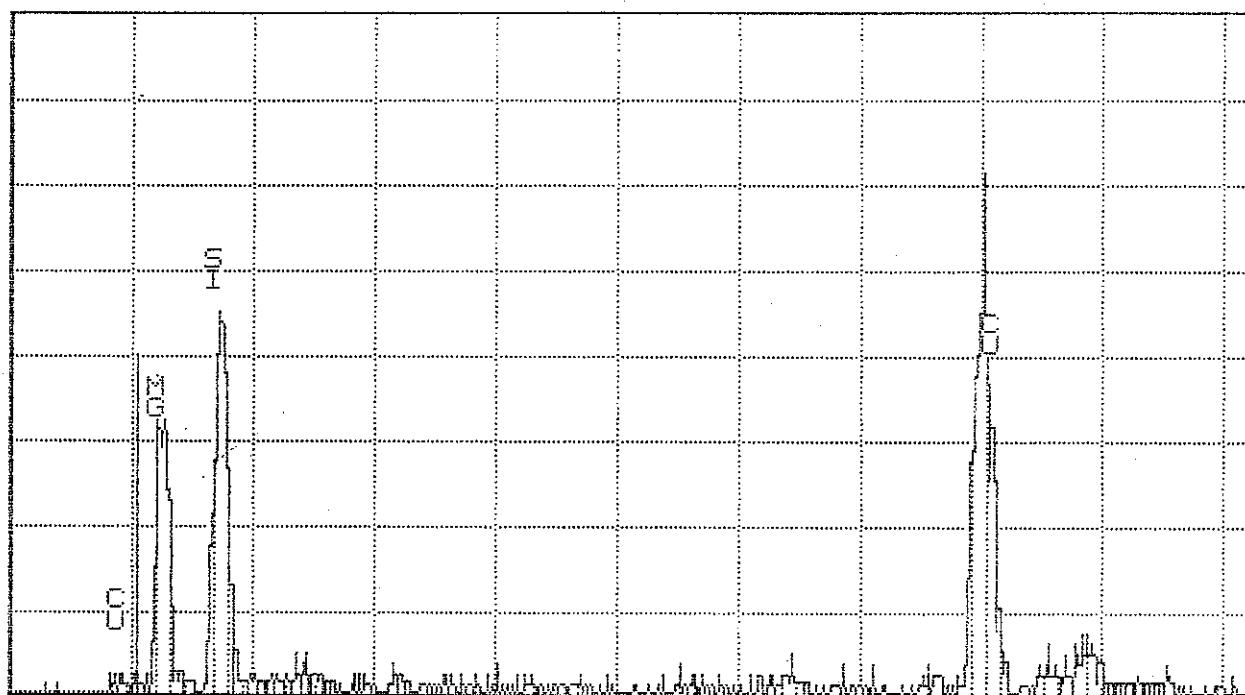
23

M31851-002 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 09:34

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

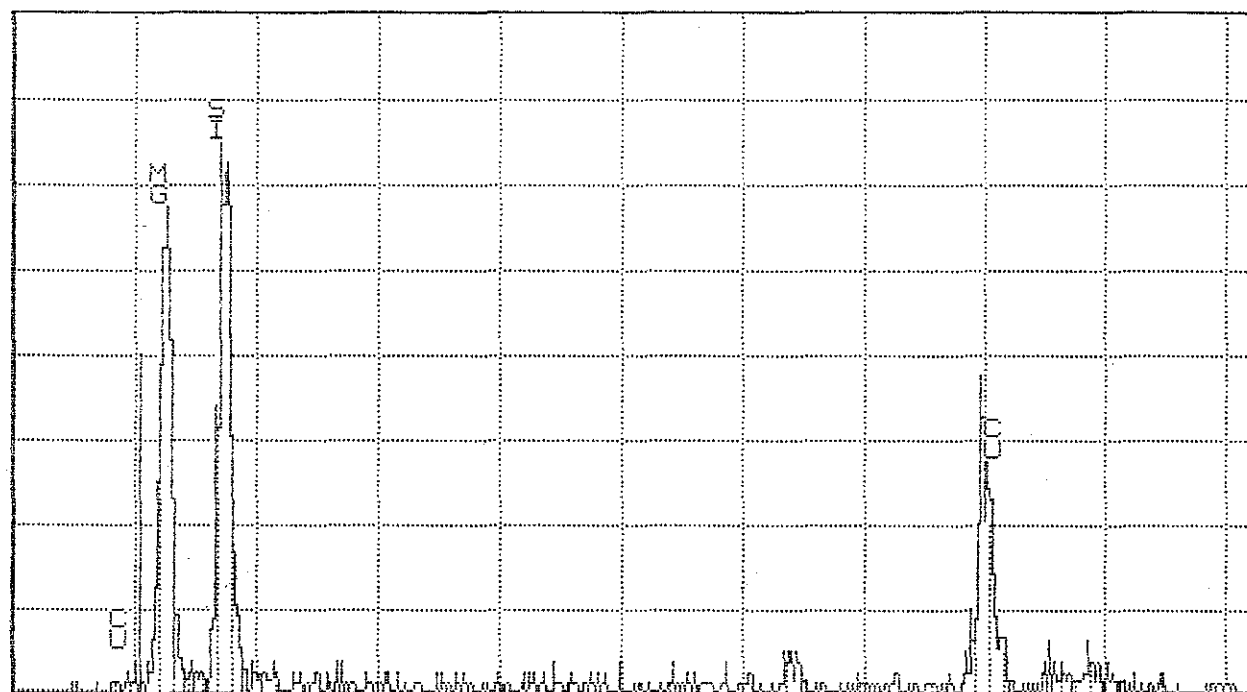
29

M31851-002 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 09:39

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

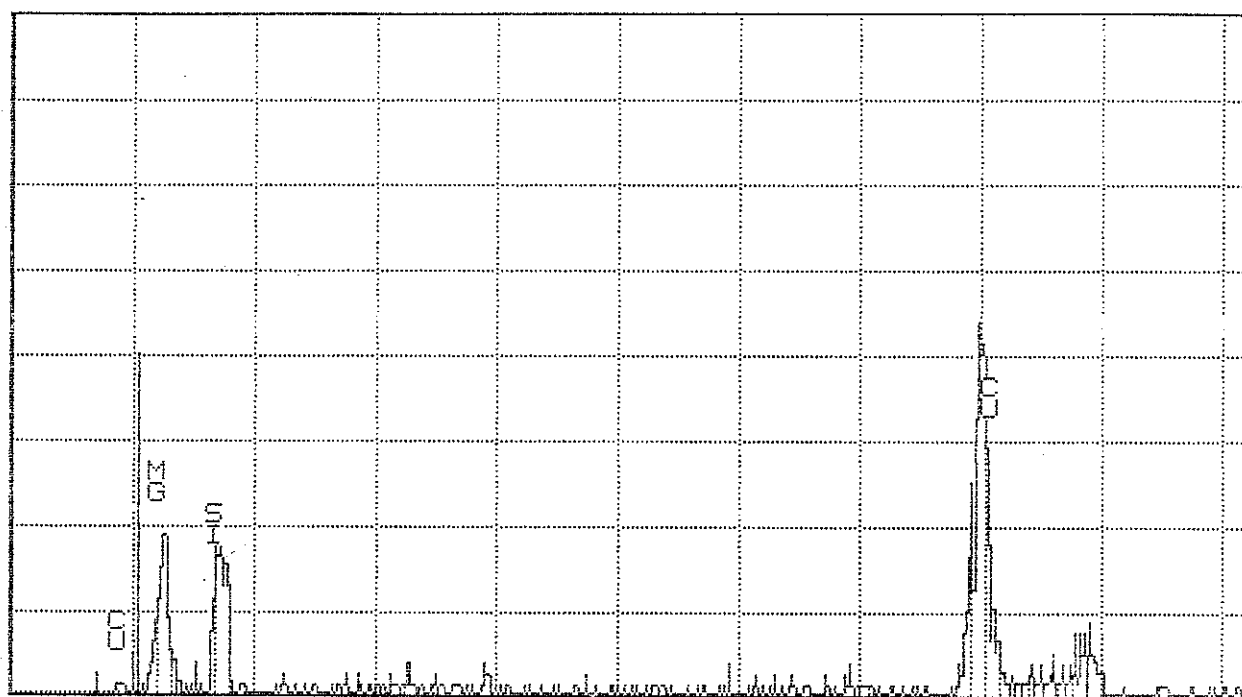
31

M31851-002 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 09:44

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

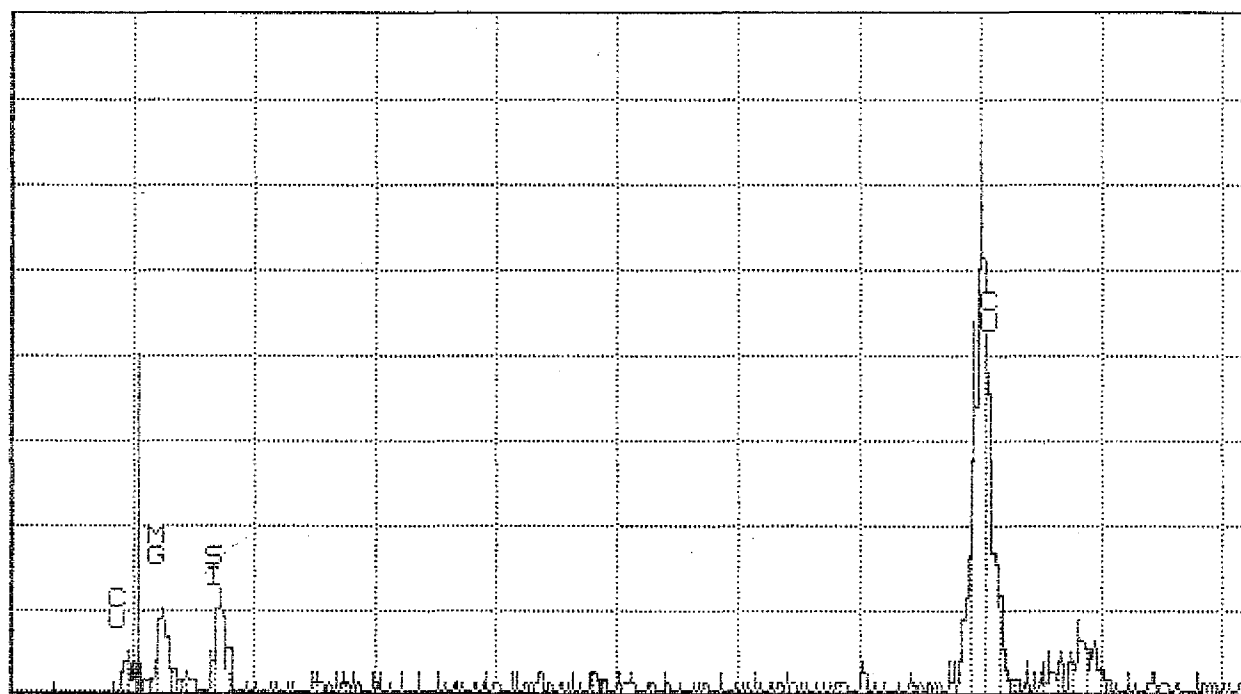
16

M31851-002 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 09:50

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

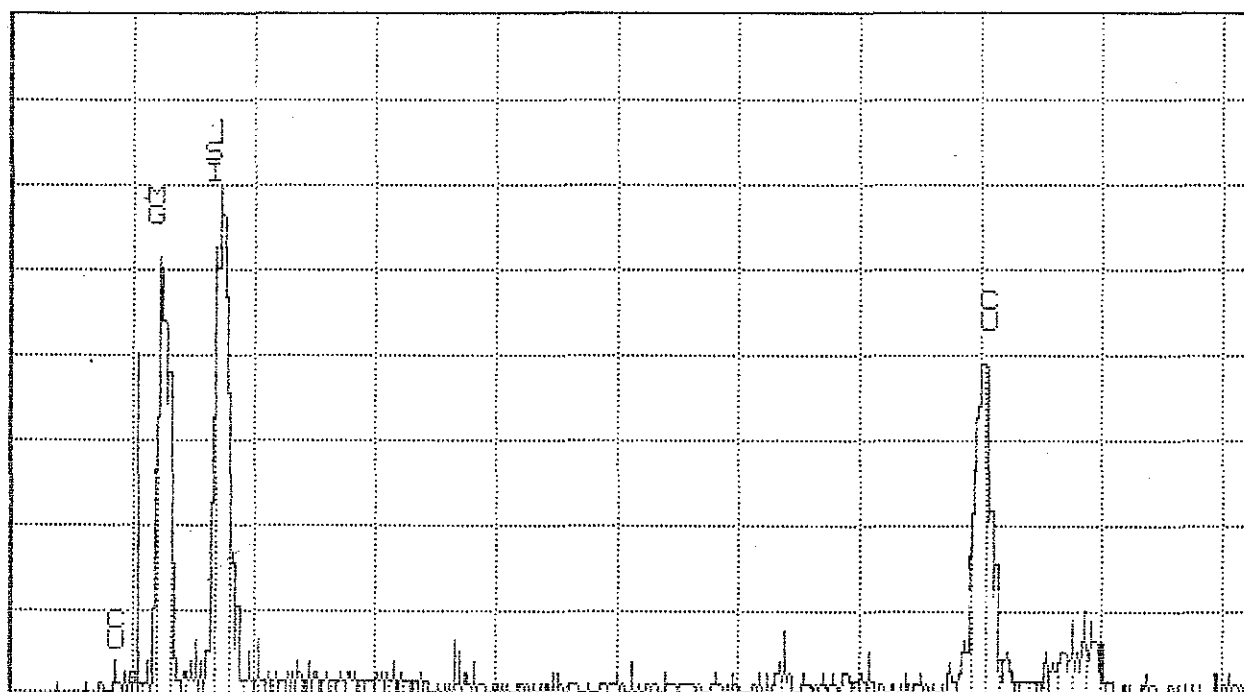
30

M31851-002 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 09:58

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 64

10.240

24

M31851-002 CHRYSOTILE

TEM DUST ANALYSIS

M31851 003

Materials Analytical Services, Inc.
Cutting CA Pipe JM

Client Sample ID: DS-2

Sample Area/ Volume: 80 cm2

Date Analyzed: 8/25/2003

Filter Type: MCE 47mm

Analyst: Jayme Callan

Pore size: 0.45

Scope Number: 4

Effective Filter Area: 1297

Accelerating Voltage: 100 KV

Sample type: Dust

Indicated Mag: 25 KX

Analysis type: Dust

Screen Mag: 20 KX

Grid Acceptance YES 1 %

Grid_box: 6615

Str < 5um: 89
Str ≥ 5um: 16
Total Str: 105

Number of grids: 2 #1: 101 #3: 102

Average Grid Size: 0.010608

Number of openings: 2 #2: 103 #4: 106

Total Area Analyzed: 0.021

Volume Filtered 10 ml

Str / sqr ft 7.455E+08

Str / cm2 8.024E+05

Dilution Factor 10

Str / sqr ft ≥ 5 1.136E+08

Str / cm2 ≥ 5 1.223E+05

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:	Photo:	Sketch:
1	E3-C6	C	B	2.40	0.15	X	X	☒	☐	☐
2		C	F	2.10	0.05	X	X	☐	☐	☐
3		C	F	2.30	0.05	X	X	☐	☐	☐
4		C	F	4.10	0.05	X	X	☐	☐	☐
5		C	F	1.50	0.05	X	X	☐	☐	☐
6		C	C-F	1.00	0.05	X	X	☐	☐	☐
7		C	F	12.40	0.05	X	X	☐	☐	☐
8		C	F	1.60	0.05	X	X	☐	☐	☐
9		C	B	1.90	0.15	X	X	☐	☐	☐
10		C	F	1.70	0.05	X	X	☐	☐	☐
11		C	B	1.80	0.20	X	X	☒	☐	☐
12		C	C-F	2.20	0.05	X	X	☐	☐	☐
13		C	B	4.20	0.20	X	X	☐	☐	☐
14		C	B	2.00	0.20	X	X	☐	☐	☐
15		C	F	1.90	0.05	X	X	☐	☐	☐

16	C	F	1.80	0.05	X	X	☐	☐	☐
17	C	F	1.60	0.03	X	X	☐	☐	☐
18	C	F	5.80	0.05	X	X	☐	☐	☐
19	C	F	1.40	0.10	X	X	☐	☐	☐
20	C	B	3.80	0.10	X	X	☐	☐	☐
21	C	F	2.00	0.10	X	X	☒	☐	☐
22	C	B	3.40	0.40	X	X	☐	☐	☐
23	C	F	3.90	0.05	X	X	☐	☐	☐
24	C	F	4.10	0.05	X	X	☐	☐	☐
25	C	F	10.20	0.20	X	X	☐	☐	☐
26	C	F	3.70	0.05	X	X	☐	☐	☐
27	C	B	1.90	0.20	X	X	☐	☐	☐
28	C	F	1.60	0.03	X	X	☐	☐	☐
29	C	B	2.10	0.20	X	X	☐	☐	☐
30	C	B	8.20	0.40	X	X	☐	☐	☐
31	C	F	2.30	0.05	X	X	☒	☐	☐
32	C	F	2.90	0.05	X	X	☐	☐	☐
33	C	B	1.90	0.15	X	X	☐	☐	☐
34	C	B	2.20	0.20	X	X	☐	☐	☐
35	C	B	7.80	0.20	X	X	☐	☐	☐
36	C	B	5.70	0.20	X	X	☐	☐	☐
37	C	B	2.20	0.20	X	X	☐	☐	☐
38	C	F	1.60	0.05	X	X	☐	☐	☐
39	C	F	4.00	0.03	X	X	☐	☐	☐
40	C	F	2.00	0.03	X	X	☐	☐	☐

41	C	B	1.80	0.20	X	X	☒	☐	☐
42	C	F	2.10	0.05	X	X	☐	☐	☐
43	C	B	2.30	0.20	X	X	☐	☐	☐
44	C	B	2.00	0.20	X	X	☐	☐	☐
45	C	F	2.10	0.05	X	X	☐	☐	☐
46	C	F	4.00	0.10	X	X	☐	☐	☐
47	A1	C	F	1.60	0.05	X	X	☐	☐
48	C	B	8.40	0.30	X	X	☐	☐	☐
49	C	F	1.60	0.10	X	X	☐	☐	☐
50	C	B	4.30	0.20	X	X	☐	☐	☐
51	C	F	6.00	0.03	X	X	☒	☐	☐
52	C	F	2.30	0.05	X	X	☐	☐	☐
53	C	B	2.00	0.20	X	X	☐	☐	☐
54	C	F	1.40	0.05	X	X	☐	☐	☐
55	C	B	8.00	0.50	X	X	☐	☐	☐
56	C	F	18.20	0.10	X	X	☐	☐	☐
57	C	F	1.80	0.05	X	X	☐	☐	☐
58	C	B	6.00	0.20	X	X	☐	☐	☐
59	C	F	1.50	0.05	X	X	☐	☐	☐
60	C	B	16.20	0.50	X	X	☐	☐	☐
61	C	F	10.00	0.05	X	X	☒	☐	☐
62	C	B	7.70	0.60	X	X	☐	☐	☐
63	C	C-F	1.00	0.05	X	X	☐	☐	☐
64	C	F	1.60	0.05	X	X	☐	☐	☐
65	C	F	1.00	0.05	X	X	☐	☐	☐

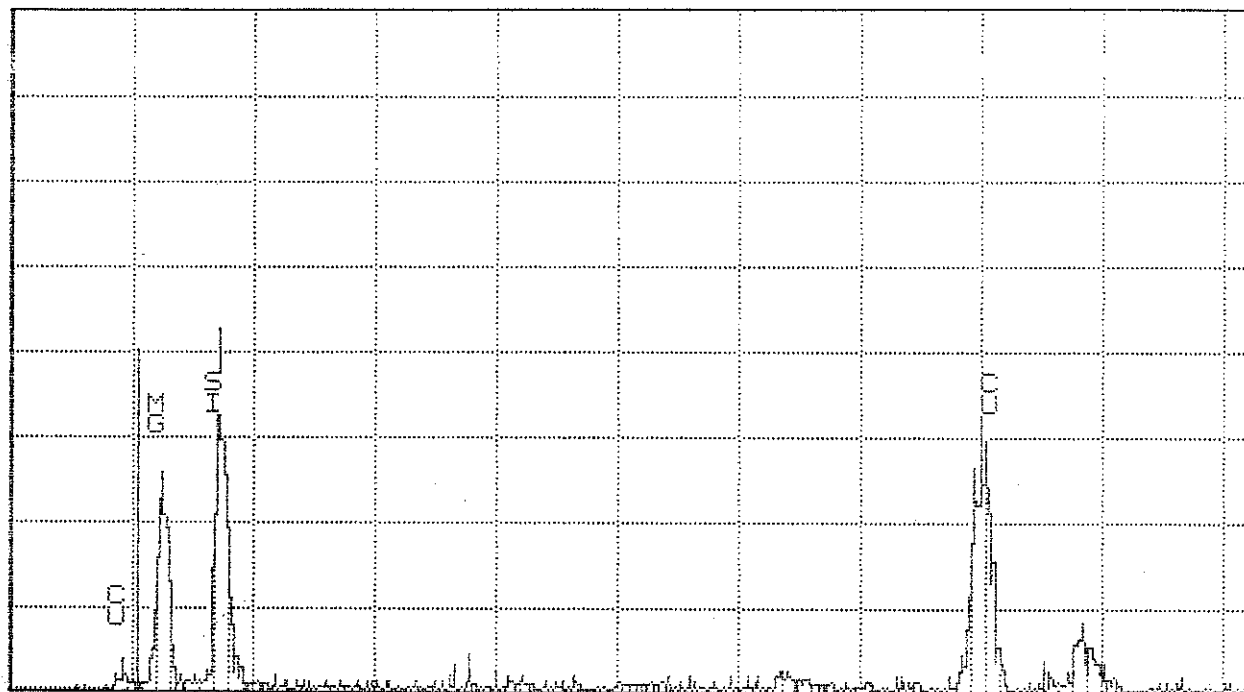
66	C	B	1.50	0.15	X	X	☐	☐	☐
67	C	B	1.80	0.15	X	X	☐	☐	☐
68	C	F	1.80	0.10	X	X	☐	☐	☐
69	C	B	2.20	0.10	X	X	☐	☐	☐
70	C	B	7.40	0.15	X	X	☐	☐	☐
71	C	F	1.90	0.03	X	X	☒	☐	☐
72	C	B	2.00	0.05	X	X	☐	☐	☐
73	C	F	3.40	0.05	X	X	☐	☐	☐
74	C	B	41.50	0.60	X	X	☐	☐	☐
75	C	F	1.60	0.05	X	X	☐	☐	☐
76	C	B	2.30	0.20	X	X	☐	☐	☐
77	C	F	2.00	0.05	X	X	☐	☐	☐
78	C	F	1.60	0.05	X	X	☐	☐	☐
79	C	F	1.70	0.03	X	X	☐	☐	☐
80	C	B	4.20	0.15	X	X	☐	☐	☐
81	C	F	1.70	0.05	X	X	☒	☐	☐
82	C	B	2.10	0.20	X	X	☐	☐	☐
83	C	F	1.50	0.10	X	X	☐	☐	☐
84	C	F	1.00	0.03	X	X	☐	☐	☐
85	C	B	2.50	0.10	X	X	☐	☐	☐
86	C	F	2.40	0.05	X	X	☐	☐	☐
87	C	B	4.10	0.10	X	X	☐	☐	☐
88	C	F	2.10	0.10	X	X	☐	☐	☐
89	C	C-F	1.90	0.05	X	X	☐	☐	☐
90	C	B	2.00	0.10	X	X	☐	☐	☐

91	C	F	1.60	0.05	X	X	☒	☐	☐
92	C	M-F	1.50	0.05	X	X	☐	☐	☐
93	C	F	1.40	0.03	X	X	☐	☐	☐
94	C	C-F	1.00	0.03	X	X	☐	☐	☐
95	C	B	2.80	0.10	X	X	☐	☐	☐
96	C	F	1.60	0.05	X	X	☐	☐	☐
97	C	F	3.60	0.05	X	X	☐	☐	☐
98	C	F	1.80	0.10	X	X	☐	☐	☐
99	C	B	1.80	0.15	X	X	☐	☐	☐
100	C	F	1.50	0.03	X	X	☐	☐	☐
101	C	B	2.00	0.20	X	X	☒	☐	☐
102	C	B	4.00	0.20	X	X	☐	☐	☐
103	C	F	1.80	0.05	X	X	☐	☐	☐
104	C	F	1.00	0.05	X	X	☐	☐	☐
105	C	F	2.00	0.05	X	X	☐	☐	☐

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 10:39

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 128

10.240

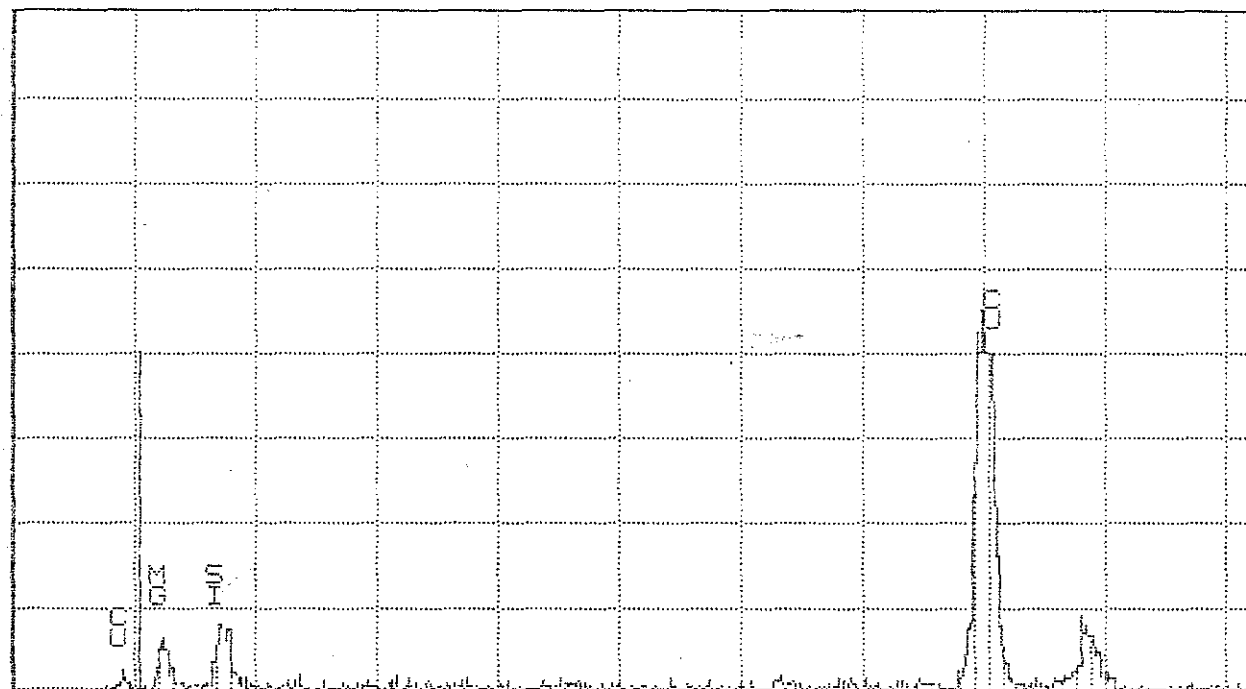
32

M31851-003 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 10:13

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 256

10.240

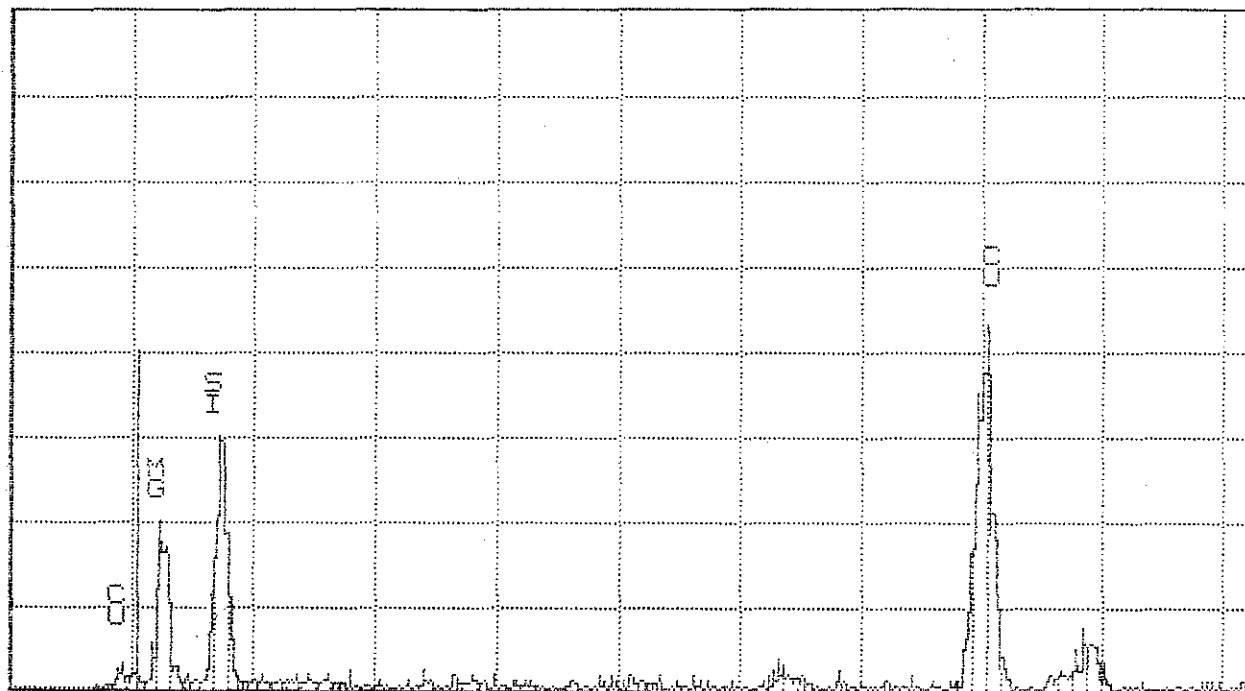
20

M31851-003 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 10:45

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 128

10.240

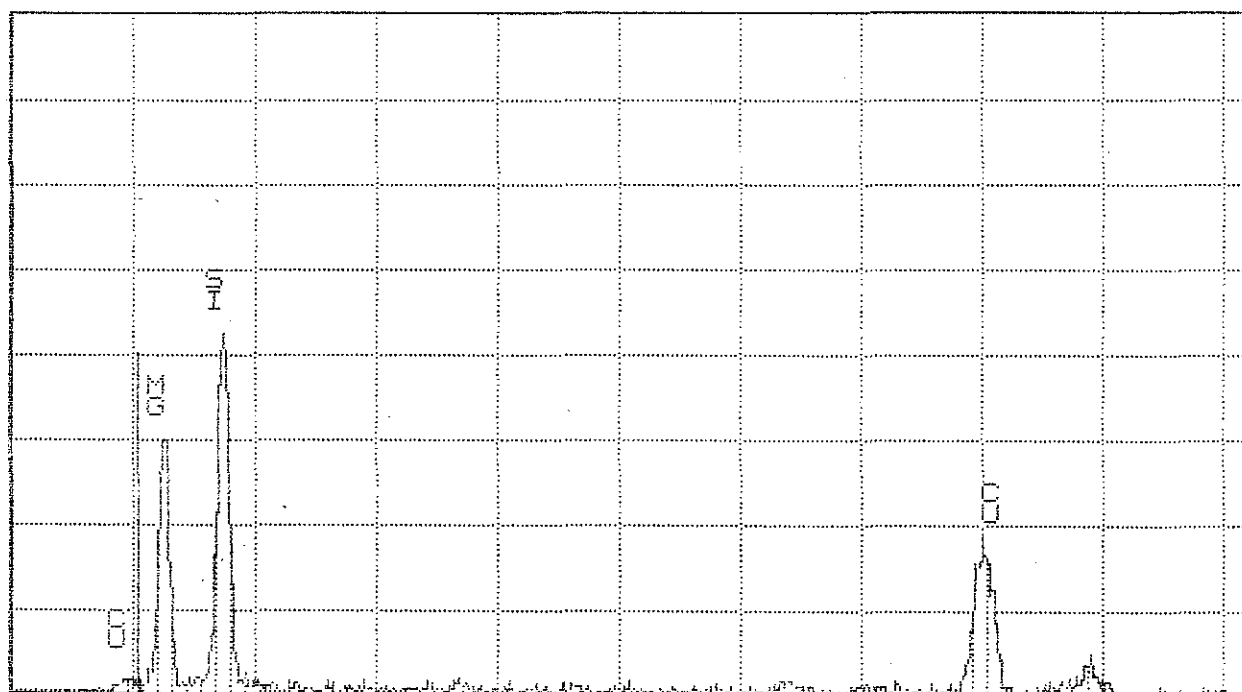
32

M31851-003 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 10:51

Cursor: 0.000keV = 0



0.000

NA-11

VFS = 256

10.240

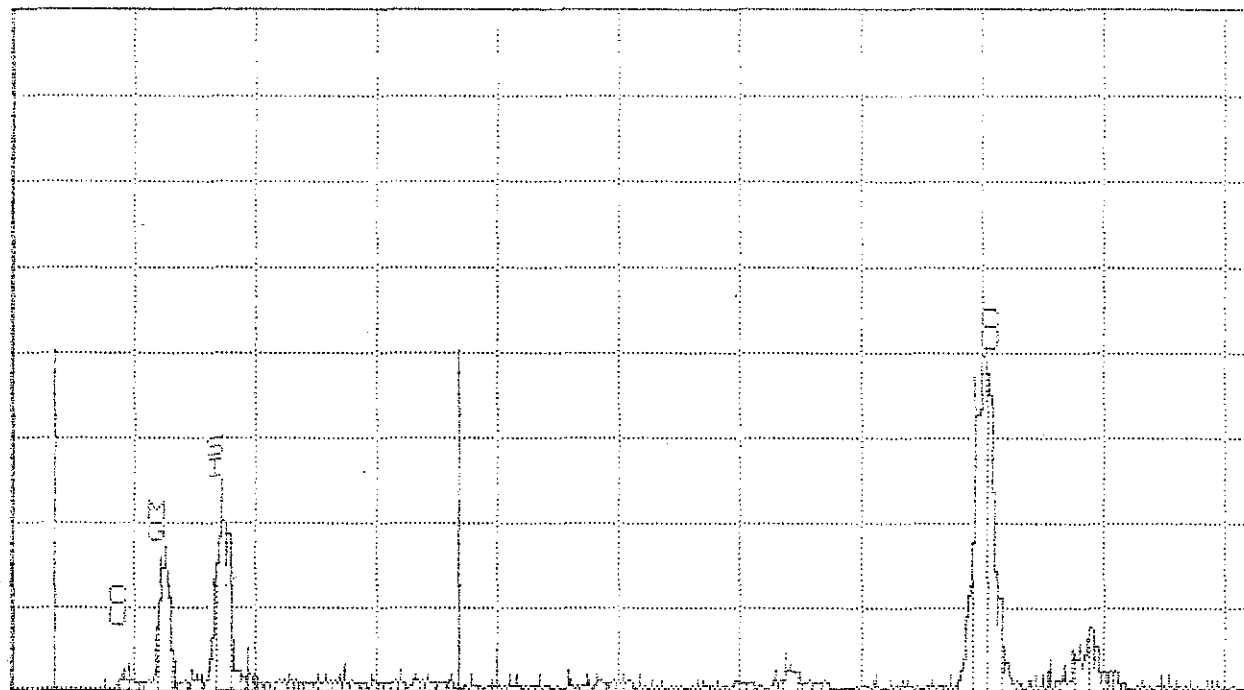
22

M31851-003 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 10:58

Cursor: 0.000keV = 0



0.000

CR-20

VFS = 128

10.240

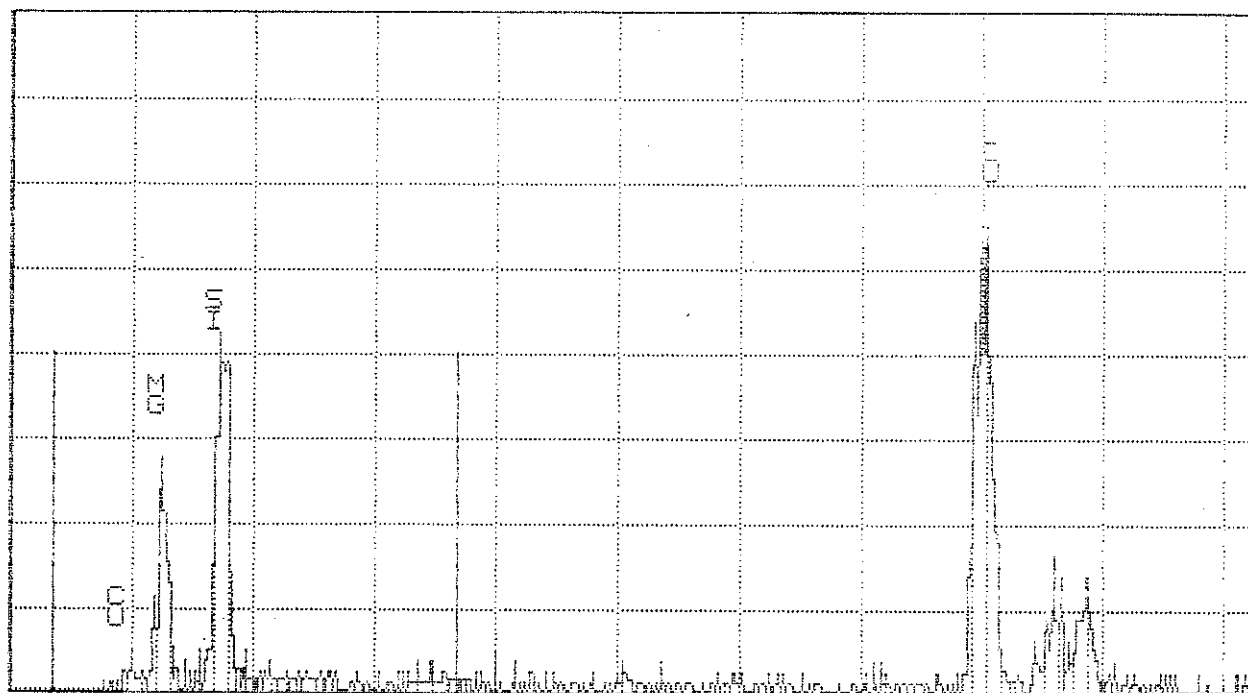
26

M31851-003 CHRYSTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 11:05

Cursor: 0.000keV = 0



0.000

CR-20

VFS = 64

10.240

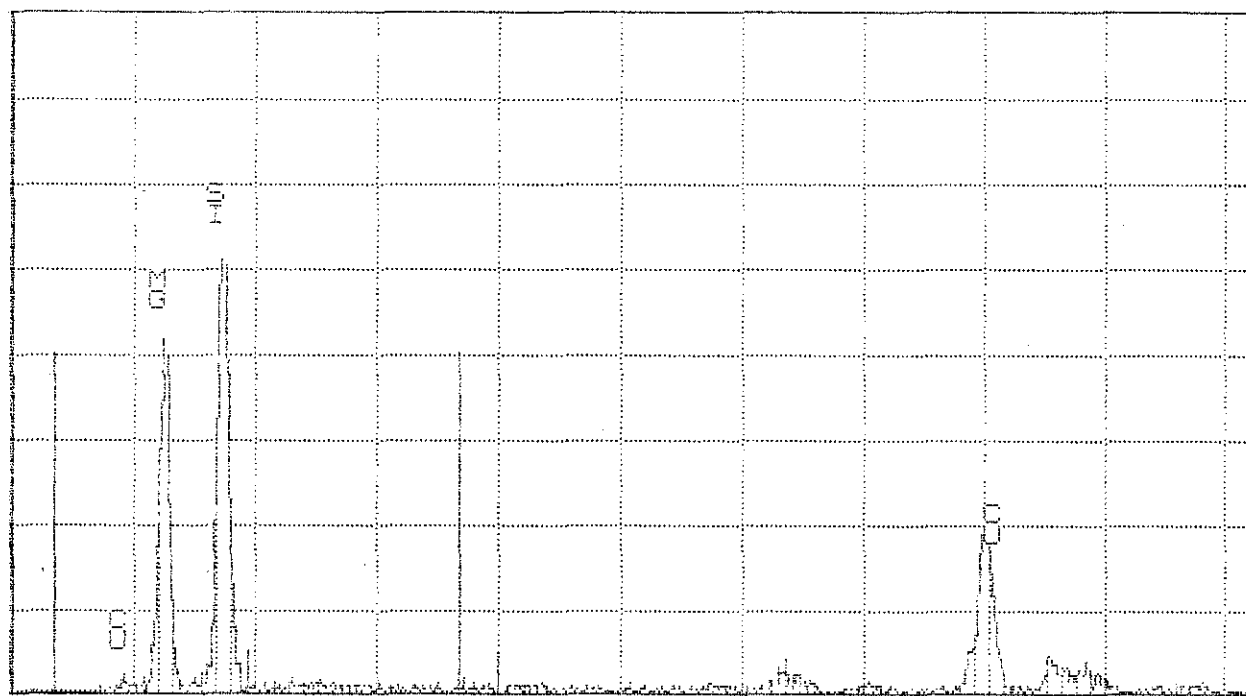
13

M31851-003 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 11:10

Cursor: 0.000keV = 0



0.000

CR-20

VFS = 256

10.240

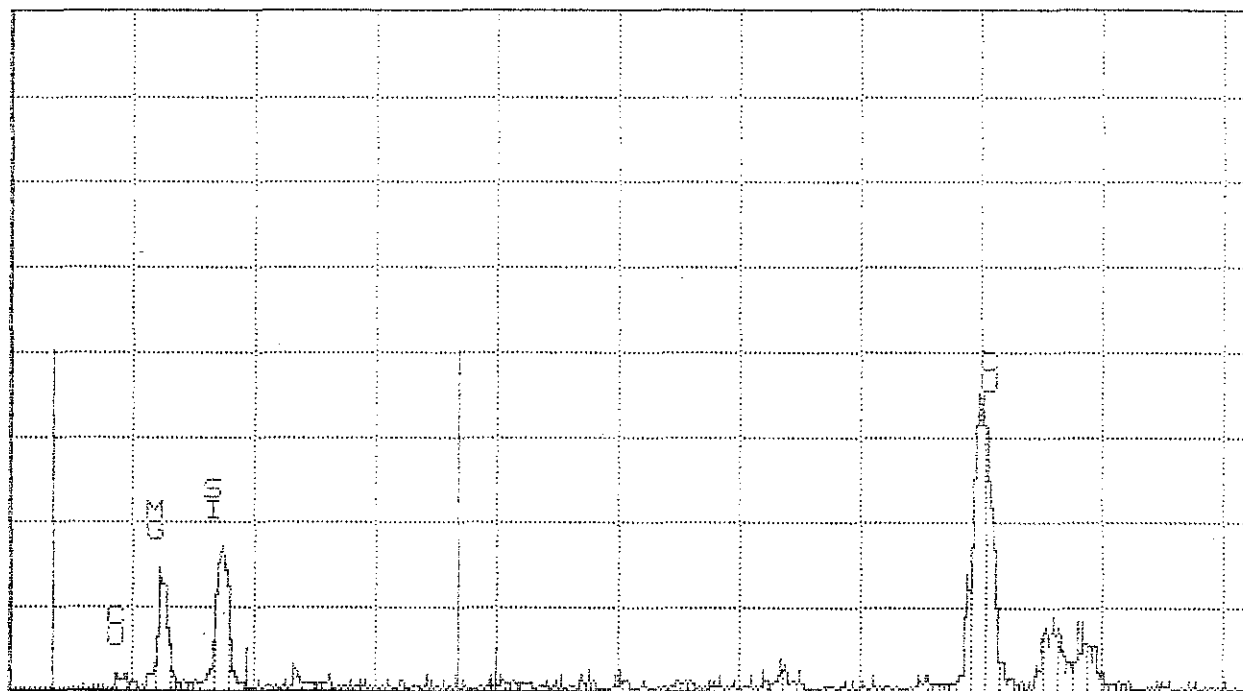
18

M31251-003 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 11:15

Cursor: 0.000keV = 0



0.000

CR-20

VFS = 128

10.240

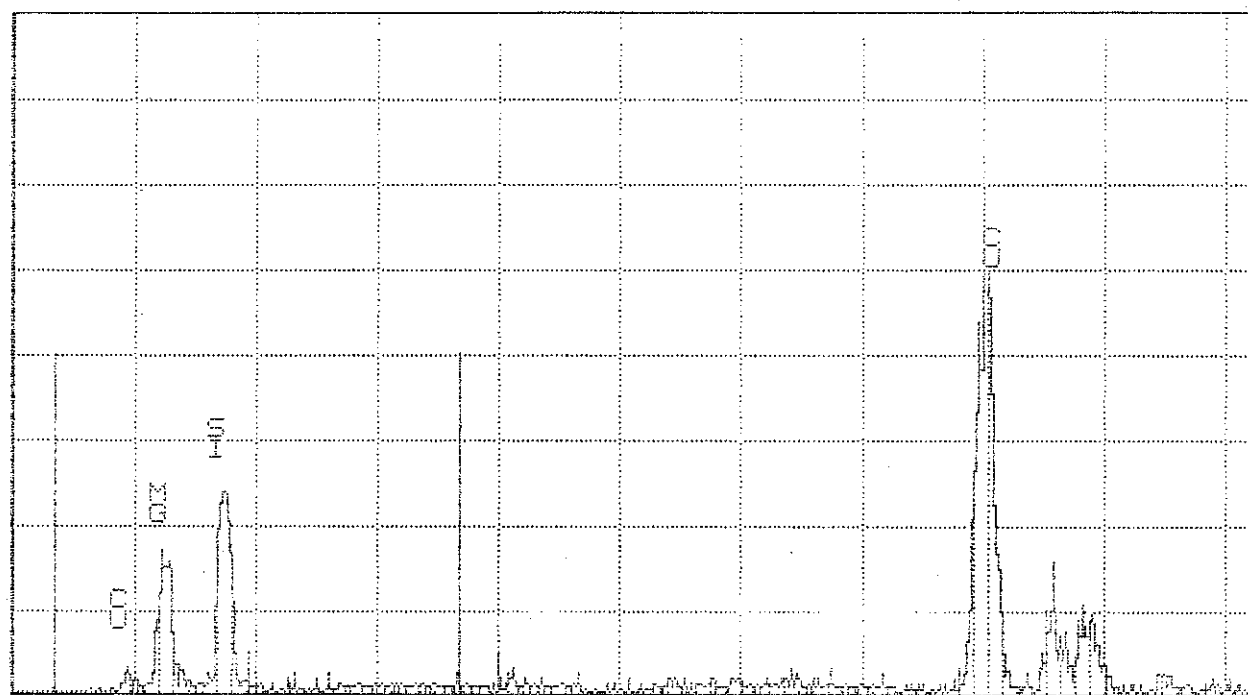
20

M31851-003 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 11:21

Cursor: 0.000keV = 0



0.000

CA-20

VF5 = 123

10.240

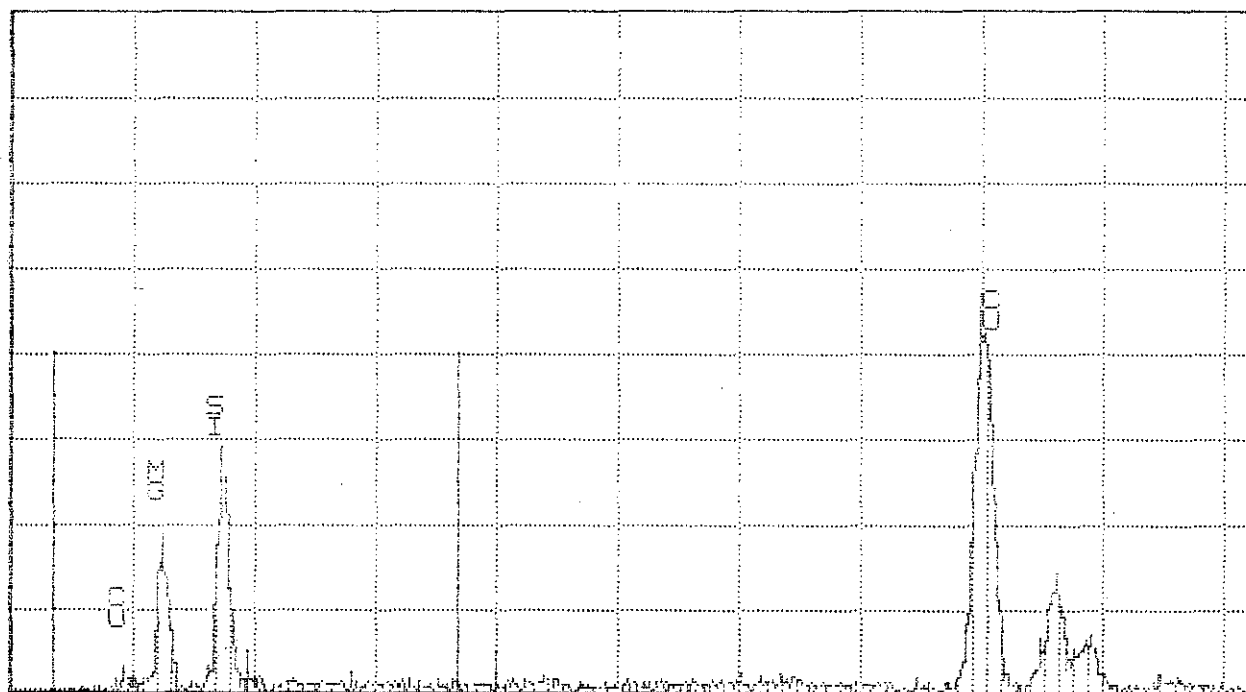
27

M31851-003 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-03 11:34

Cursor: 0.000keV = 0



0.000

CA-20

VFS = 256

10.240

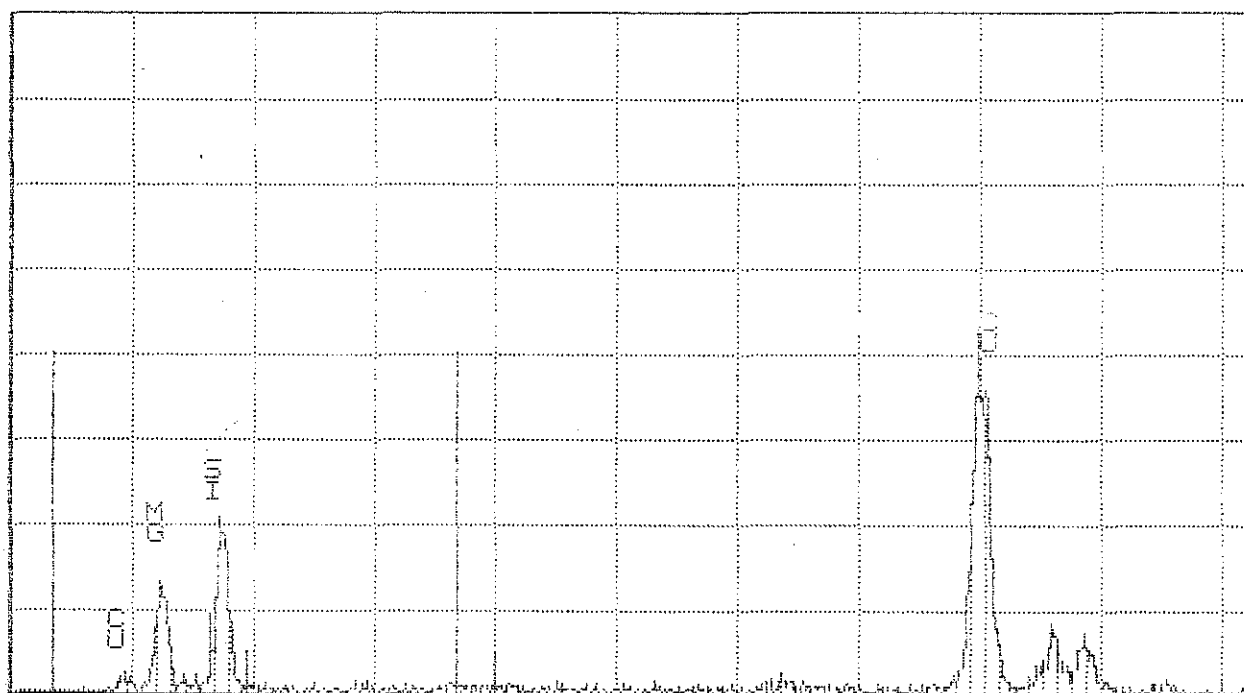
45

M31851-003 CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

MON 25-AUG-02 11:39

Cursor: 0.000keV = 0



0.000

DR-20

VFS = 256

10.240

20

M31651-003 CHRYSOTILE

SECTION 7



Dust Counting Method

Cell Field Count

0	0	0	0	1
---	---	---	---	---

Average Field Count 0.20 = AFC

Average Blank Field Count = ABFC

Average Net Field Count = ANFC

Field Area (sq. mm) 0.25 = FA

Volume of Sample (ml) 100.00 = SV

Additional Dilution Factor 1 = DF

Cell Depth (mm) 1 = CD

Cell Factor 4000 = CF
 $1000 / (\text{field area}) \times (\text{cell depth})$

Air Volume 1.76 = AV
Sampled (cu.ft.)

Dust Concentration #VALUE! particles per cubic foot

Dust Concentration = $\text{ANFC} \times \text{CF} \times \text{SV} \times \text{DF} / \text{AV}$

Project Name

JM AC Pipe

Project Number

Sample Number

Sample Location

Blank



Dust Counting Method

Cell Field Count

1	2	0.5	1.5	1.5
---	---	-----	-----	-----

Average Field Count 1.30 = AFC

Average Blank Field Count 0.20 = ABFC

Average Net Field Count 1.10 = ANFC

Field Area (sq. mm) 0.25 = FA

Volume of Sample (ml) 100.00 = SV

Additional Dilution Factor 1 = DF

Cell Depth (mm) 1 = CD

Cell Factor 4000 = CF
 $1000 / (\text{field area}) \times (\text{cell depth})$

Air Volume 1.75 = AV
Sampled (cu.ft.)

Dust Concentration 251,429 particles per cubic foot

Dust Concentration = $\text{ANFC} \times \text{CF} \times \text{SV} \times \text{DF} / \text{AV}$

Project Name

JM AC Pipe

Project Number

Sample Number

Background

Sample Location

IWA - Area Background



Dust Counting Method

Cell Field Count

44.5	48.5	57.5	52	52.5
------	------	------	----	------

Average Field Count 51.00 = AFC

Average Blank Field Count = ABFC

Average Net Field Count = ANFC

Field Area (sq. mm) = FA

Volume of Sample (ml) = SV

Additional Dilution Factor = DF

Cell Depth (mm) = CD

Cell Factor = CF
1000/(field area) x (cell depth)

Air Volume = AV
Sampled (cu.ft.)

Dust Concentration particles per cubic foot

Dust Concentration = ANFC x CF x SV x DF / AV

Project Name

JM AC Pipe

Project Number

Sample Number

P-1-MI-MM

Sample Location

IWA-Personnel



Dust Counting Method

Cell Field Count

na	na	na	na	na
----	----	----	----	----

Average Field Count #DIV/0! = AFC

Average Blank Field Count 0.20 = ABFC

Average Net Field Count #DIV/0! = ANFC

Field Area (sq. mm) 0.25 = FA

Volume of Sample (ml) 100.00 = SV

Additional Dilution Factor 1 = DF

Cell Depth (mm) 1 = CD

Cell Factor 4000 = CF
1000/(field area) x (cell depth)

Air Volume na = AV Pump Failed
Sampled (cu.ft.)

Dust Concentration #DIV/0! particles per cubic foot

Dust Concentration = ANFC x CF x SV x DF / AV

Project Name

JM AC Pipe

Project Number

Sample Number

P-1-MI-RH

Sample Location

IWA - Personnel

SECTION 8

SKIL®

7



5400-01

F0125400AA

START LINES WITH EASE

ON DE DEUX POINTS -
S LIGNES DROITES

AS CON FACILIDAD

SKIL/
RIGGER

SECURE STARTS

SEC VERROUILLAGE DE SÉCURITÉ -
DÉMARRAGE INTÉPÉSTIF

ON CIERRE DE SEGURIDAD:
UES ACCIDENTALES

LOWER
NT PENDING

WHEN
W CUT-OFFS

INFÉRIEUR DE TYPE ANTIBLOCAÉ
- RÉDUIT LES ACCROCHAGES
NAGE DES MATÉRIAUX MINCES

NTIENGANCHES (PATENTE)
S ENGANCHES CUANDO
E TROCEADO ESTRECHOS

DEPTH
T

ES
PTH

EUR VISIBLE À
S'ASSURER RAPIDEMENT
COUPE

AD DE VISTA POSTERIOR:
LA PROFUNDIDAD

R
RDS

DUST PORT

ÉVACUATION DU BRAN DE SCIE
ORIFICIO PARA POLVO

ON-TOOL WRENCH

RANGEMENT DE LA CLÉ SUR LA MACHINE
ÂREA PARA ALMACENAR LLAVES DE
TUERCA EN LA HERRAMIENTA

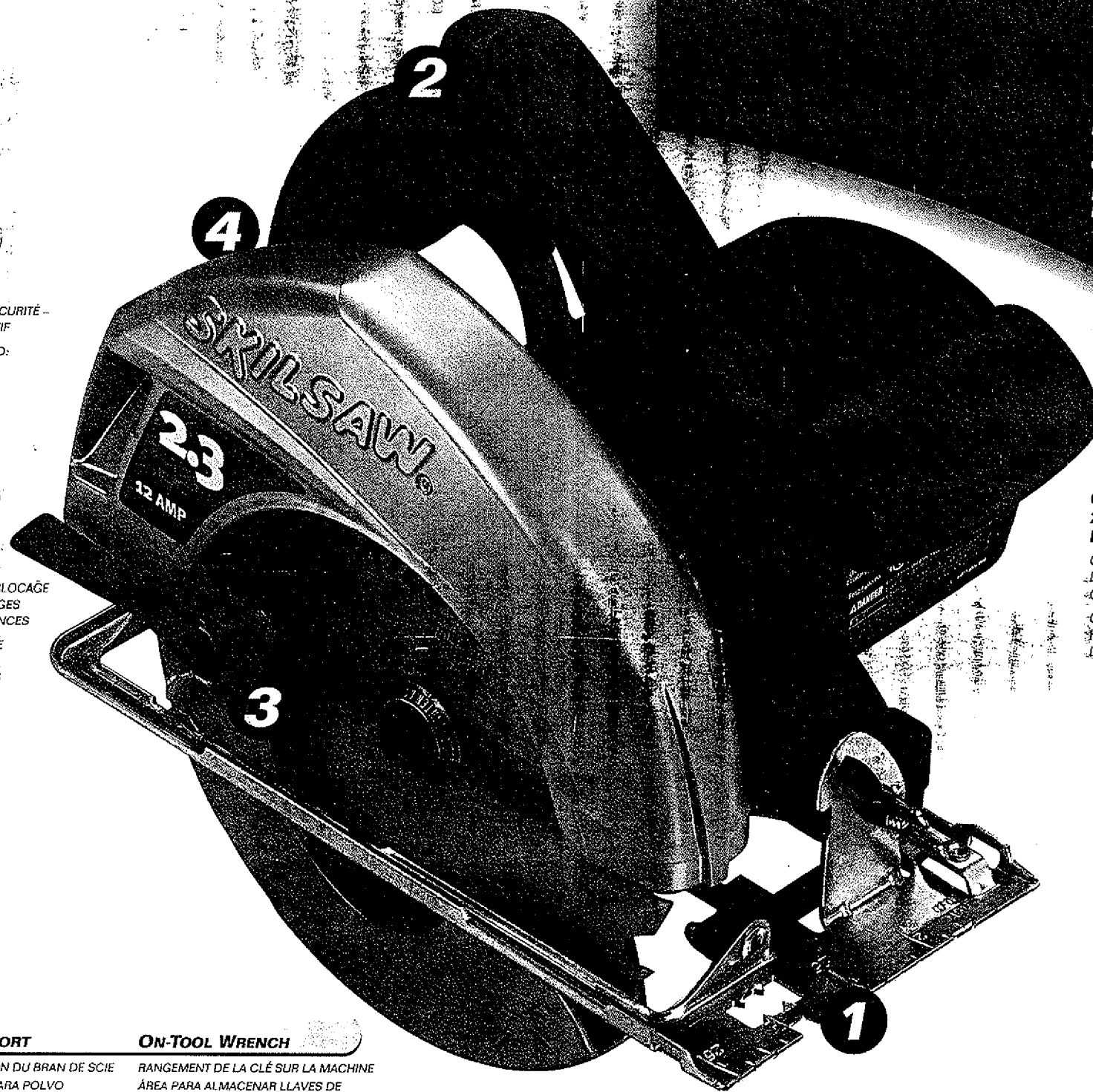
INCLUDES 20-TOOTH
STEEL BLADE

LAME EN ACIER À 20 DENTS INCLUSE
INCLUYE HOJA DE ACERO DE 20 DIENTES

CONTENTS: 5400 CIRCULAR SAW
20-TOOTH STEEL BLADE
BLADE WRENCH

CONTENU : SCIE CIRCULAIRE 5400
LAME EN ACIER À 20 DENTS
CLÉ DE LAME

CONTENIDO: SIERRA CIRCULAR 5400
HOJA DE SIERRA DE 20 DIENTES
LLAVE DE TUERCA PARA HOJA



SKIL®

SPECIFICATIONS

VOLTS	120V AC, 50-60 Hz
AMPS	12
RPM	4600/MIN.

CARACTÉRISTIQUES DU MODÈLE 5400

TENSION 120 V, 50-60 Hz

INTENSITÉ 12 A

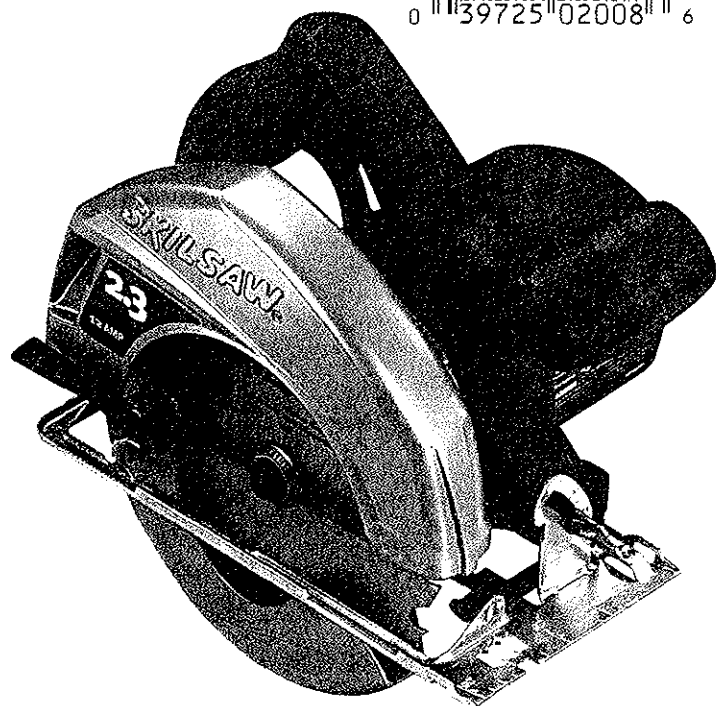
VITESSE 4 600 TR/MIN

ESPECIFICACIONES DEL MODELO 5400

V 120 V CA, 50-60 Hz

A 12 A

RPM 4 600



5400-01

F0125400AA

2.3HP MAX. MOTOR 12 AMP MOTOR

7 1/4" SKILSAW®

- ✓ **TWO POINT LINE OF SIGHT**
CUT STRAIGHT LINES WITH EASE
- ✓ **SAFETY LOCK/GUARDED TRIGGER**
MINIMIZES ACCIDENTAL STARTS
- ✓ **ANTI-SNAG LOWER GUARD**
(PATENT PENDING)
REDUCES SNAGS WHEN
MAKING NARROW CUT-OFFS
- ✓ **REAR VIEW DEPTH ADJUSTMENT**
QUICKLY ASSURES DESIRED CUT DEPTH

CLICK IT

DIAL IT

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USA

Outperforms Conventional Abrasive Blades

100X

LONGER LASTING
Than Conventional Abrasive Blades

3X

FASTER CUTTING

100X PLUS DURABLE que
les lames abrasives
classiques

100X MAYOR
DURACION
que los discos
abrasivos
convencionales

COUPE 3X
PLUS
RAPIDE

3X
CORTE
MAS
RAPIDO

TURBO

**DIAMOND
HARD**



**7" Dry/Wet
Cutting**



**Diamond
Masonry Blade**



**FOR CONCRETE,
STONE, BRICK, BLOCK,
STUCCO, TILE, BACKERBOARD
AND CEMENT TYPE SIDING**

Pour béton, pierre, brique, bloc, stucco et carreaux
Para hormigón, piedra, ladrillo, bloque, estuco y losa

Longer Blade Life

7 mm

Rim Height
Hauteur de couronne de 7 mm
Altura del borde, 7 mm

