7N-25-CR
77702

SURFACE SCIENCE LABORATORIES

P.81

The University of Alabama in Huntsville

Dr. J. C. Gregory

Dr. J. J. Weimer

XPS Analysis

Monday, July 8, 1991

For: R. Kamenetzky
Mail Code EH53
NASA-Marshall Space Flight Center

Samples: Viton 747
Viton 747-1
Viton
Silicon Ruber STS 41
Silicon Rubber
Halar
RTV511

(NASA-CR-190088) XPS ANALYSIS Monthly Technical Report, 8 Jul. 1991 (Alabama Univ.) 81 p

N92-70523

Unclas
Z9/25 0077702

July 8, 1991

Technical Report

The following materials were received from MSFC on June 27, for analysis:

Viton 747	sample 1-10
Viton 747-1	sample psi#1
Viton	sample 111L
Silicon Rubber STS 41	sample S-383(A)

Additional samples were delivered on July 2:

Silicon Rubber baked out	sample S-383(2)
Halar	fresh cut surface
RTV511	fresh cut surface

A total of ten (10) samples were analyzed. All samples were returned with this report.

1.	viton1u	viton 747 sample 1-10 unexposed (back) side
2.	viton1x	viton 747 sample 1-10 exposed (front) side
3.	viton2u	viton 747-1 sample psi#111 unexposed (back) side
4.	viton2x	viton 747-1 sample psi#111 exposed (front) side
5.	viton3u	viton sample 111L unexposed (back) side
6.	viton3x	viton sample 111L exposed (front) side
7.	si383a	silicon rubber sts 41 sample s-383(a)
8.	si383r	silicon rubber baked out reference
9.	halarr	halar reference sample
10.	rtv511r	rtv511 reference sample

This report contains the results with the samples labelled as described above. Each analysis is divided by a blue colored separation sheet. For the viton samples (1-6), the first page contains a summary table of elemental concentrations (atomic percent) on all six samples. The next pages present the quantitative chemical analysis in atomic percent for each particular sample. These pages for each sample show the XPS scans in the order of survey over a wide energy range, utility on a narrow energy range, and high resolution on each of the major components. The high resolution scans show the area used for quantitative determination of atomic concentrations.

jjw

on Gun:OFF X-ray:OFF Mg Technique:ESCA

0.6mPa 7/1/91 17:28

Atomic Concentration (%) Summary Table Screen 1 of 1

Page 1 of 1

1 File Name	Angle/ Cycle	F1s	O1s	C1s	Si2p	Ca2p	Cu2p3	Mg2s	Co2p3	Mo3d	K2p
viton1x_3		29.81	23.17	36.41	10.61	-	-	-	-	-	-
iton2x_3		46.24	10.64	23.39	-	6.96	1.60	9.92	1.24	-	-
iton3x_3		28.21	34.43	21.47	-	2.86	0.60	8.52	-	3.90	-
viton1u_3		54.68	26.44	10.98	7.91	-	-	-	-	-	-
iton2u_4		57.08	12.63	24.72	4.22	-	-	-	-	-	1.35
viton3u_3		19.57	23.85	42.68	13.54	-	-	-	-	-	0.37

Print Summary Delete Entry Clear AC Summary Exit

on Gun:OFF X-ray: ON Mg Acq complete Technique:ESCA

0.6mPa 7/1/91 14:47

Atomic Concentration

1 Peak Measurement Use Height Area Element Name

2 Included Regions 1 2 3 4

Atomic Concentration Table

File: viton1u_3

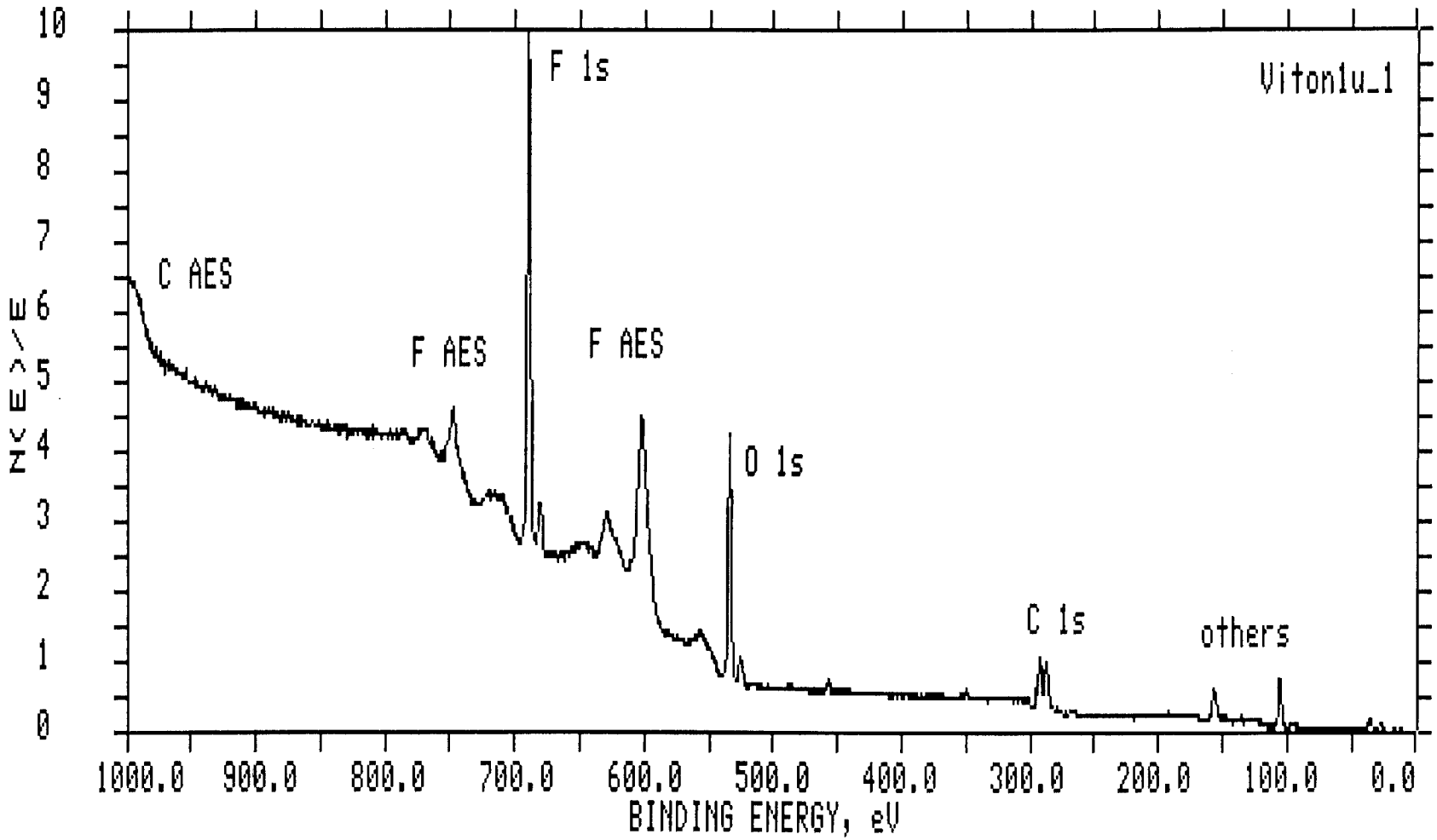
Comment: viton 747 sample 1-10 unexposed area

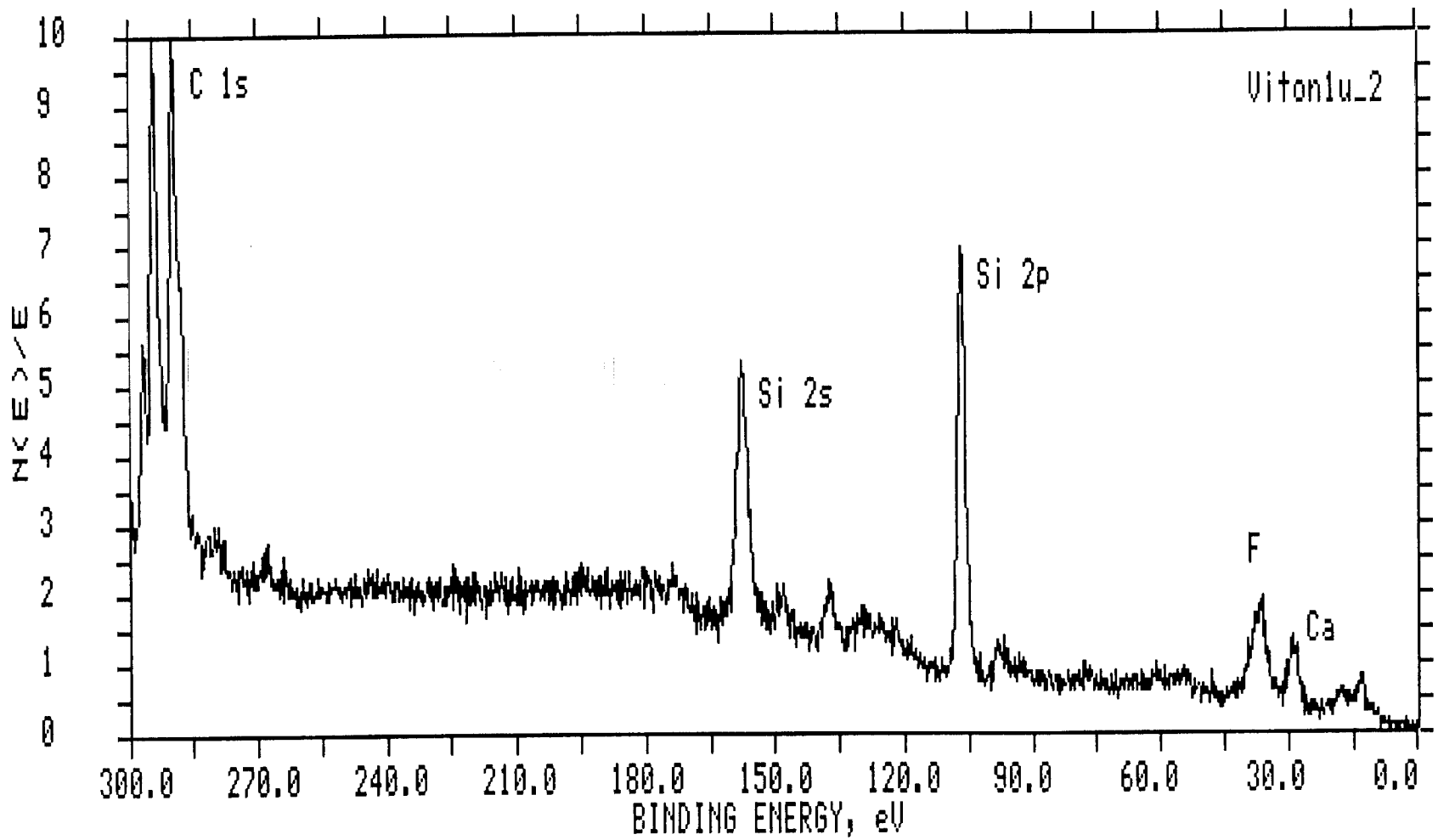
Input Lens: Large Area Omni Focus

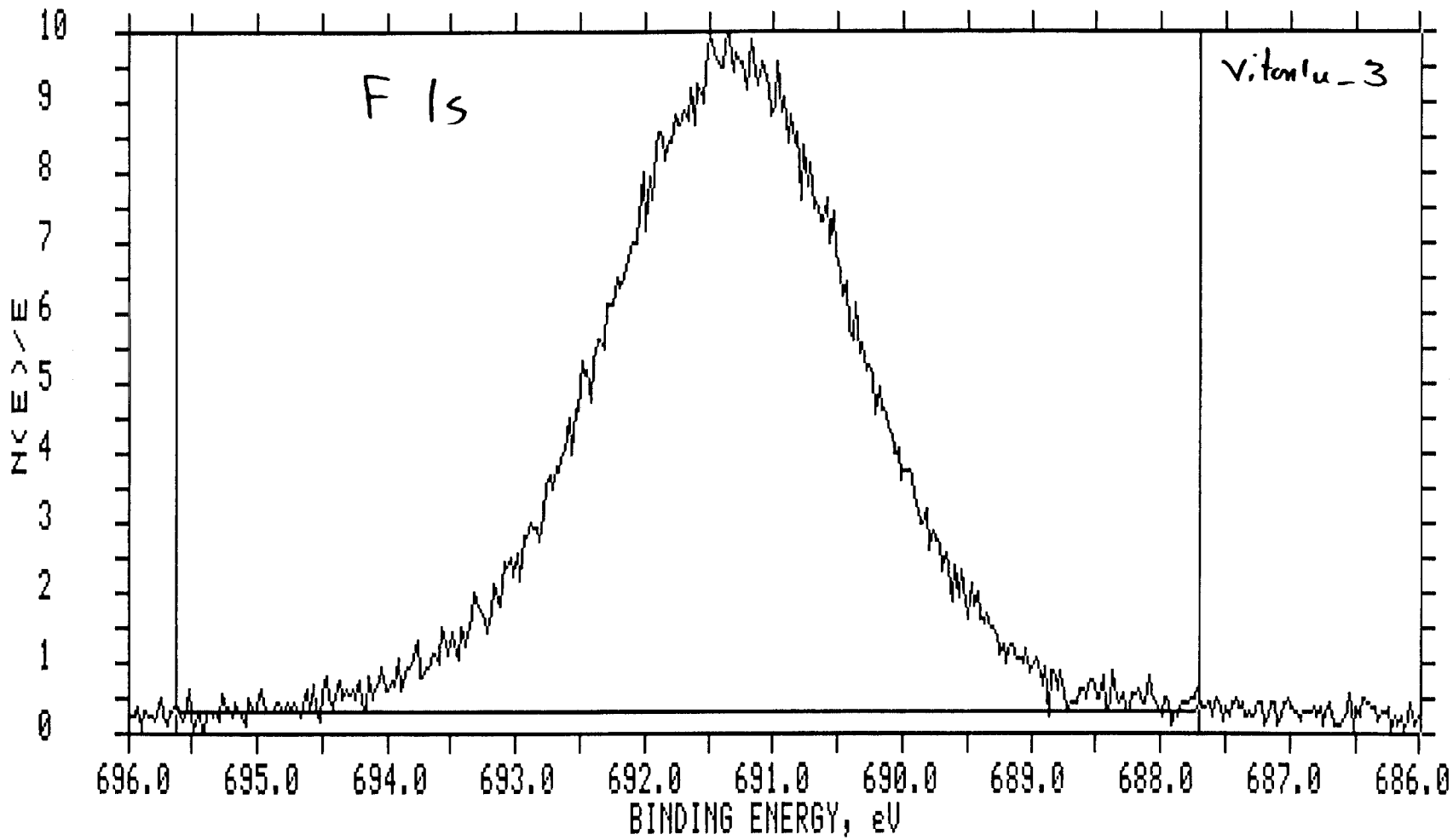
Element	Concentration(%)	Sens. Factor
F1s	54.68	1.000
O1s	26.44	0.711
C1s	10.98	0.296
Si2p	7.91	0.339

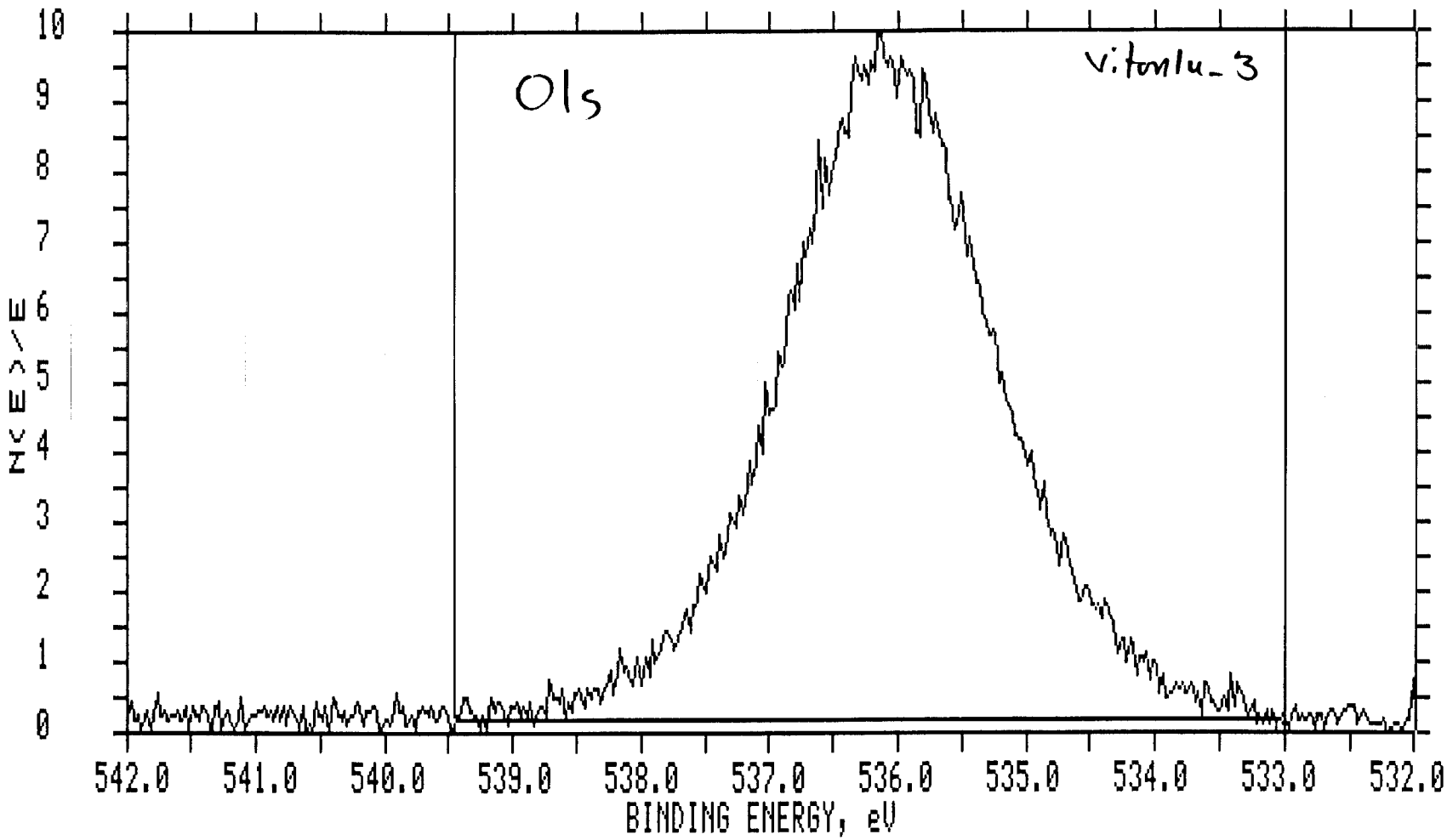
AC Omit Exit

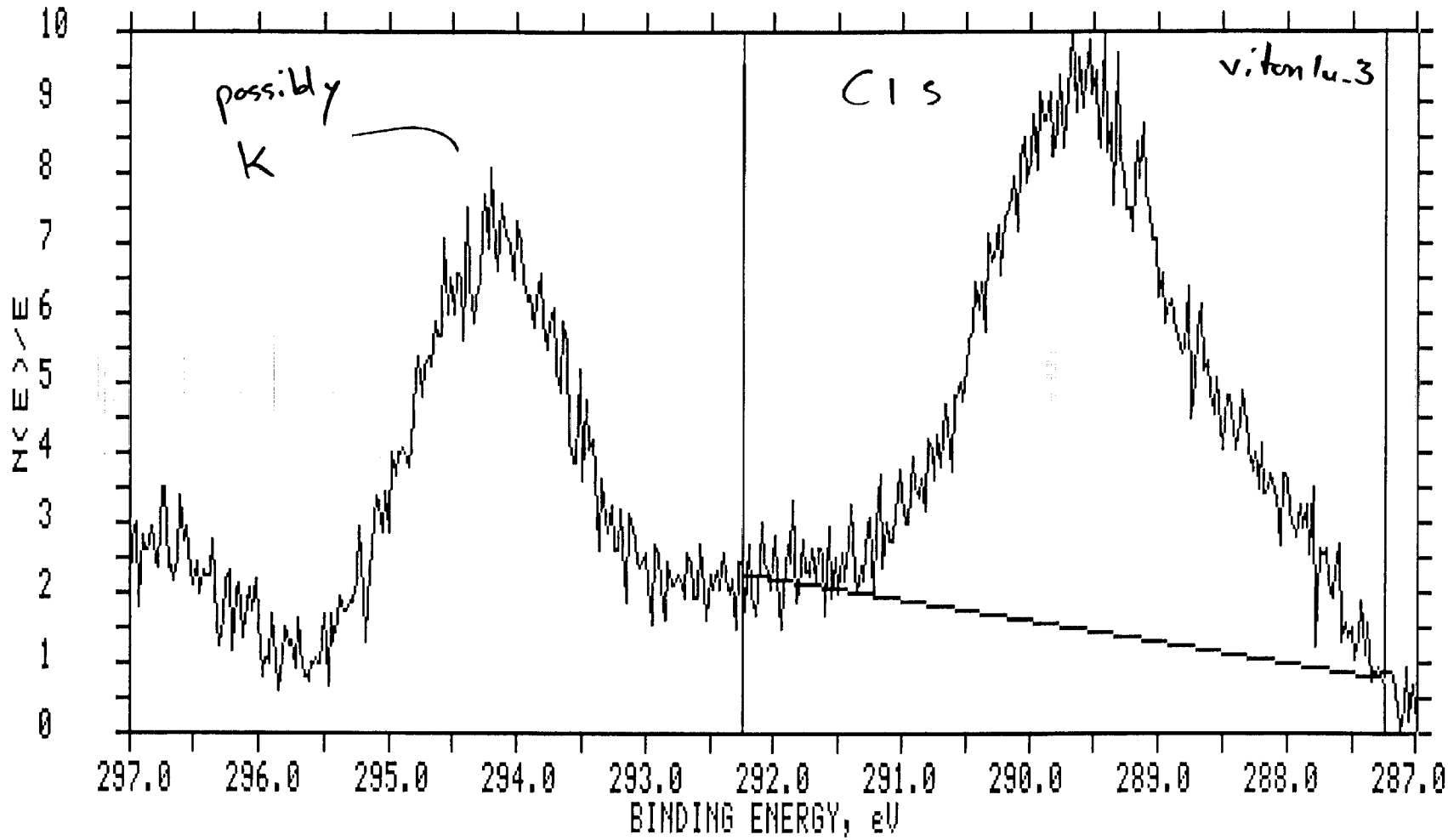
Table All

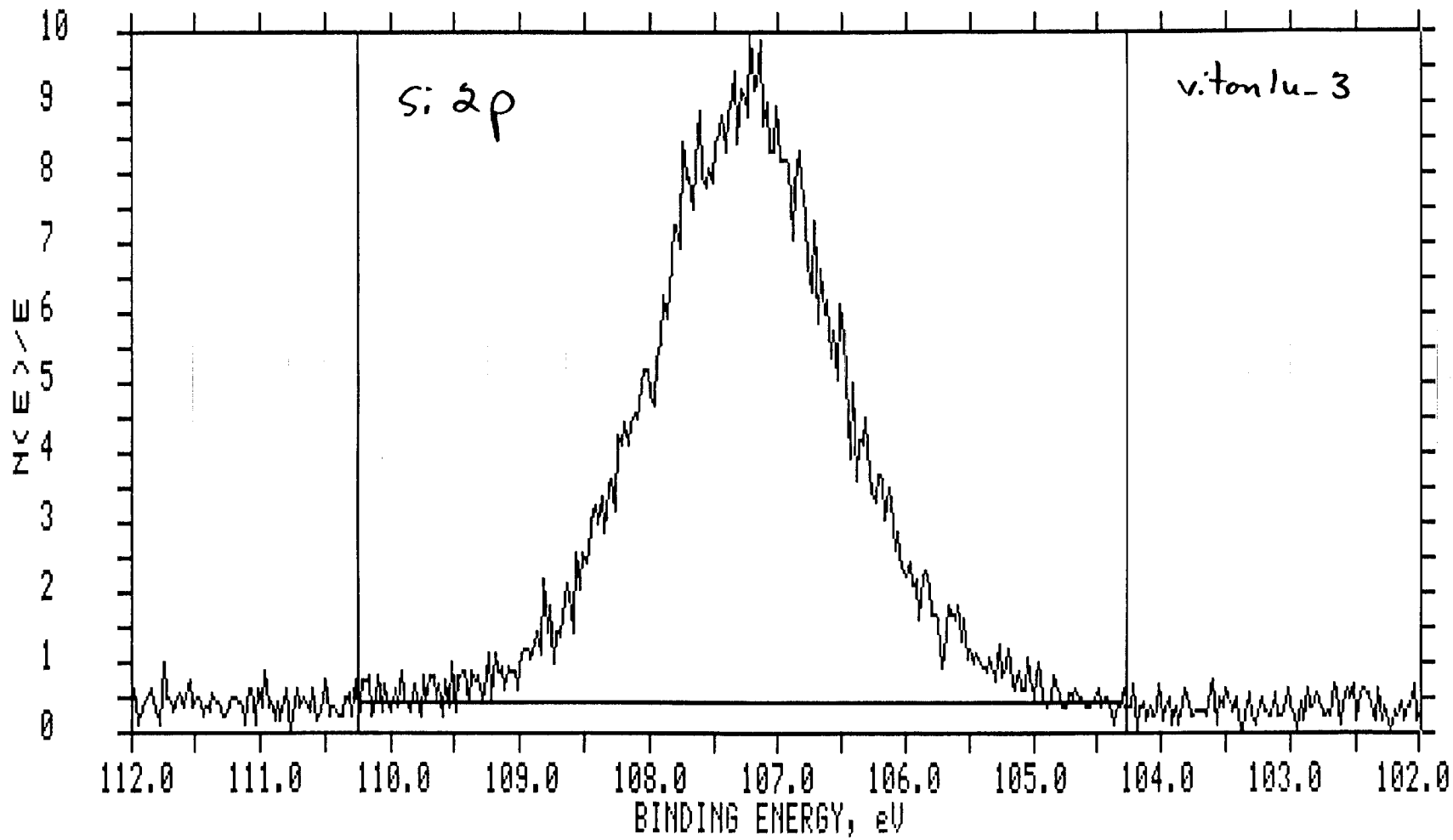

Vitonlu_1
F 1s
C AES
F AES
F AES
O 1s
C 1s
others
N(E)/E
BINDING ENERGY, eV
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
0
1
2
3
4
5
6
7
8
9
10


C 1s
Vitonlu_2
Si 2p
Si 2s
F
Ca
N(E)/E
BINDING ENERGY, eV
0
1
2
3
4
5
6
7
8
9
10
300.0
270.0
240.0
210.0
180.0
150.0
120.0
90.0
60.0
30.0
0.0


F 1s
Vitonlu_3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
696.0
695.0
694.0
693.0
692.0
691.0
690.0
689.0
688.0
687.0
686.0
BINDING ENERGY, eV


O1s
Vitonlu_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
542.0
541.0
540.0
539.0
538.0
537.0
536.0
535.0
534.0
533.0
532.0
BINDING ENERGY, eV


possibly
K
C1s
viton lu_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
297.0
296.0
295.0
294.0
293.0
292.0
291.0
290.0
289.0
288.0
287.0
BINDING ENERGY, eV


Si 2p
viton lu_3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
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111.0
110.0
109.0
108.0
107.0
106.0
105.0
104.0
103.0
102.0
BINDING ENERGY, eV

Ion Gun:OFF X-ray:OFF Mg

Technique:ESCA

0.6mPa

6/30/91 15:23

Atomic Concentration

1 Peak Measurement Use Height Area Element Name

2 Included Regions 1 2 3 4

Atomic Concentration Table

File: viton1x_3

Comment: viton 747 sample 1-10 exposed area

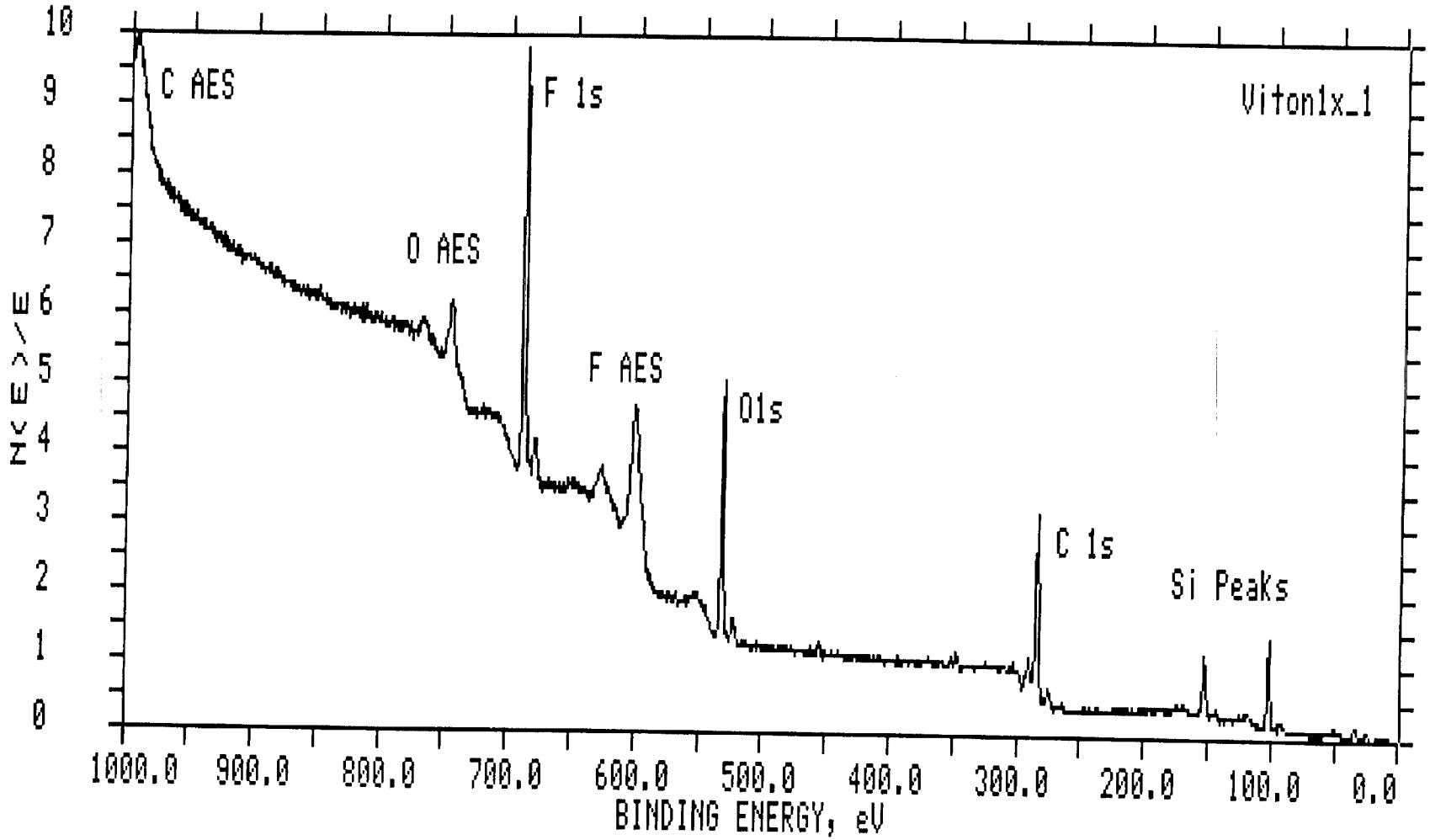
Input Lens: Large Area Omni Focus

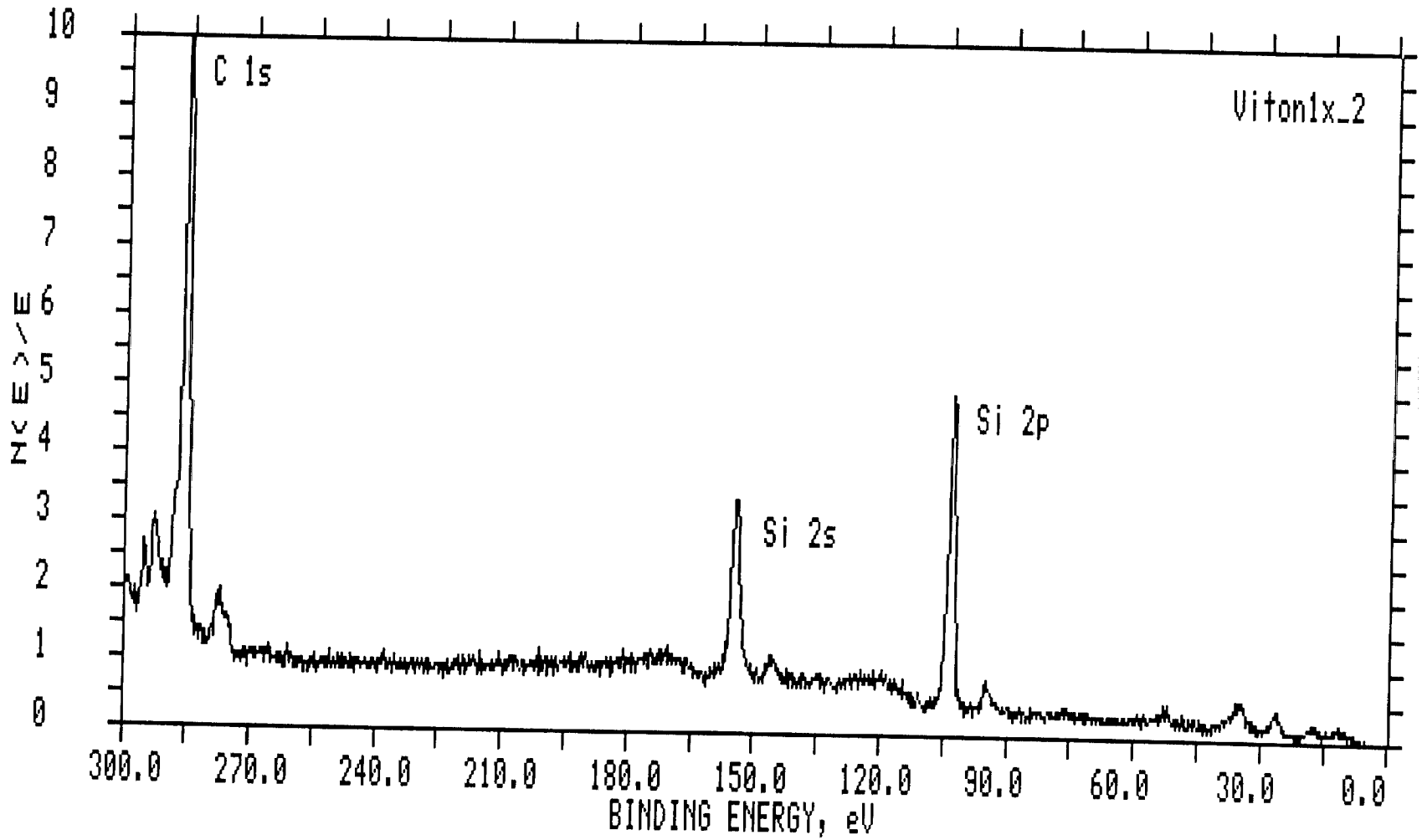
Element	Concentration(%)	Sens. Factor
F1s	29.81	1.000
O1s	23.17	0.711
C1s	36.41	0.296
Si2p	10.61	0.339

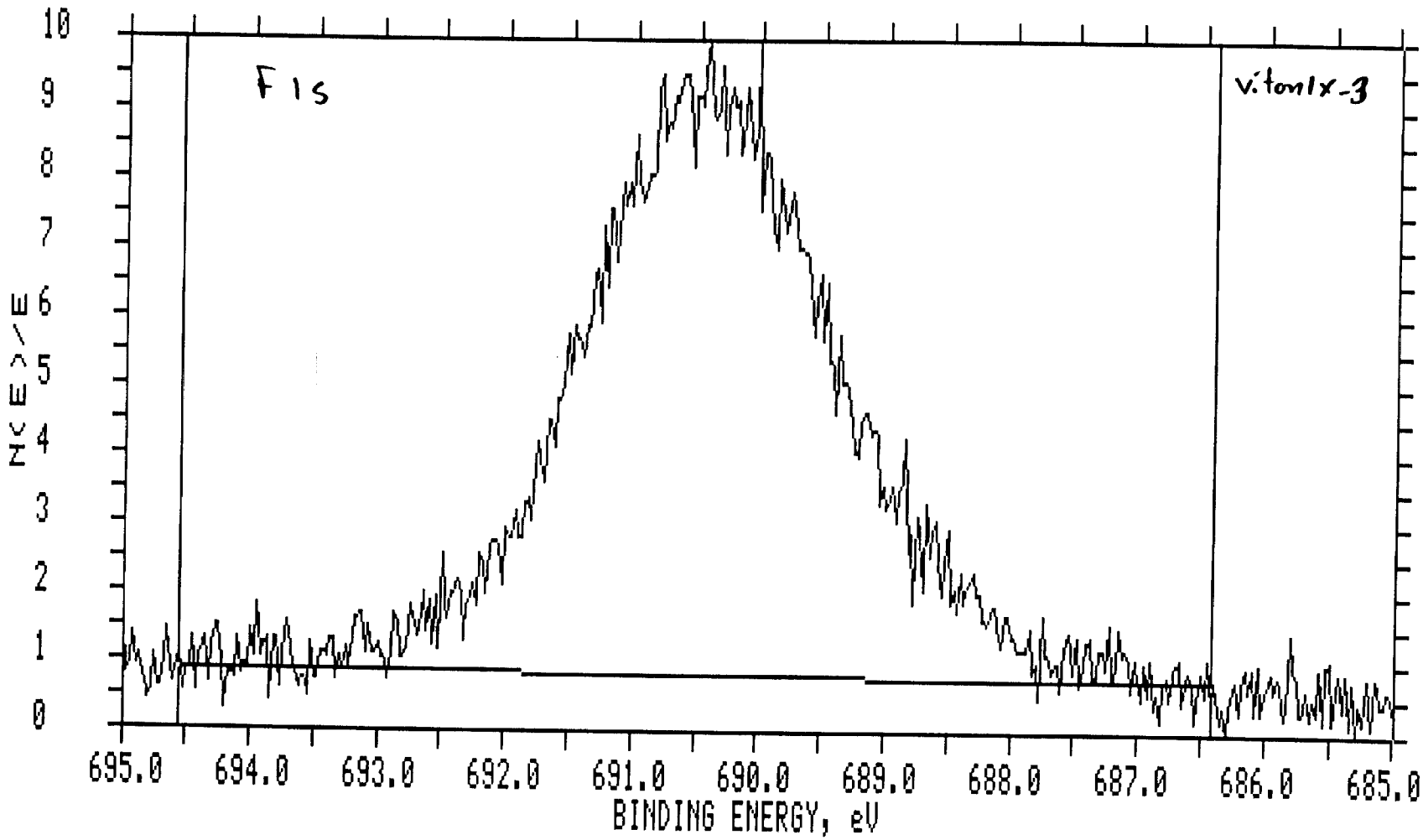
AC Table

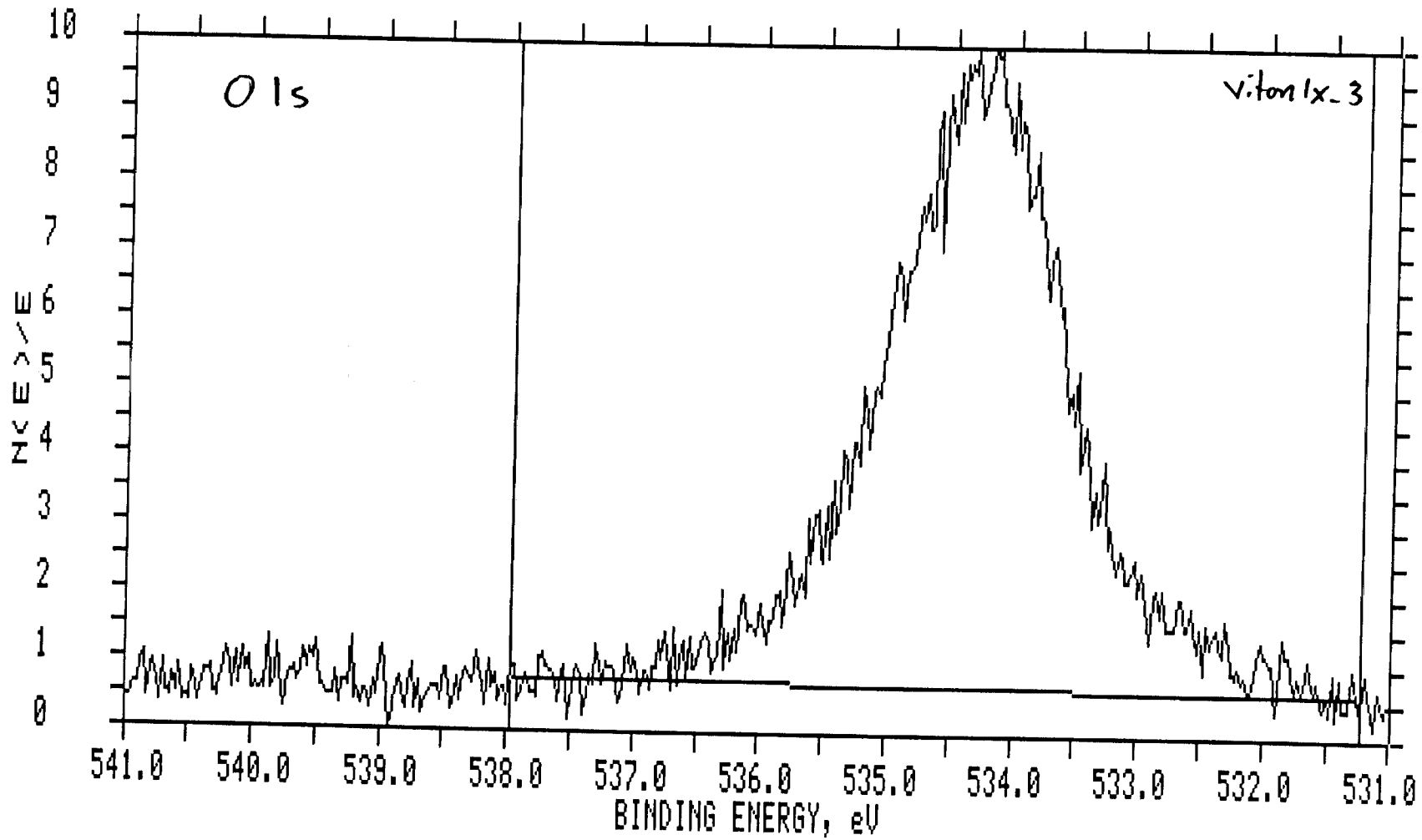
Omit All

Exit


C AES
F 1s
Viton1x_1
O AES
F AES
O1s
C 1s
Si Peaks
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
BINDING ENERGY, eV


C 1s
Viton1x_2
Si 2p
Si 2s
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
300.0
270.0
240.0
210.0
180.0
150.0
120.0
90.0
60.0
30.0
0.0
BINDING ENERGY, eV


F 1s
Viton1x-3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
695.0
694.0
693.0
692.0
691.0
690.0
689.0
688.0
687.0
686.0
685.0
BINDING ENERGY, eV


O 1s
Viton lx_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
541.0
540.0
539.0
538.0
537.0
536.0
535.0
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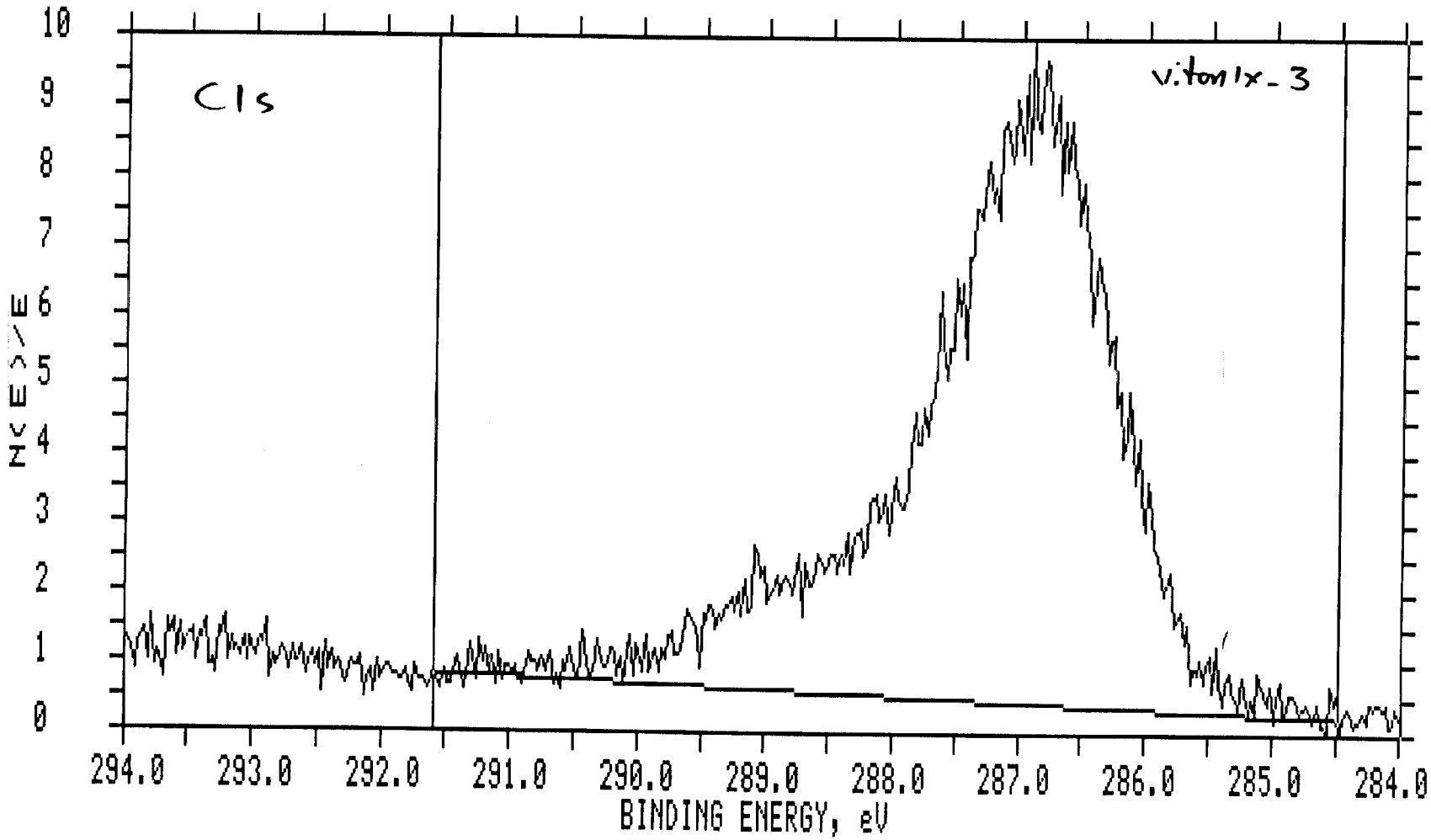
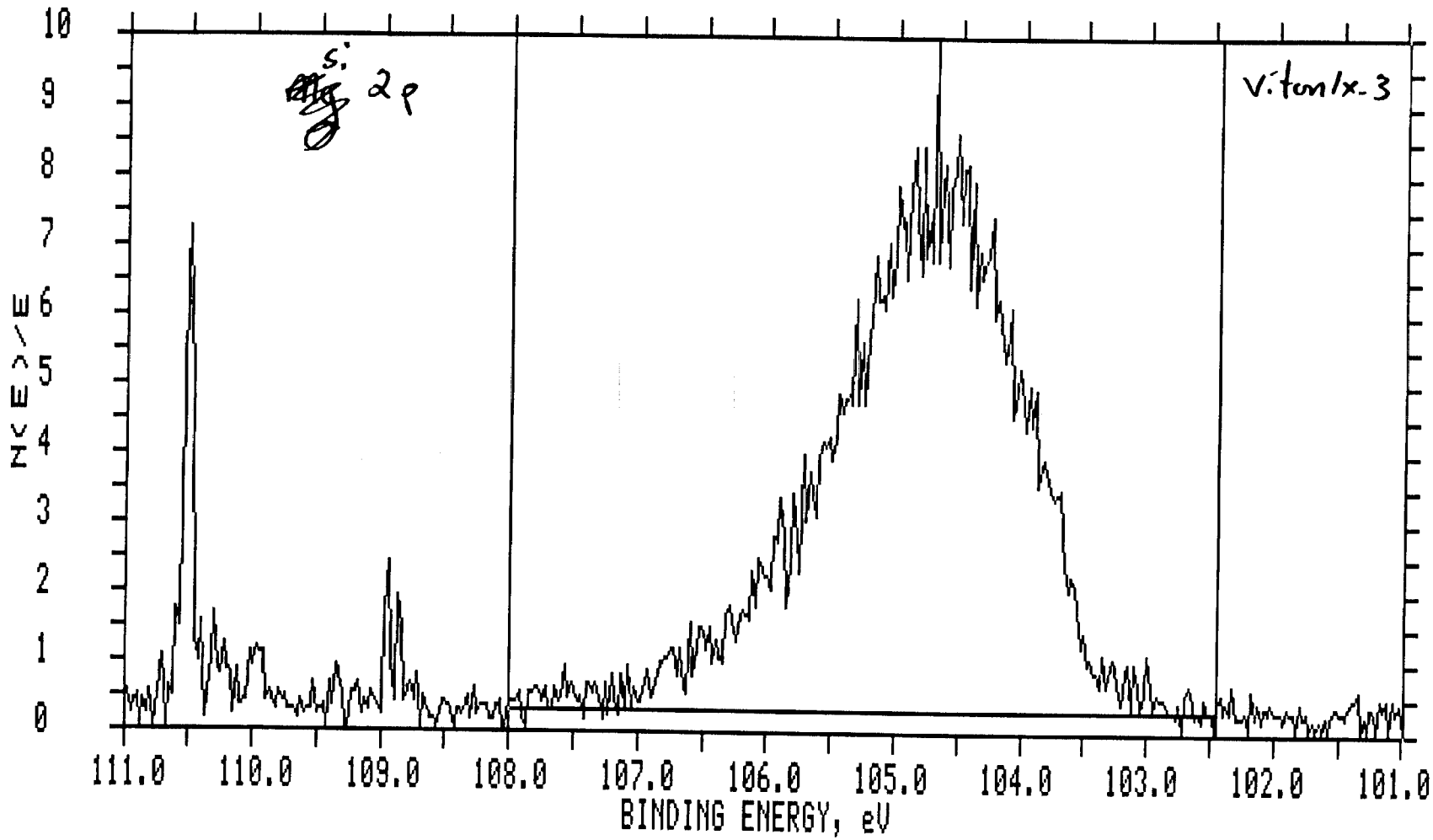
533.0
532.0
531.0
BINDING ENERGY, eV


C1s
viton 1x-3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
294.0
293.0
292.0
291.0
290.0
289.0
288.0
287.0
286.0
285.0
284.0
BINDING ENERGY, eV


Si 2p
Viton/x-3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
111.0
110.0
109.0
108.0
107.0
106.0
105.0
104.0
103.0
102.0
101.0
BINDING ENERGY, eV

n Gun:OFF X-ray:OFF Mg Technique:ESCA

0.6mPa 7/1/91 16:01

Atomic Concentration

1 Peak Measurement Use Height Area Element Name

2 Included Regions 1 2 3 4 5

Atomic Concentration Table

le: viton2u_4

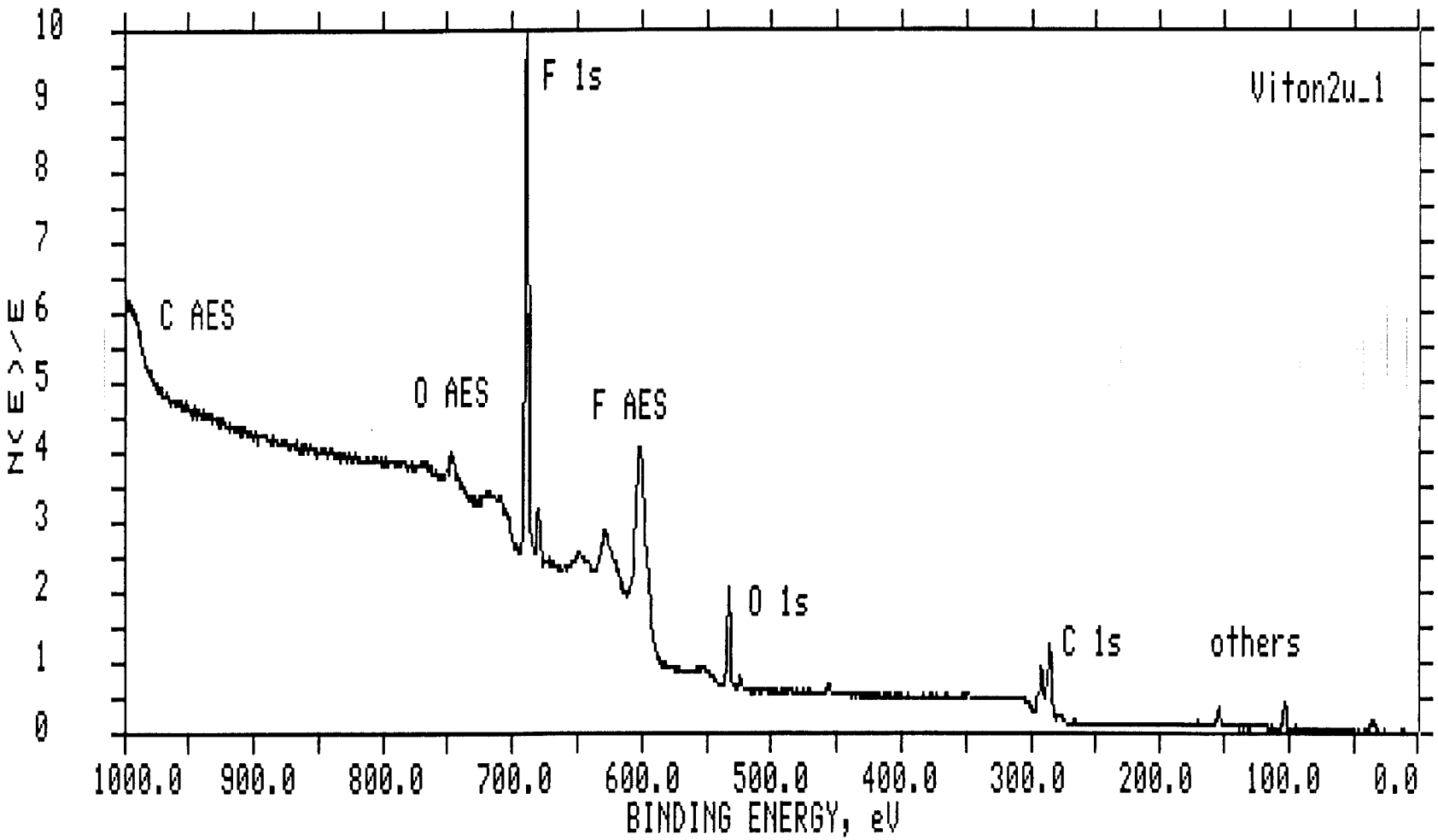
mment: viton 747 sample psi1 unexposed area

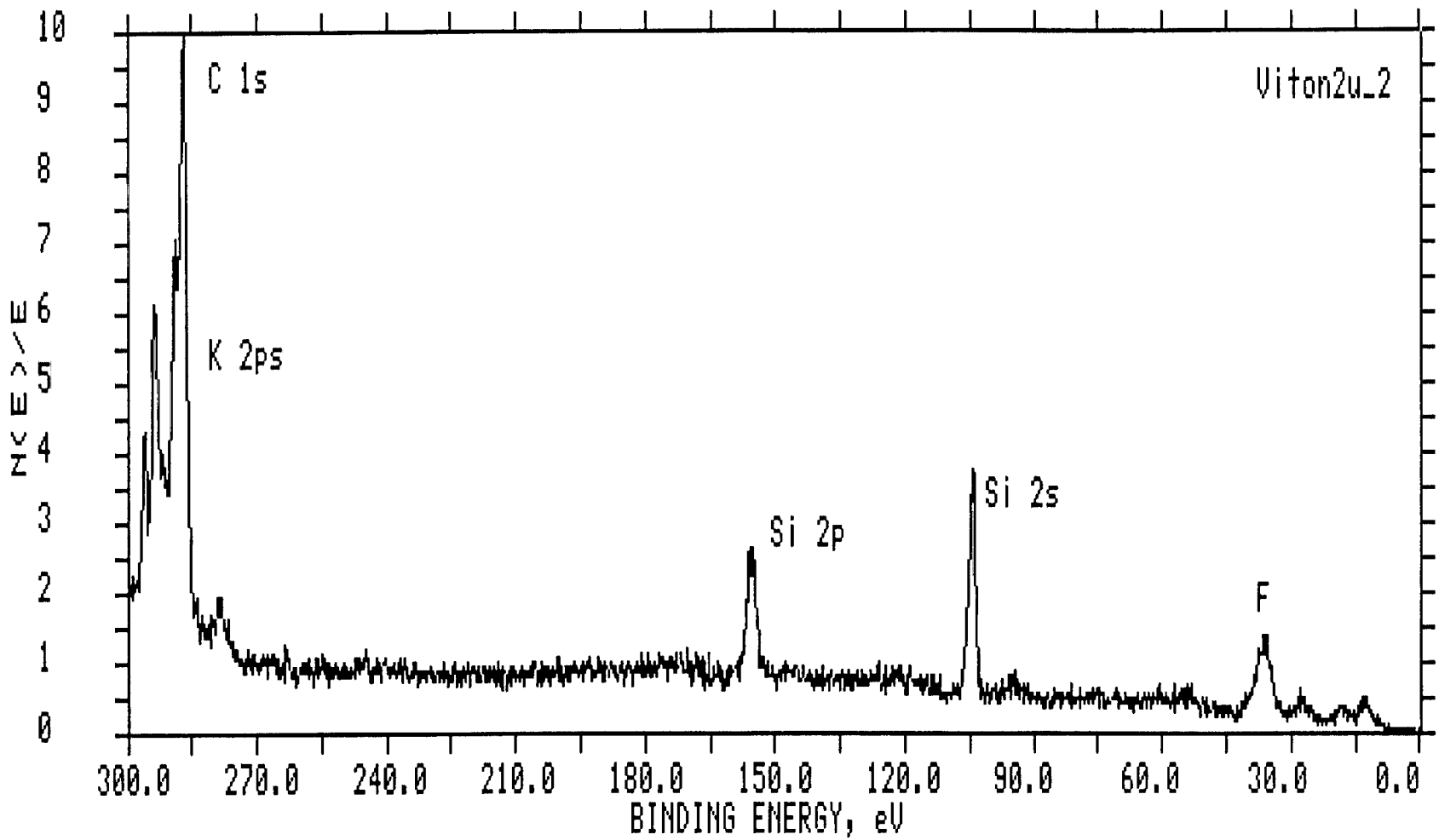
put Lens: Large Area Omni Focus

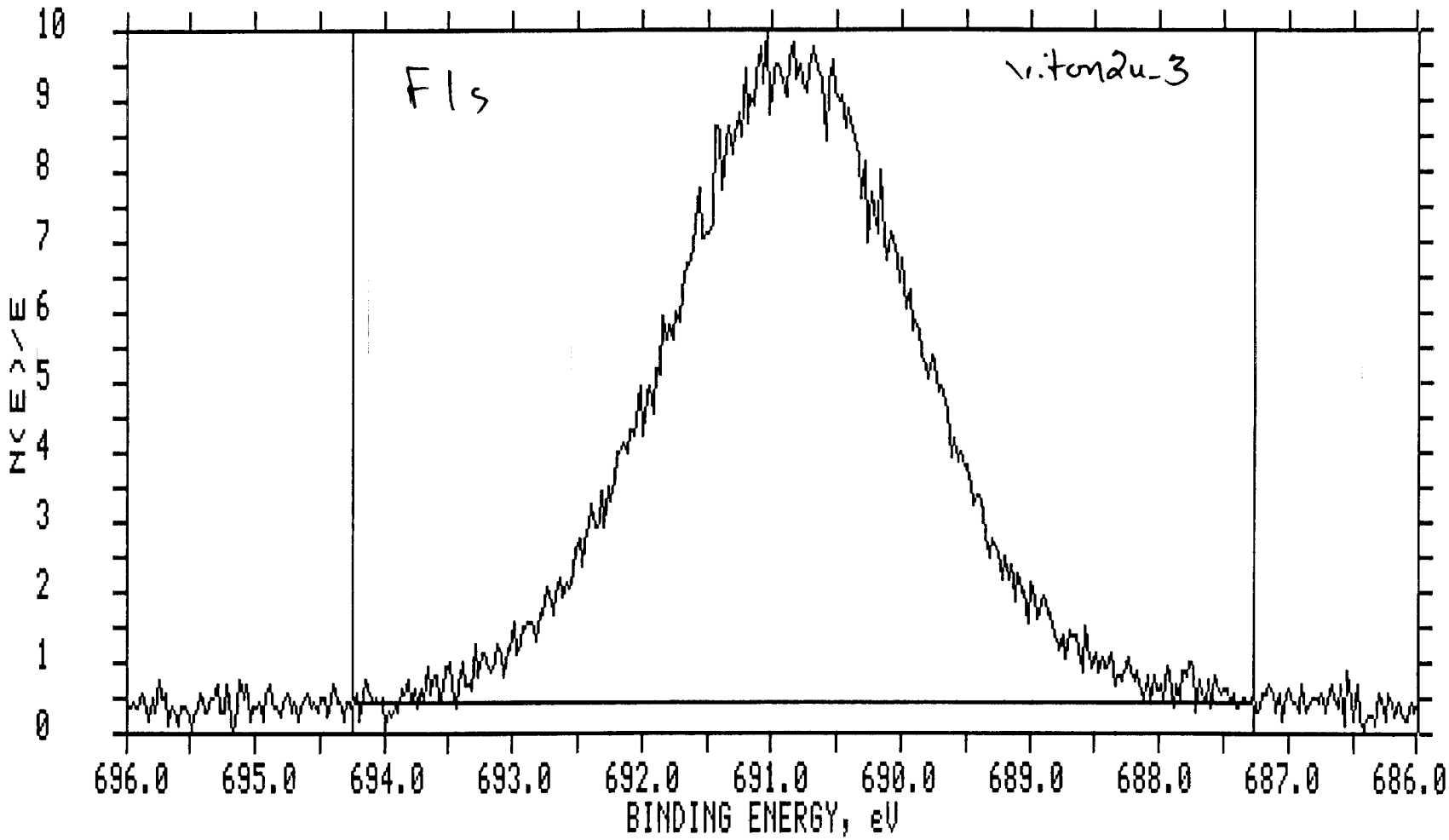
Element	Concentration(%)	Sens. Factor
F1s	57.08	1.000
O1s	12.63	0.711
C1s	24.72	0.296
Si2p	4.22	0.339
K2p	1.35	1.466

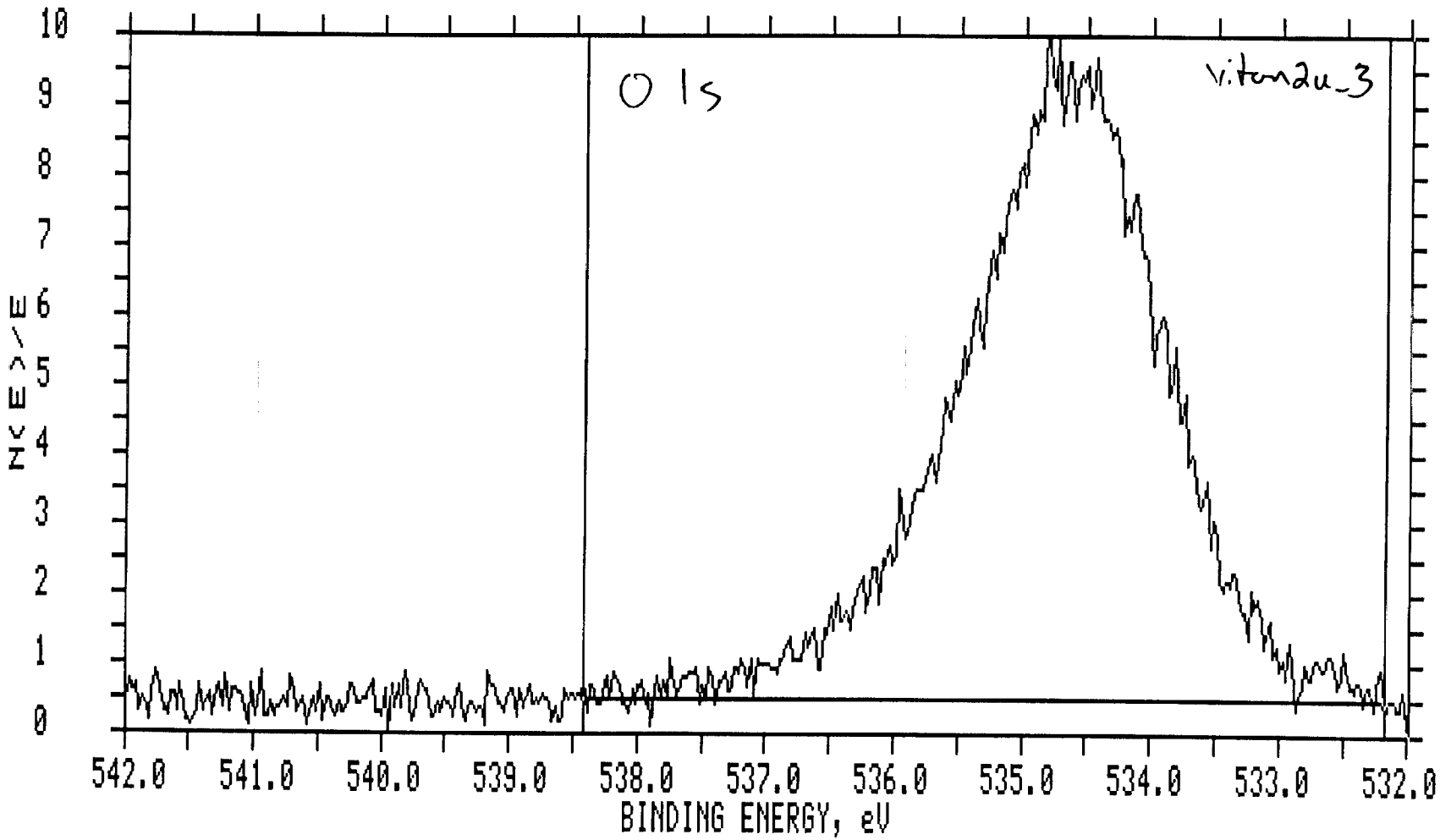
AC Omit Exit

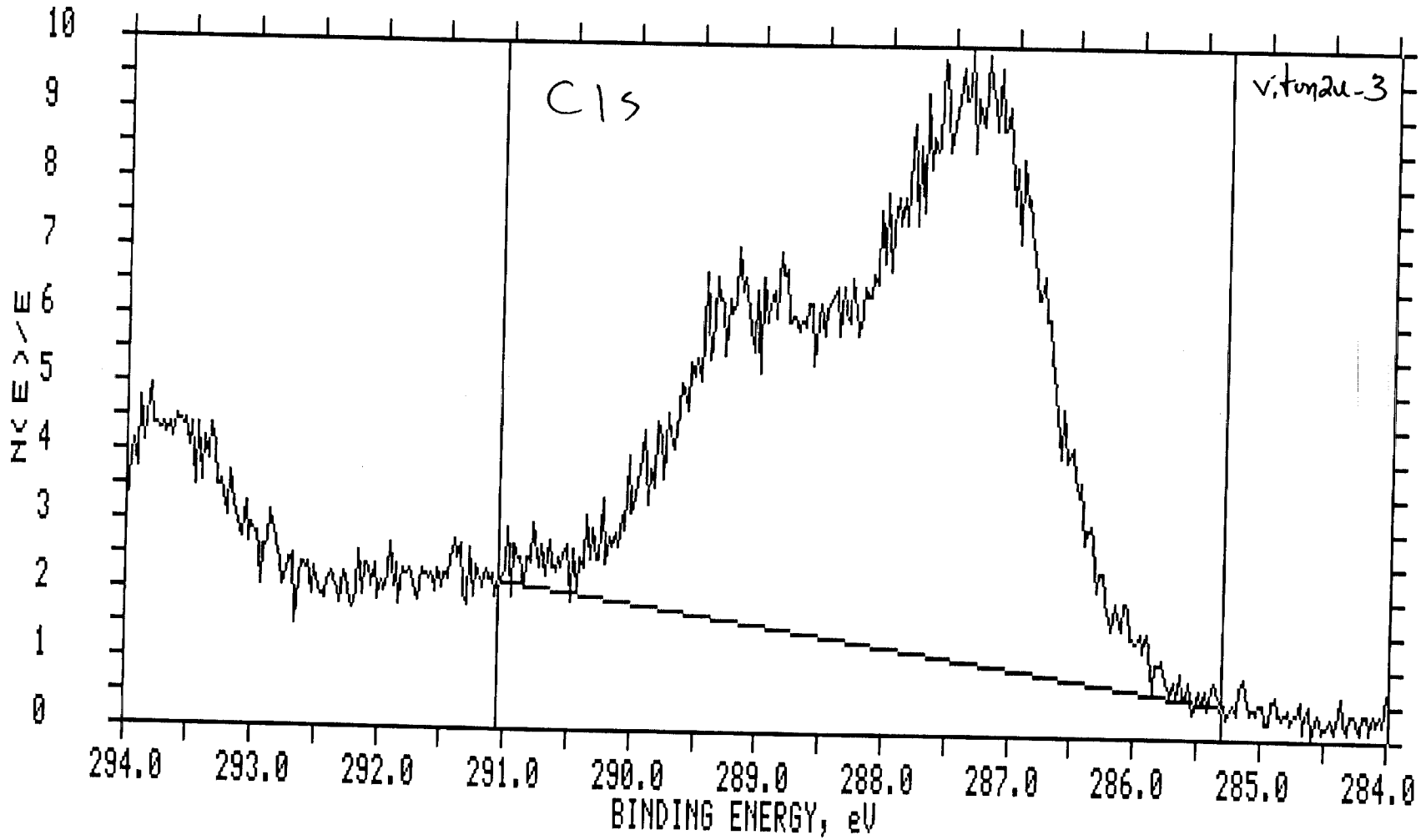
Table All

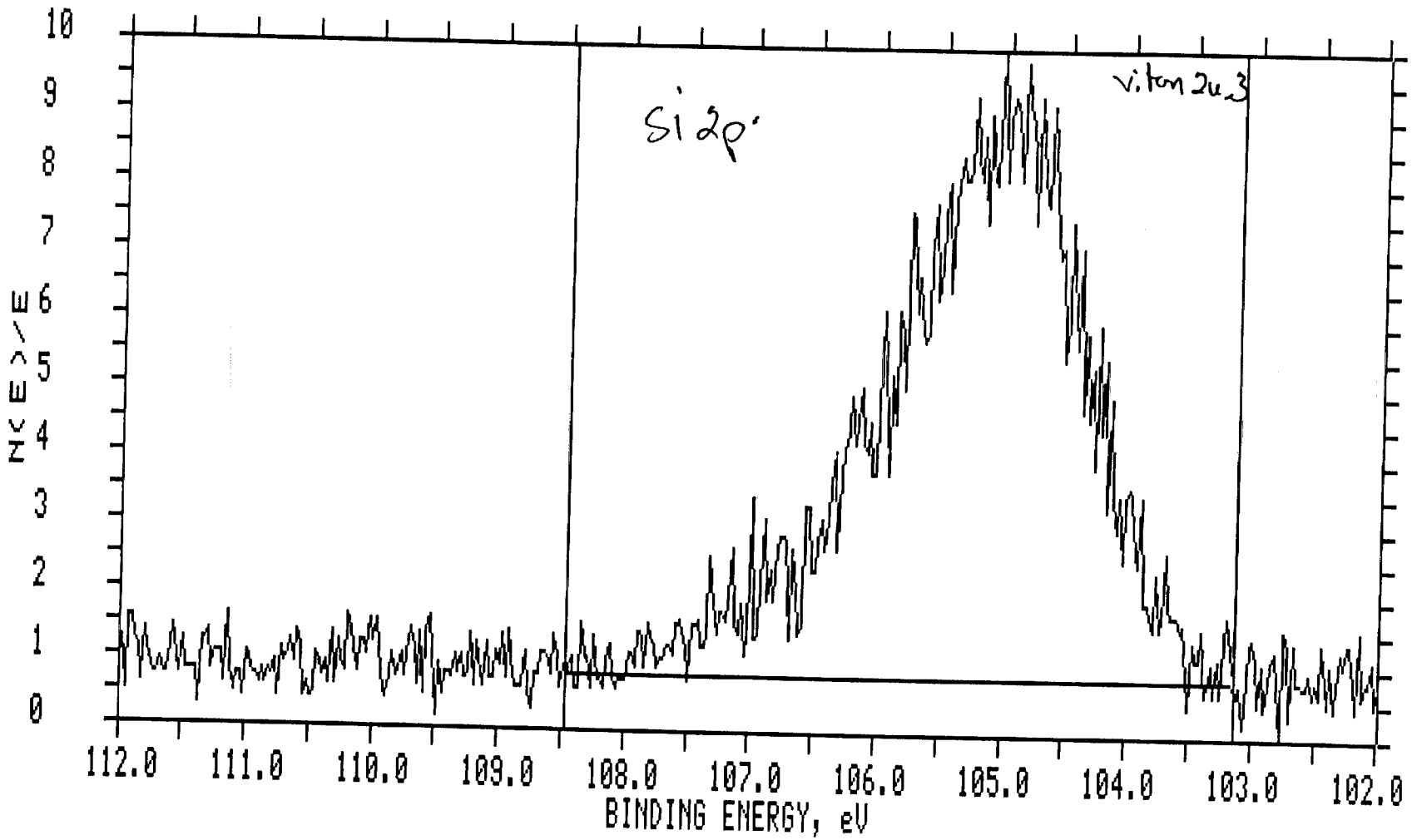

Viton2u_1
F 1s
C AES
O AES
F AES
O 1s
C 1s
others
N(E)/E
BINDING ENERGY, eV
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
0
1
2
3
4
5
6
7
8
9
10


C 1s
K 2ps
Si 2p
Si 2s
F
Viton2u_2
N(E)/E
BINDING ENERGY, eV
300.0
270.0
240.0
210.0
180.0
150.0
120.0
90.0
60.0
30.0
0.0
0
1
2
3
4
5
6
7
8
9
10


F1s
viton2u_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
696.0
695.0
694.0
693.0
692.0
691.0
690.0
689.0
688.0
687.0
686.0
BINDING ENERGY, eV


O 1s
viton2u_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
542.0
541.0
540.0
539.0
538.0
537.0
536.0
535.0
534.0
533.0
532.0
BINDING ENERGY, eV


C1s
Viton2u-3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
294.0
293.0
292.0
291.0
290.0
289.0
288.0
287.0
286.0
285.0
284.0
BINDING ENERGY, eV


Si 2p
viton 2u3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
112.0
111.0
110.0
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108.0
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104.0
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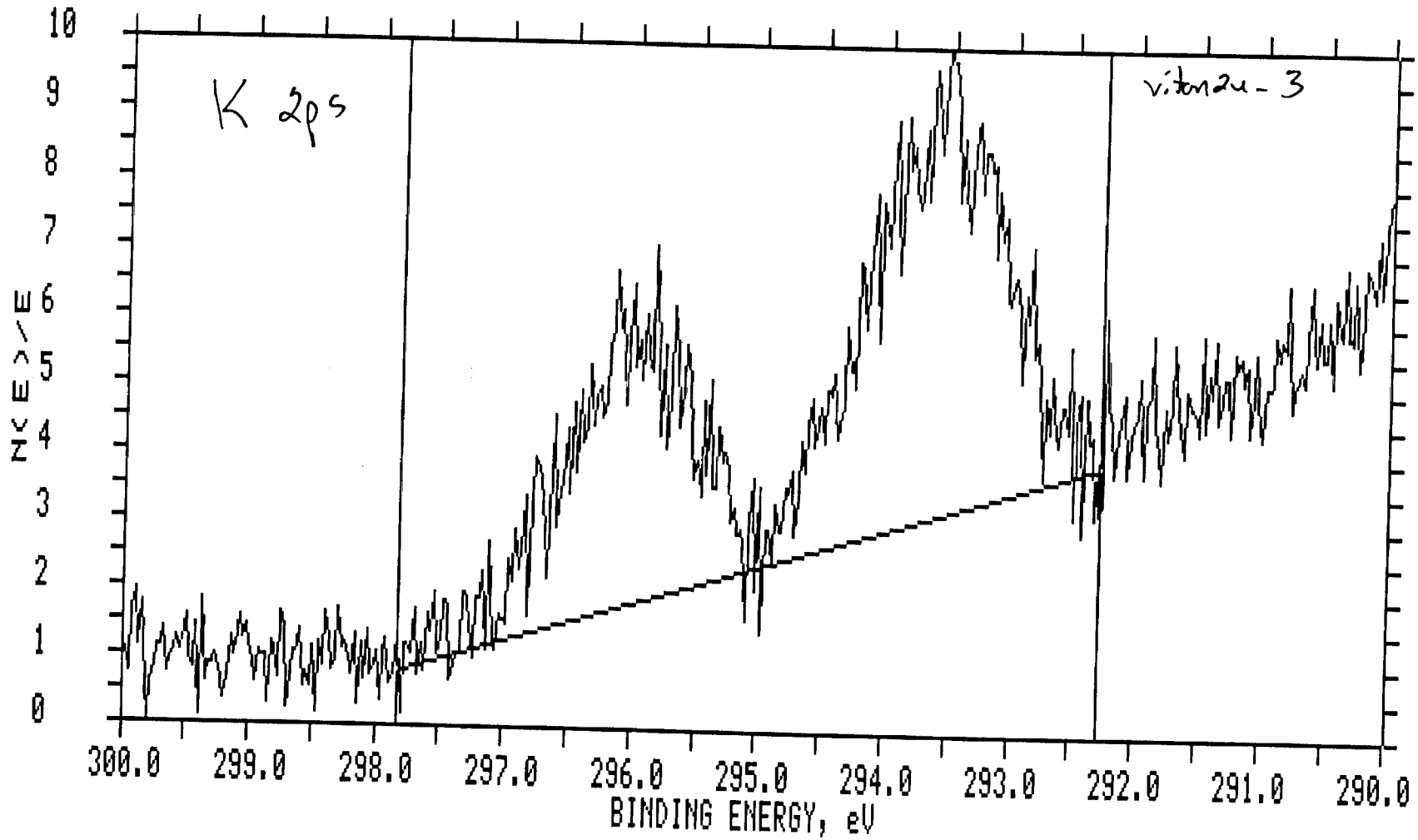
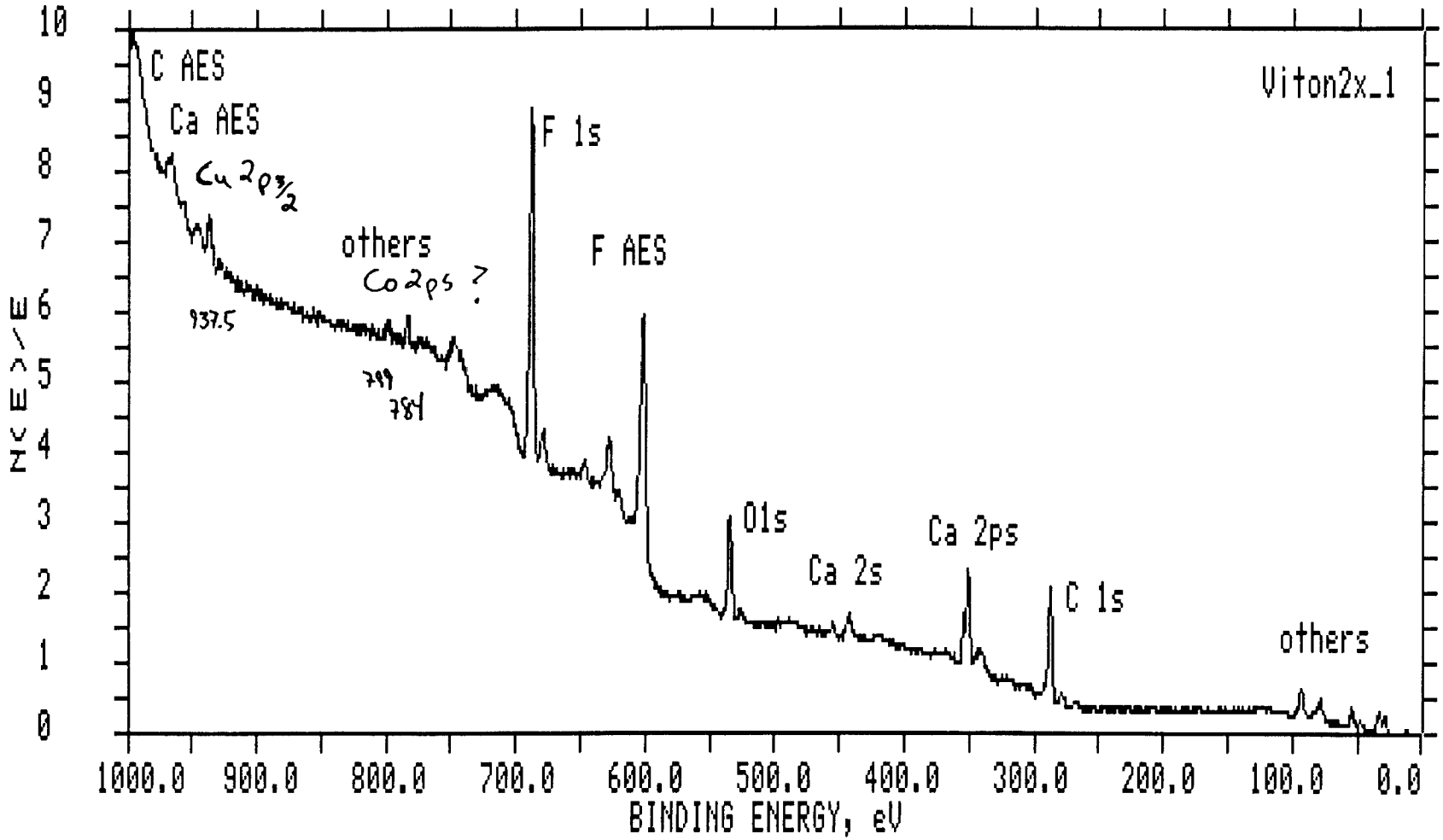
102.0
BINDING ENERGY, eV

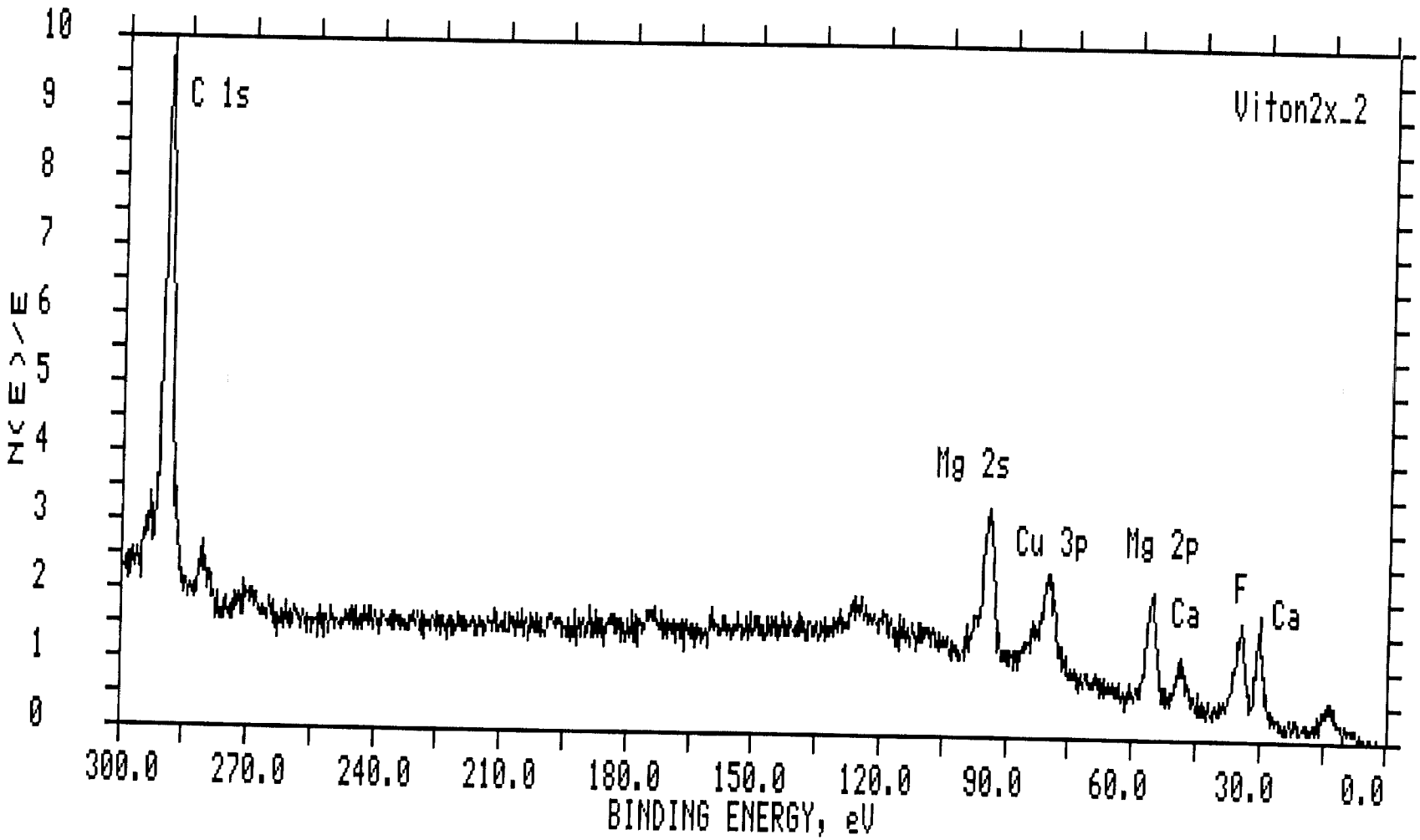

K 2ps
vitan2u-3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
300.0
299.0
298.0
297.0
296.0
295.0
294.0
293.0
292.0
291.0
290.0
BINDING ENERGY, eV

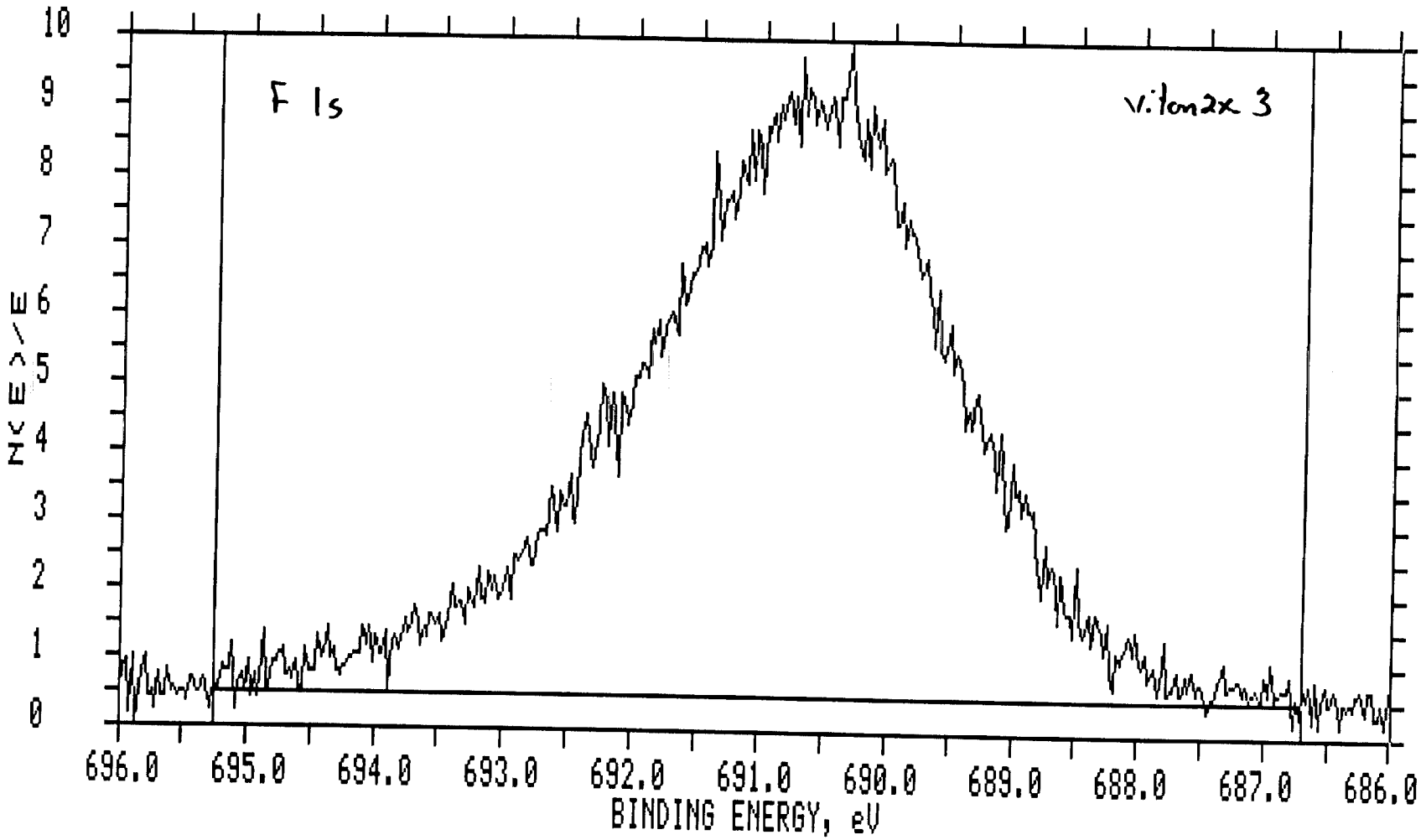
File: viton 2x-3

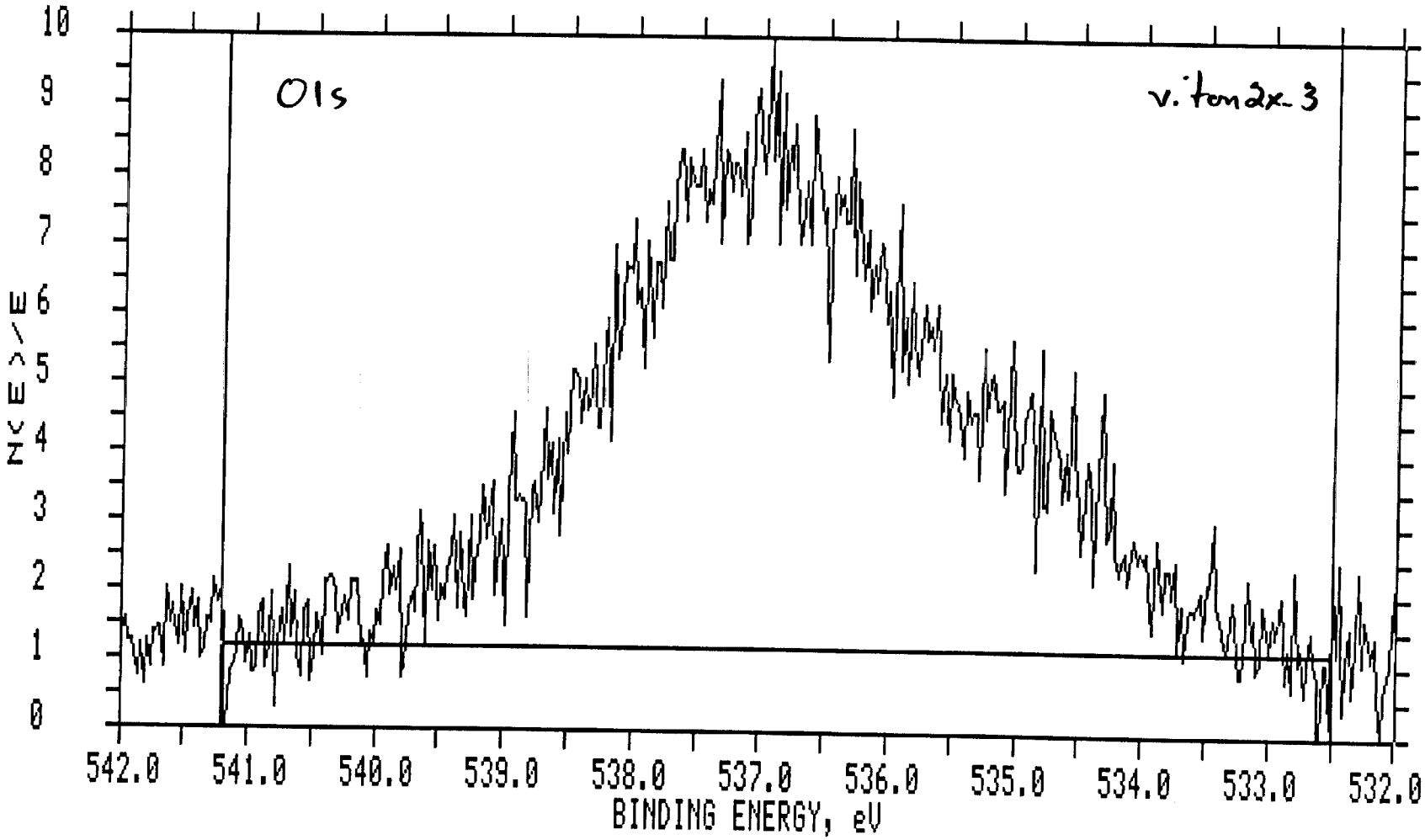
Comment: viton 747-1 sample psi #1 exposed area

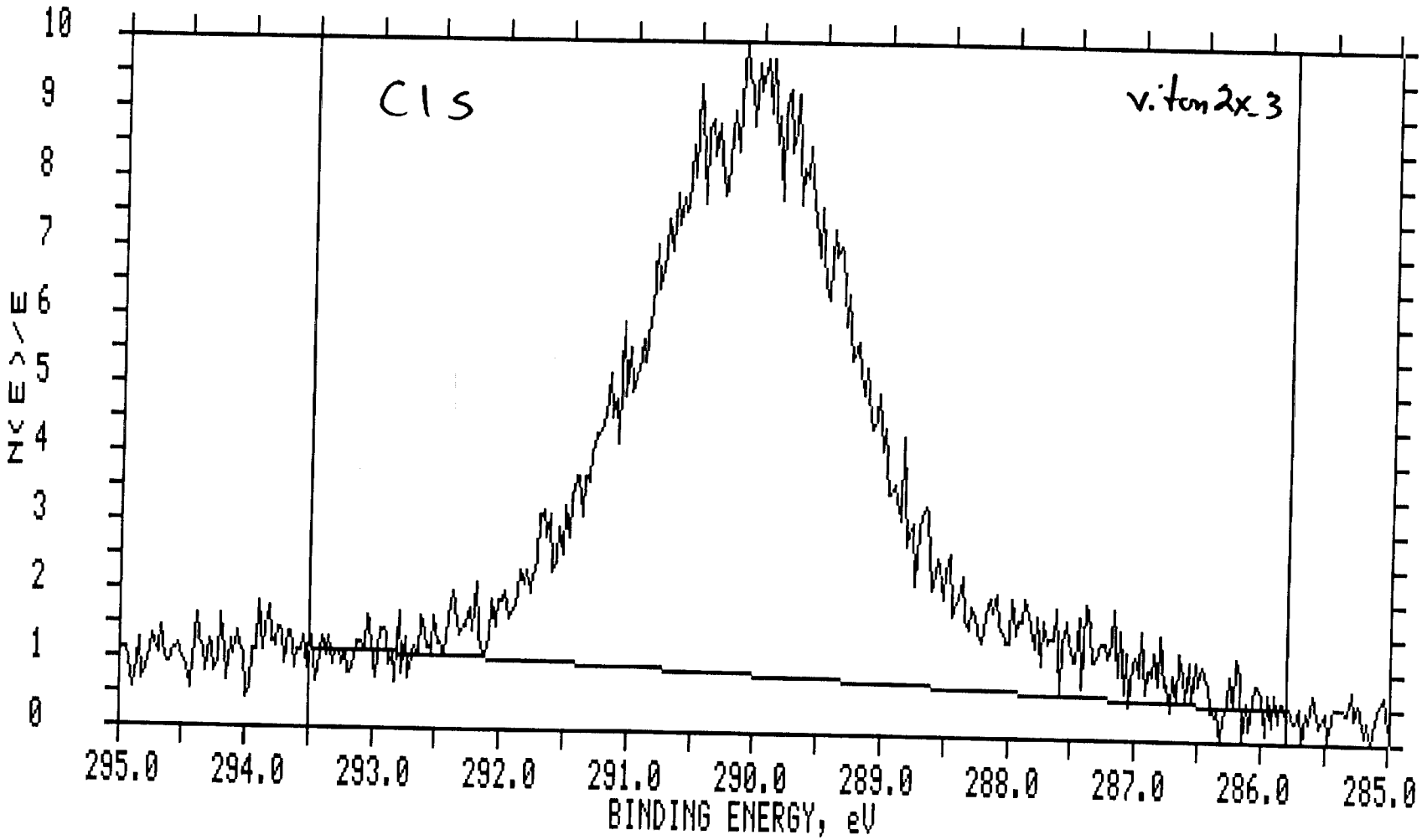
Element	%
F1s	46.24
O1s	10.64
C1s	23.39
Ca2p	6.96
Cu2p3	1.60
Mg2s	9.92
Co2p3	1.24

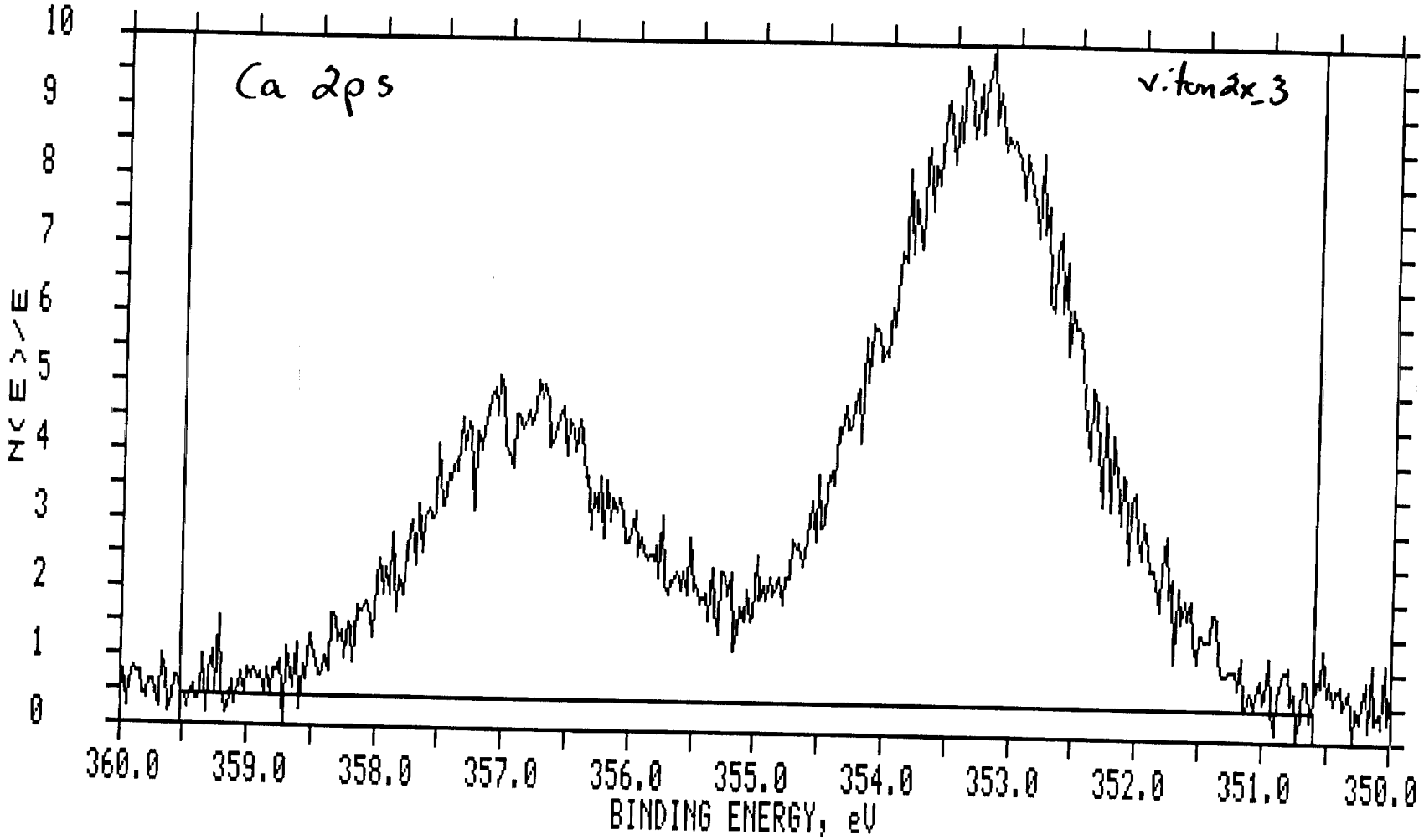

Viton2x_1
C AES
Ca AES
Cu 2p3/2
others
Co 2ps ?
937.5
799
781
F 1s
F AES
O1s
Ca 2s
Ca 2ps
C 1s
others
N(E)/E
BINDING ENERGY, eV
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
0
1
2
3
4
5
6
7
8
9
10

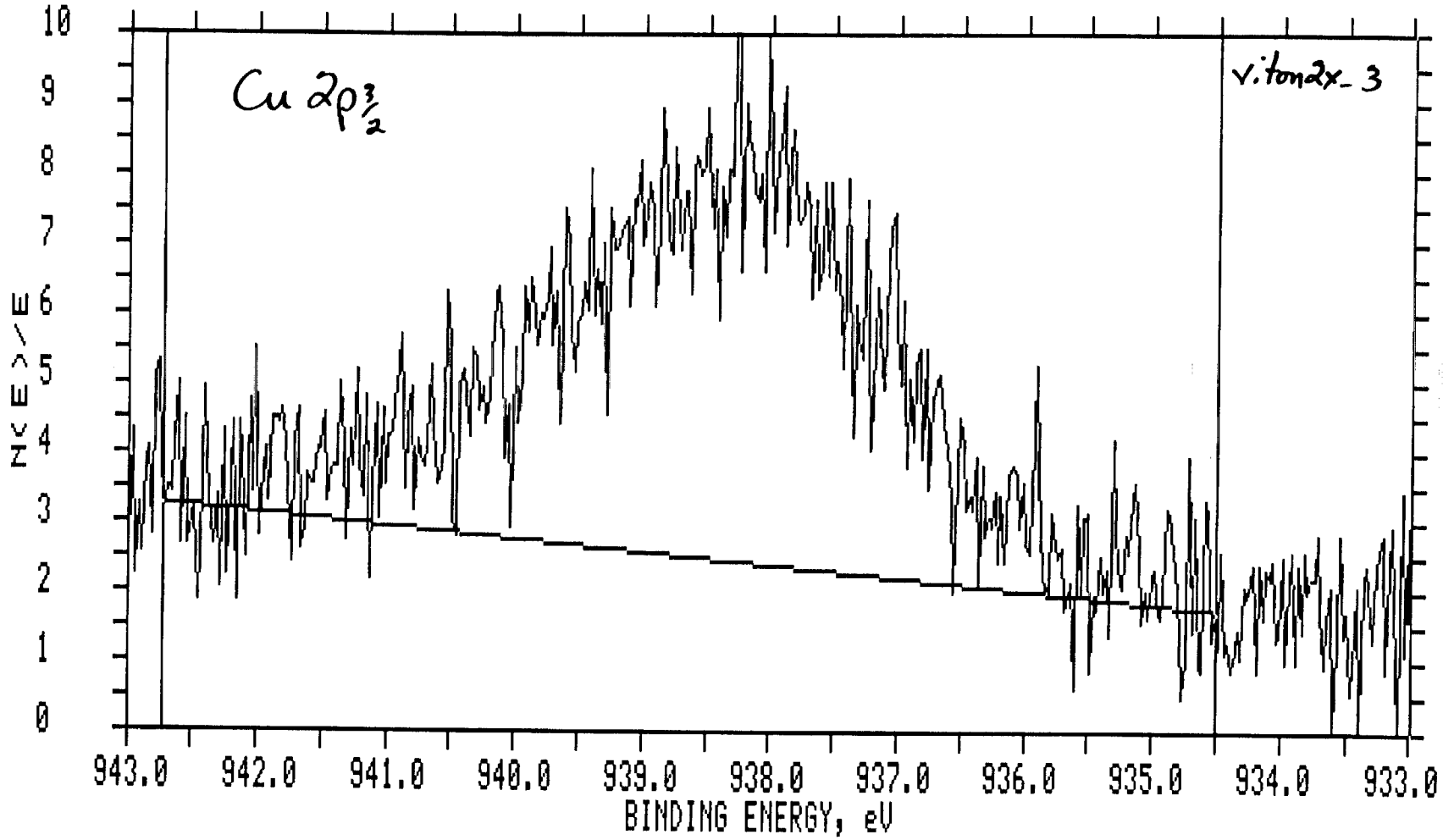

C 1s
Viton2x_2
Mg 2s
Cu 3p
Mg 2p
Ca
F
Ca
N(E)/E
BINDING ENERGY, eV
300.0
270.0
240.0
210.0
180.0
150.0
120.0
90.0
60.0
30.0
0.0
0
1
2
3
4
5
6
7
8
9
10

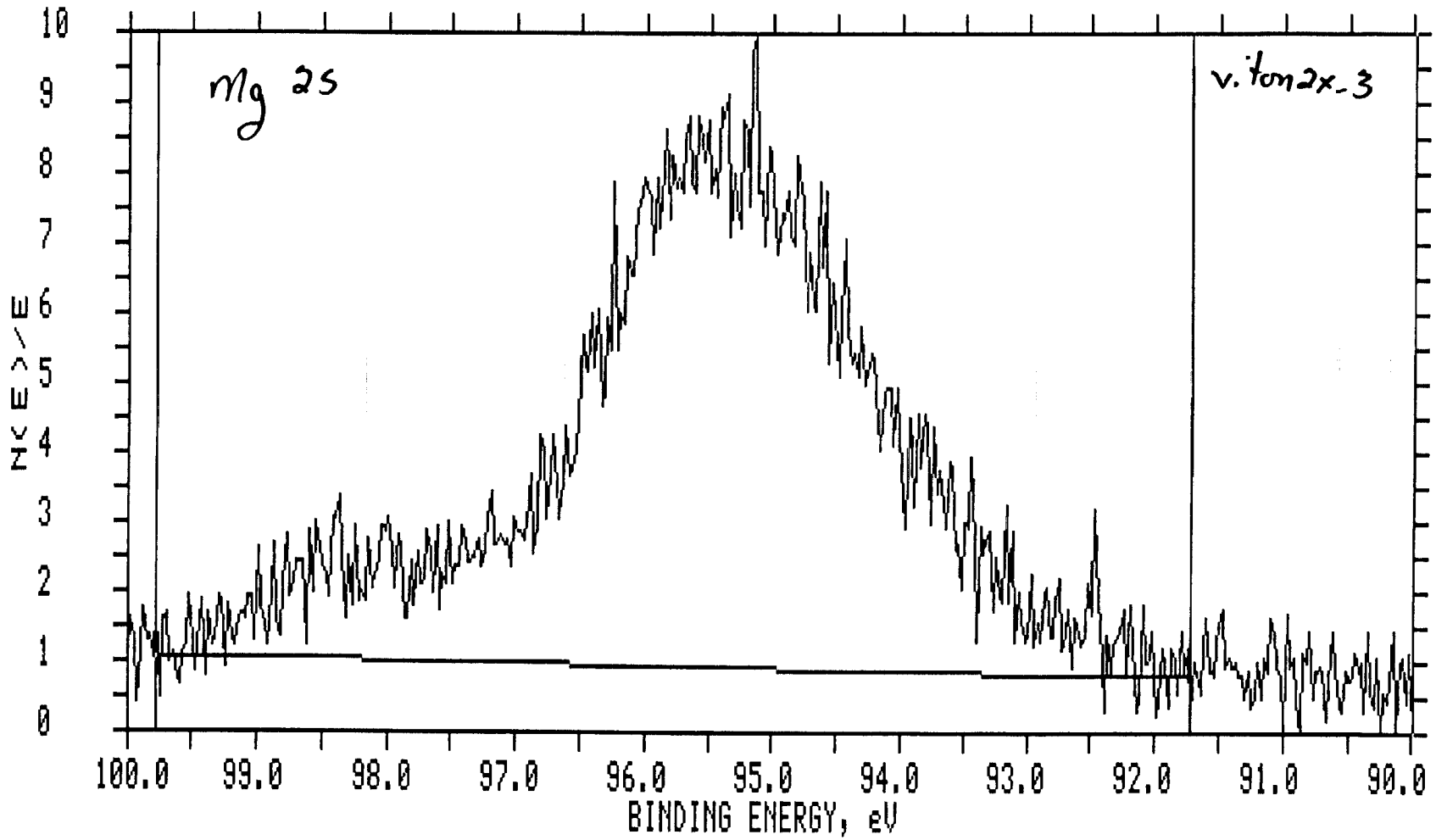

F 1s
viton2x 3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
696.0
695.0
694.0
693.0
692.0
691.0
690.0
689.0
688.0
687.0
686.0
BINDING ENERGY, eV

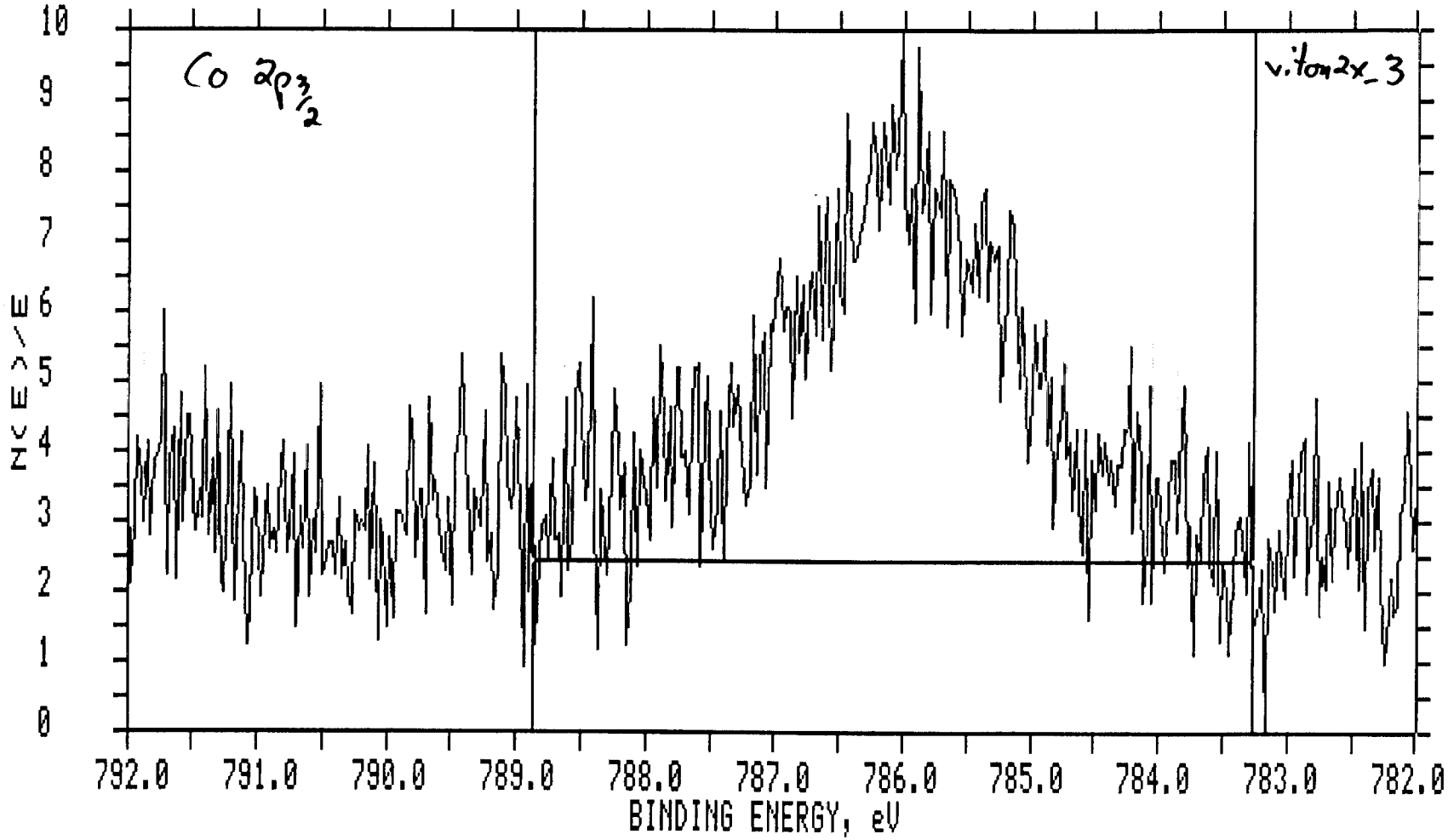

O1s
v.ton2x-3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
542.0
541.0
540.0
539.0
538.0
537.0
536.0
535.0
534.0
533.0
532.0
BINDING ENERGY, eV


C1s
v.ton2x3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
295.0
294.0
293.0
292.0
291.0
290.0
289.0
288.0
287.0
286.0
285.0
BINDING ENERGY, eV


Ca 2ps
v.ton2x_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
360.0
359.0
358.0
357.0
356.0
355.0
354.0
353.0
352.0
351.0
350.0
BINDING ENERGY, eV


Cu 2p3/2
v.ton2x_3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
943.0
942.0
941.0
940.0
939.0
938.0
937.0
936.0
935.0
934.0
933.0
BINDING ENERGY, eV


Mg 2s
v.ion2x_3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
100.0
99.0
98.0
97.0
96.0
95.0
94.0
93.0
92.0
91.0
90.0
BINDING ENERGY, eV


Co 2p3/2
v.ion2x_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
792.0
791.0
790.0
789.0
788.0
787.0
786.0
785.0
784.0
783.0
782.0
BINDING ENERGY, eV

Ion Gun:OFF X-ray:OFF Mg

Technique:ESCA

0.6mPa

7/1/91 17:28

Atomic Concentration

1 Peak Measurement Use Height Area Element Name

2 Included Regions 1 2 3 4 5

Atomic Concentration Table

File: viton3u_3

Comment: viton 1111 sample unexposed area

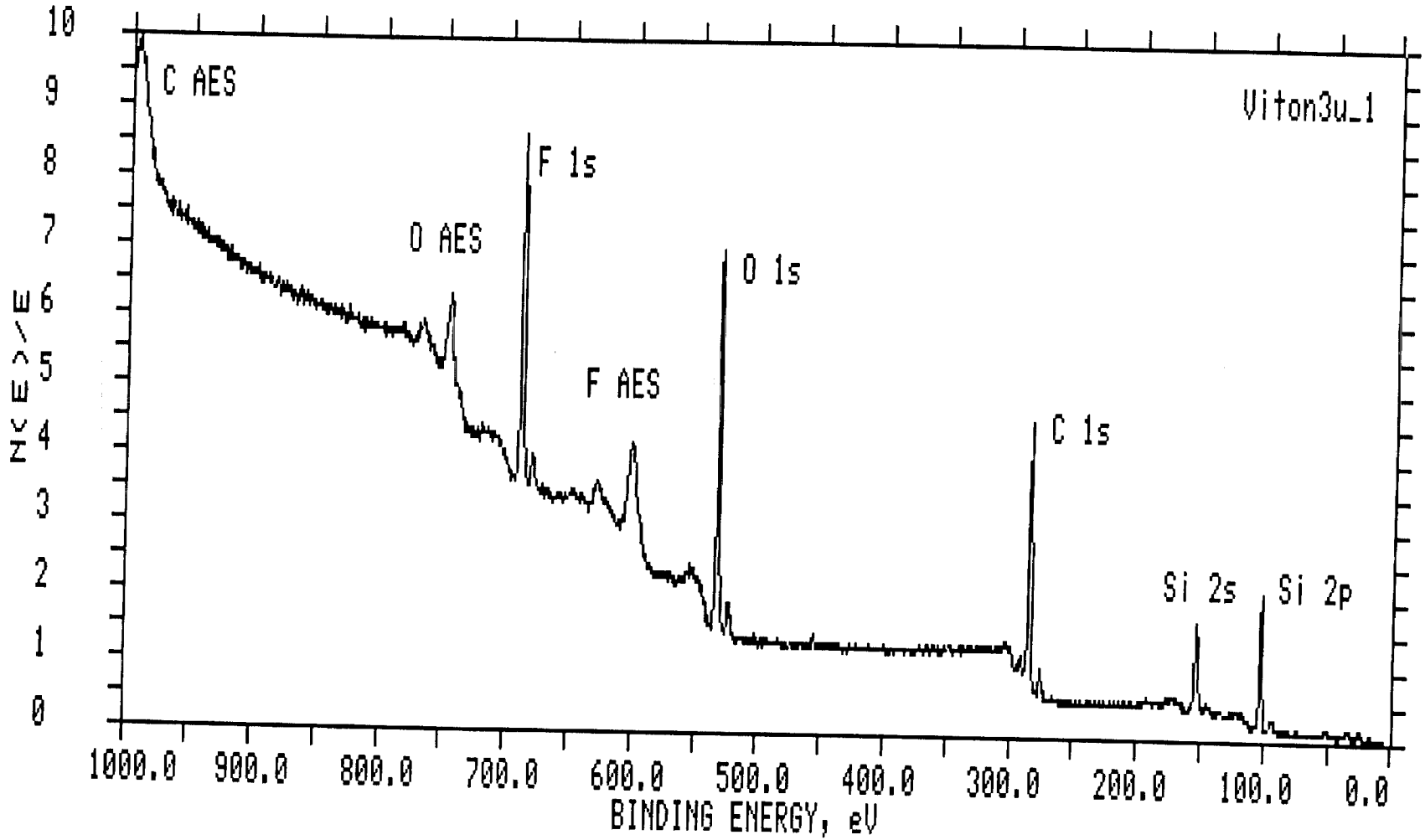
Input Lens: Large Area Omni Focus

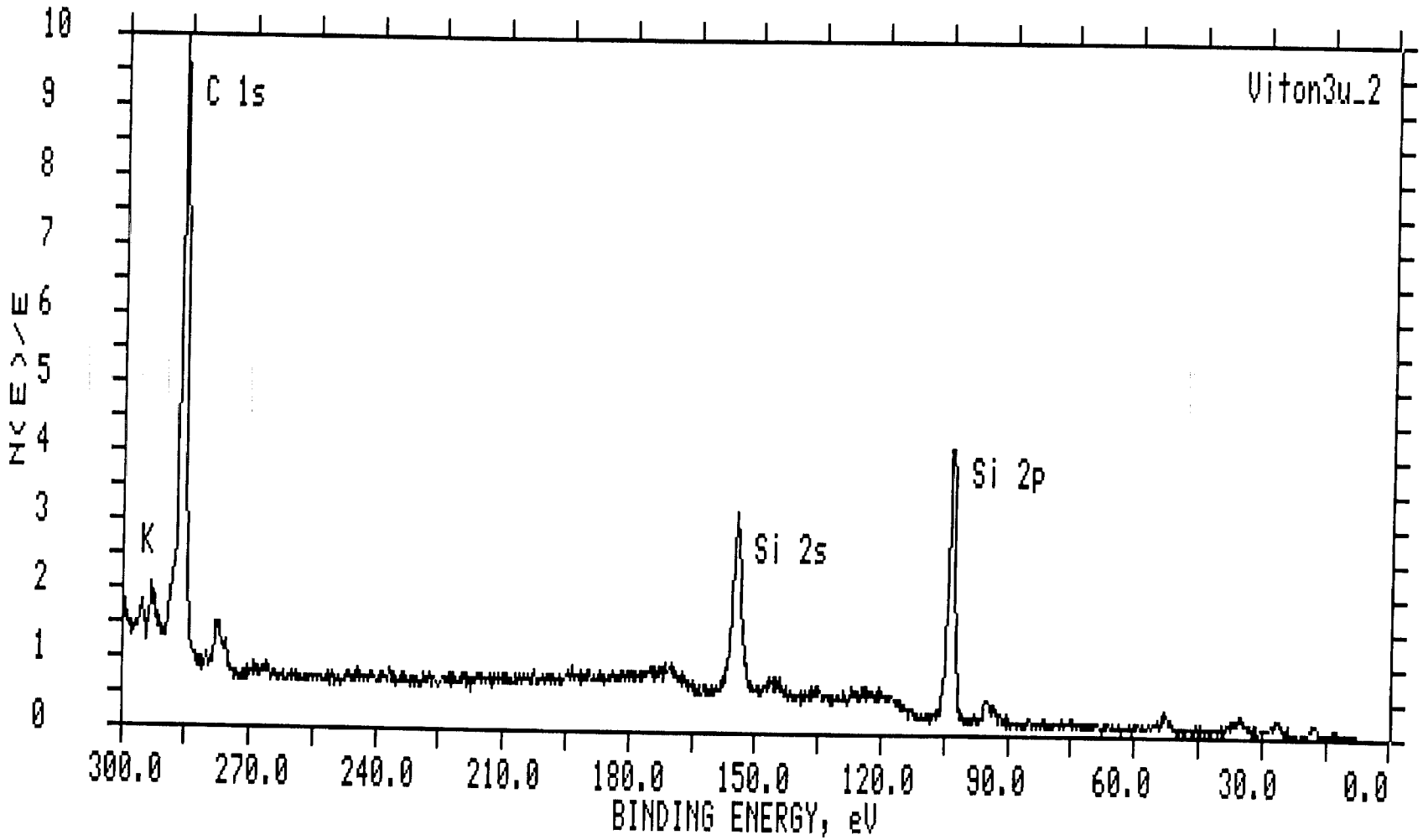
Element	Concentration(%)	Sens. Factor
F1s	19.57	1.000
O1s	23.85	0.711
C1s	42.68	0.296
Si2p	13.54	0.339
K2p	0.37	1.466

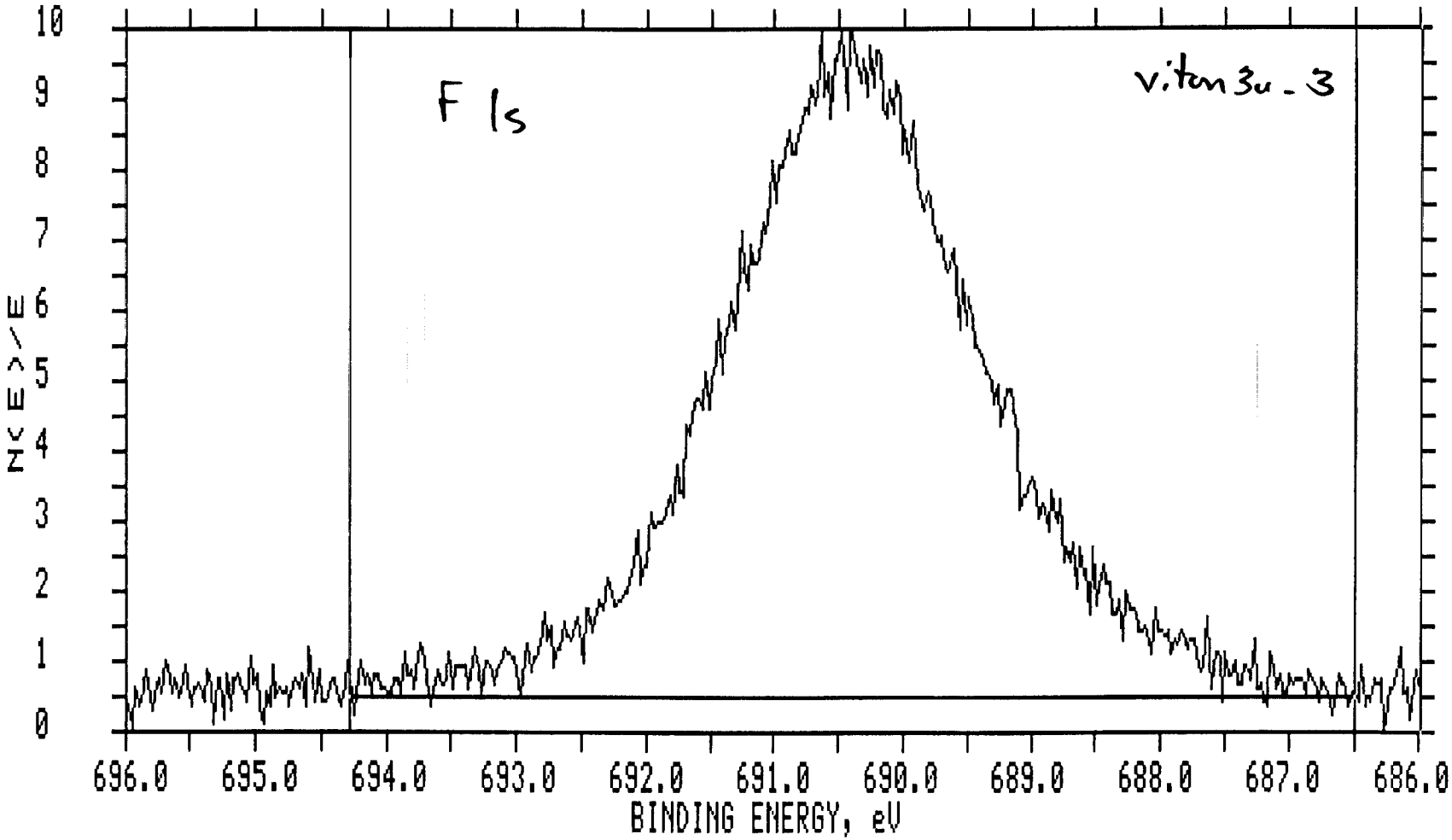
AC Table

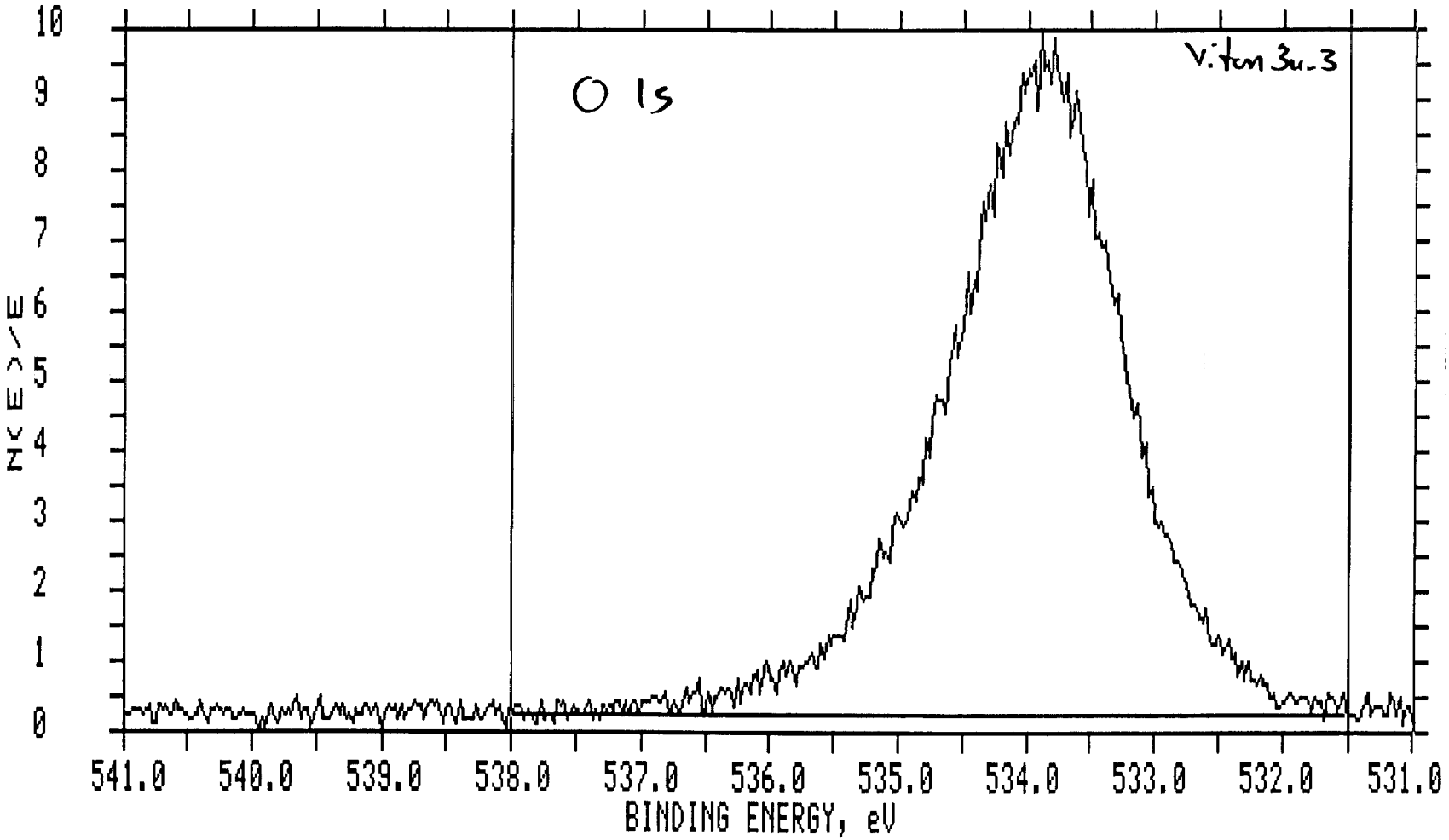
Omit All

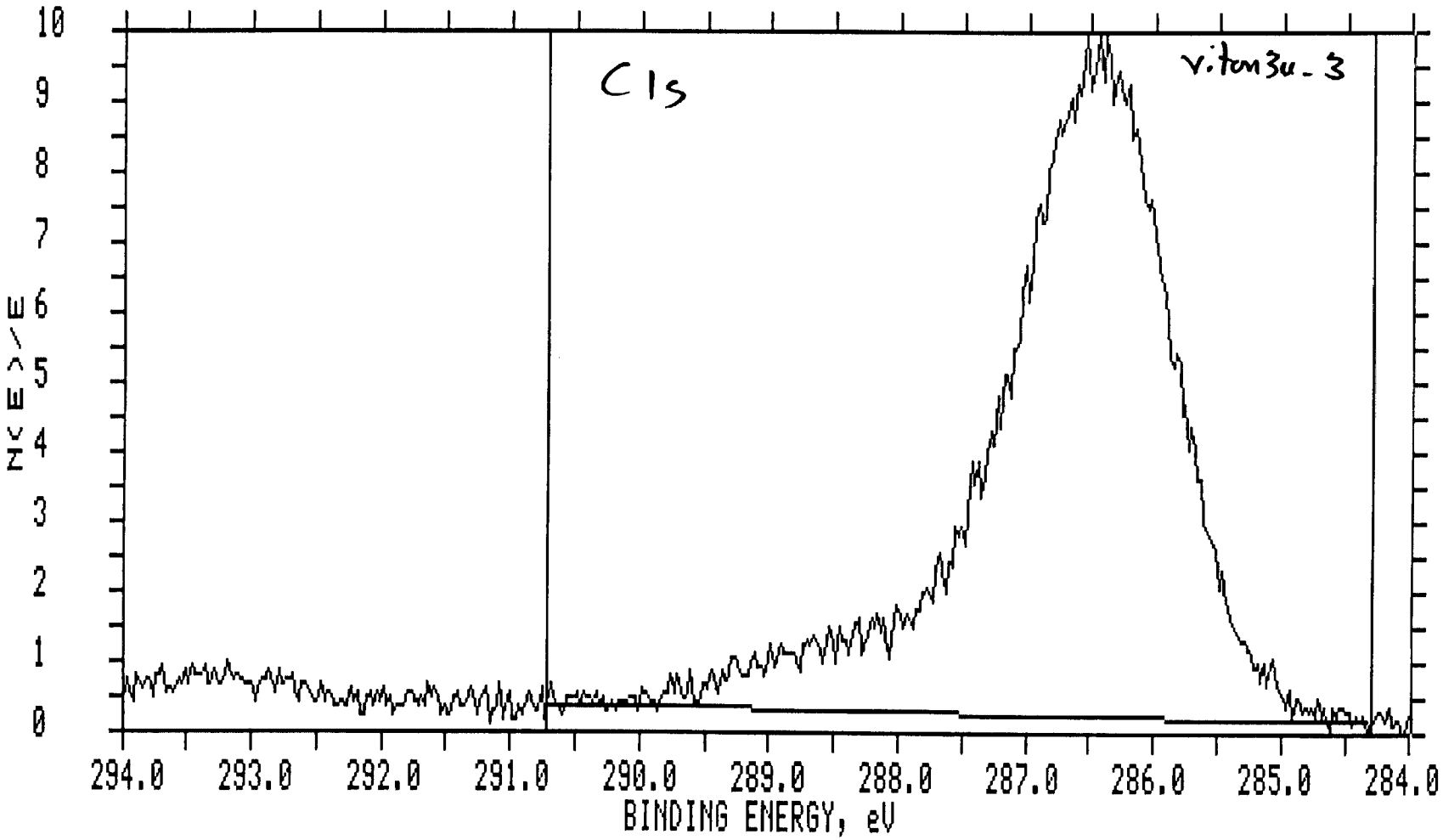
Exit

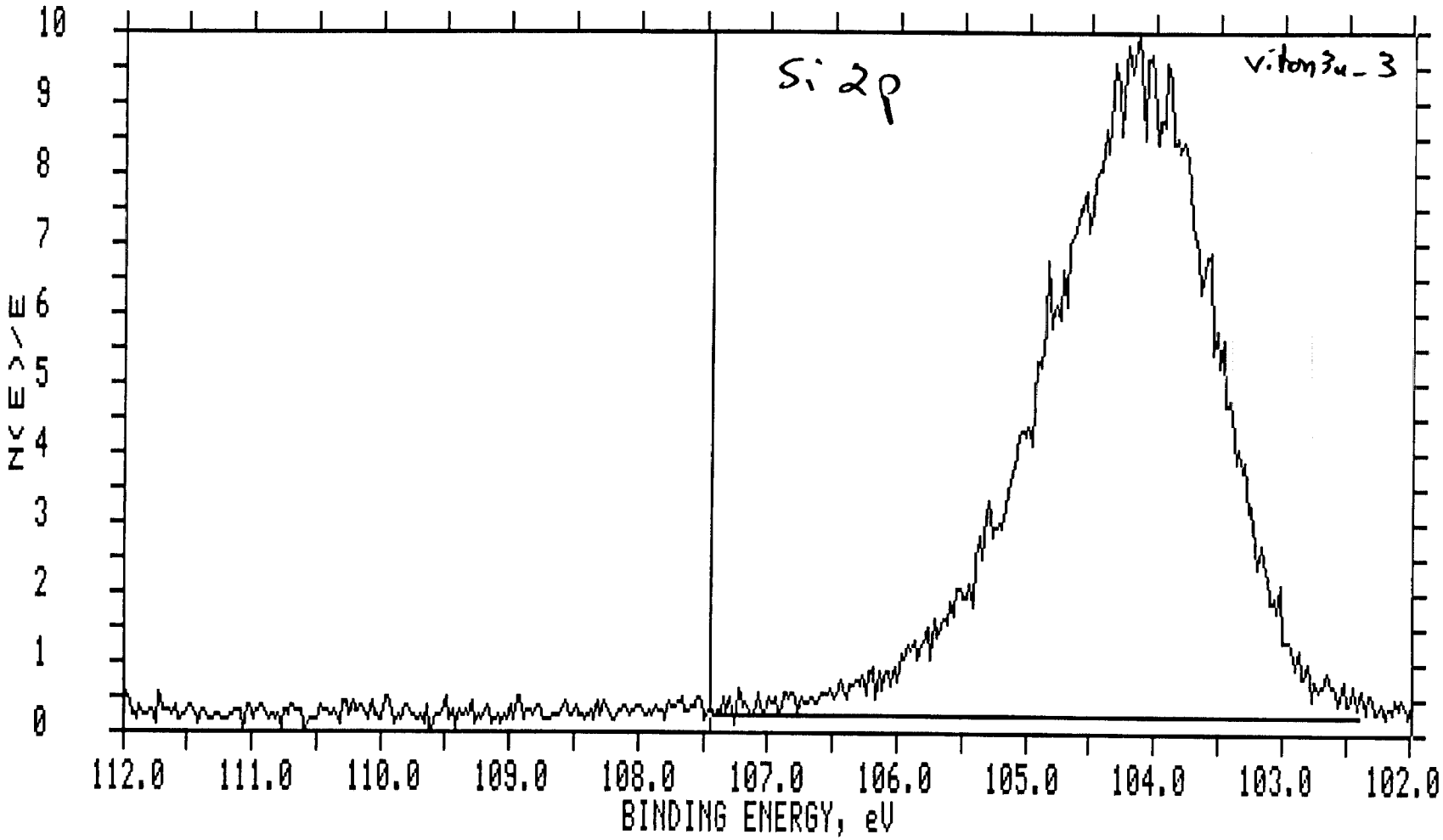

Viton3u_1
C AES
O AES
F 1s
F AES
O 1s
C 1s
Si 2s
Si 2p
N(E)/E
BINDING ENERGY, eV
10
9
8
7
6
5
4
3
2
1
0
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0

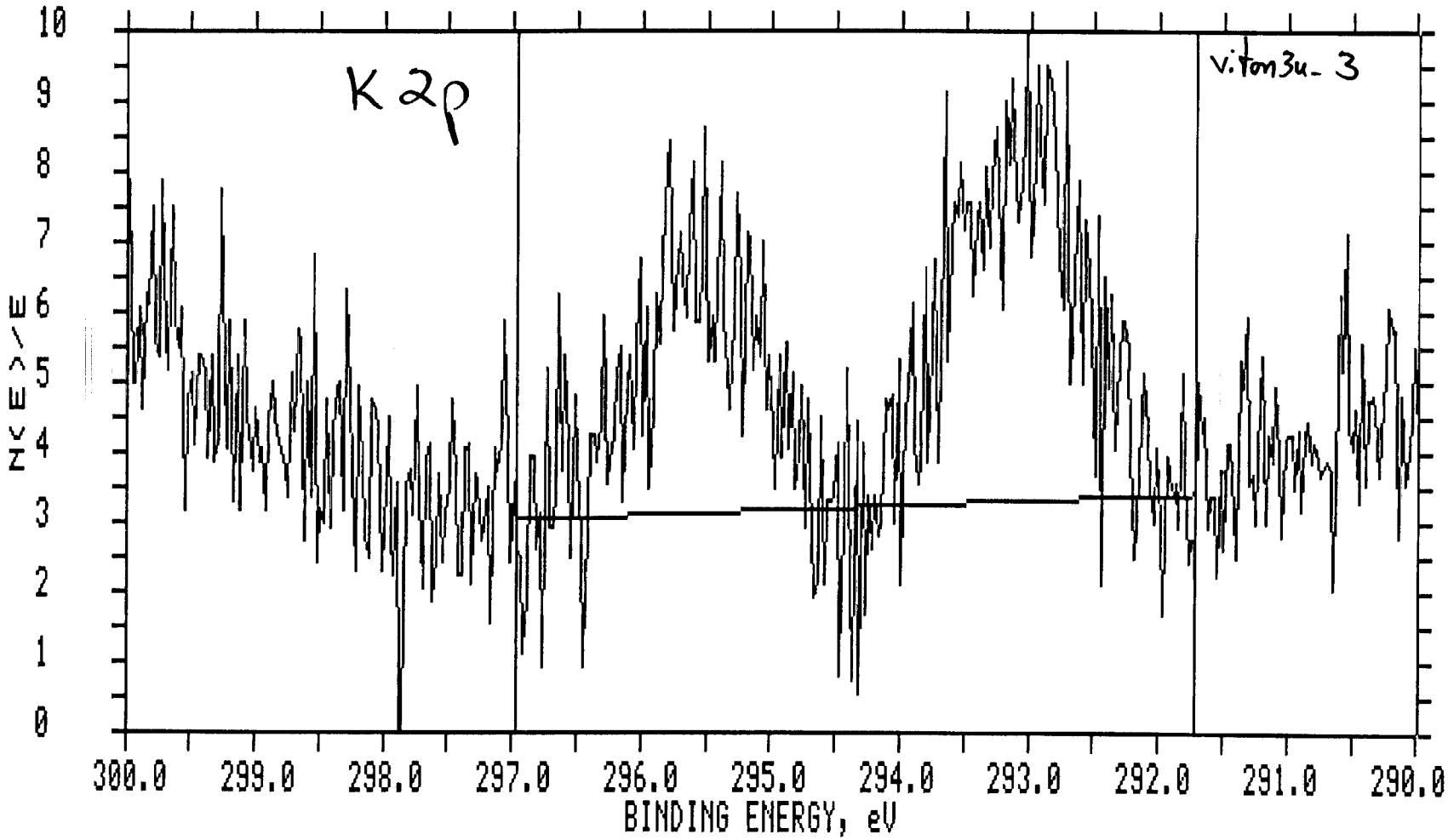

Viton3u_2
C 1s
K
Si 2s
Si 2p
N(E)/E
BINDING ENERGY, eV
300.0
270.0
240.0
210.0
180.0
150.0
120.0
90.0
60.0
30.0
0.0
0
1
2
3
4
5
6
7
8
9
10


F 1s
vitan 3u - 3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
696.0
695.0
694.0
693.0
692.0
691.0
690.0
689.0
688.0
687.0
686.0
BINDING ENERGY, eV


O 1s
Viton 3u-3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
541.0
540.0
539.0
538.0
537.0
536.0
535.0
534.0
533.0
532.0
531.0
BINDING ENERGY, eV


C1s
viton3u_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
294.0
293.0
292.0
291.0
290.0
289.0
288.0
287.0
286.0
285.0
284.0
BINDING ENERGY, eV


Si 2p
vitonzu_3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
112.0
111.0
110.0
109.0
108.0
107.0
106.0
105.0
104.0
103.0
102.0
BINDING ENERGY, eV


K 2p
viton3u_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
300.0
299.0
298.0
297.0
296.0
295.0
294.0
293.0
292.0
291.0
290.0
BINDING ENERGY, eV

Gun:OFF X-ray:OFF Mg Technique:ESCA

0.6mPa 7/1/91 11:00

Atomic Concentration

1 Peak Measurement Use Height Area Element Name

Included Regions 1 2 3 4 5 6 7

Atomic Concentration Table

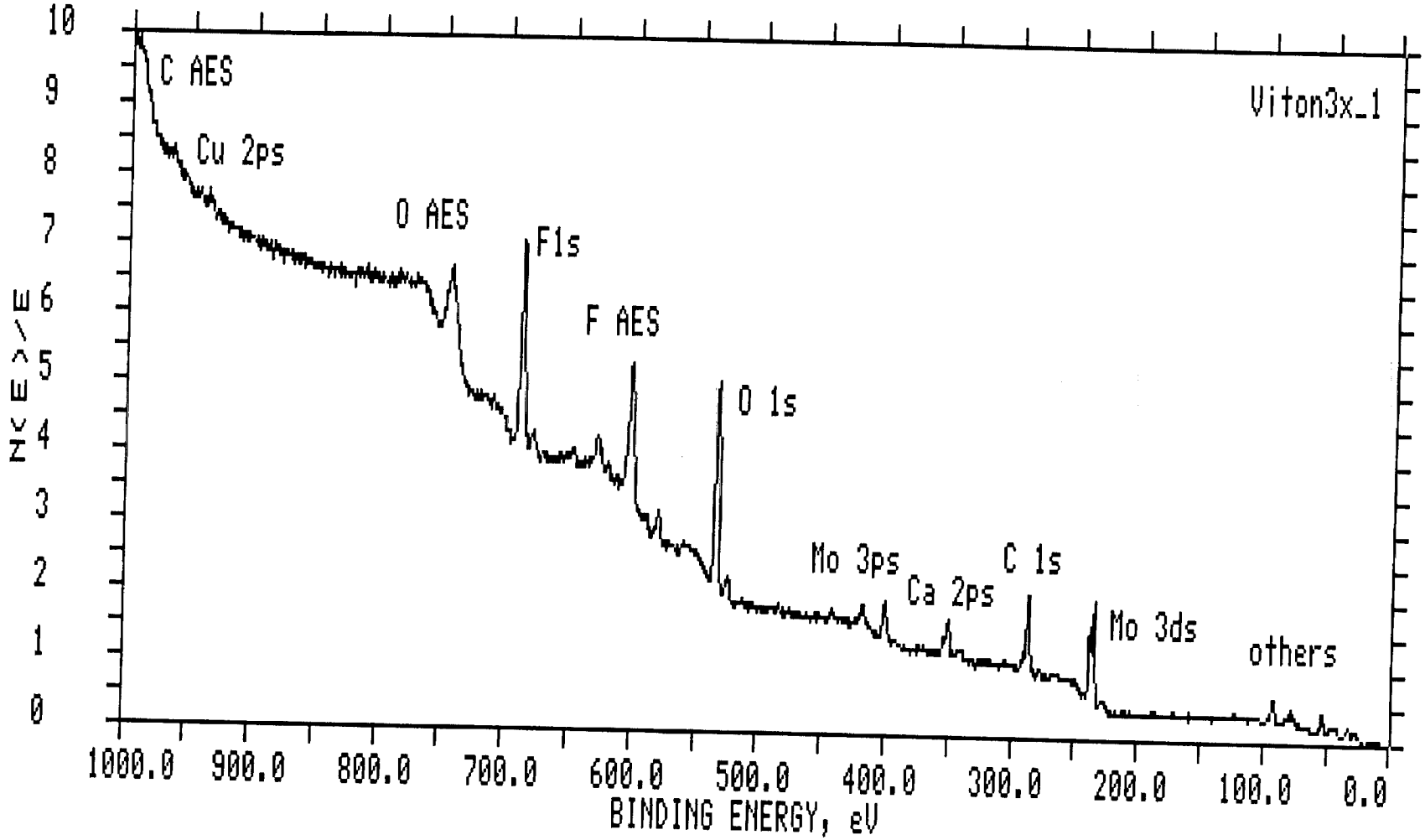
ile: viton3x_3

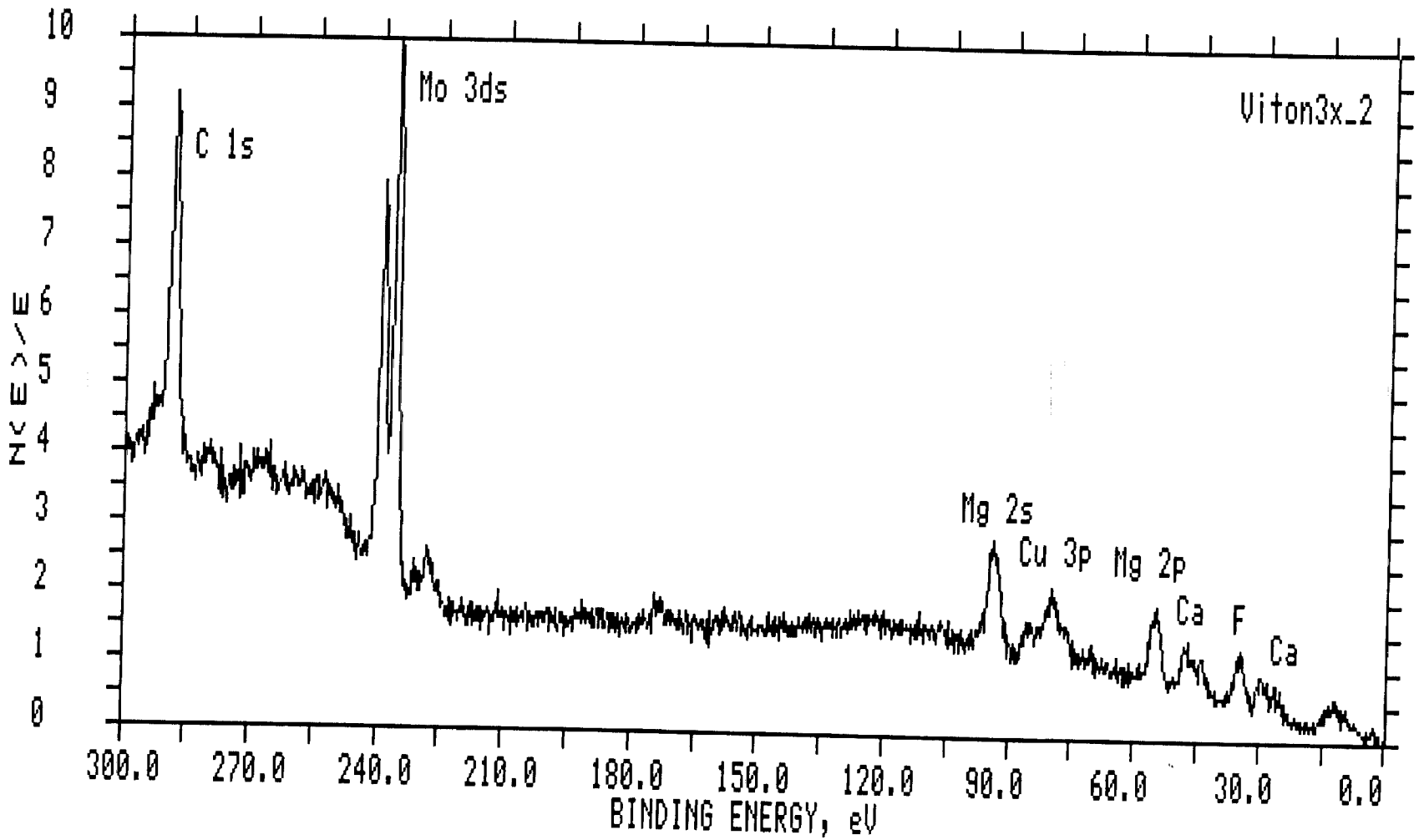
ment: viton 1111 sample exposed area

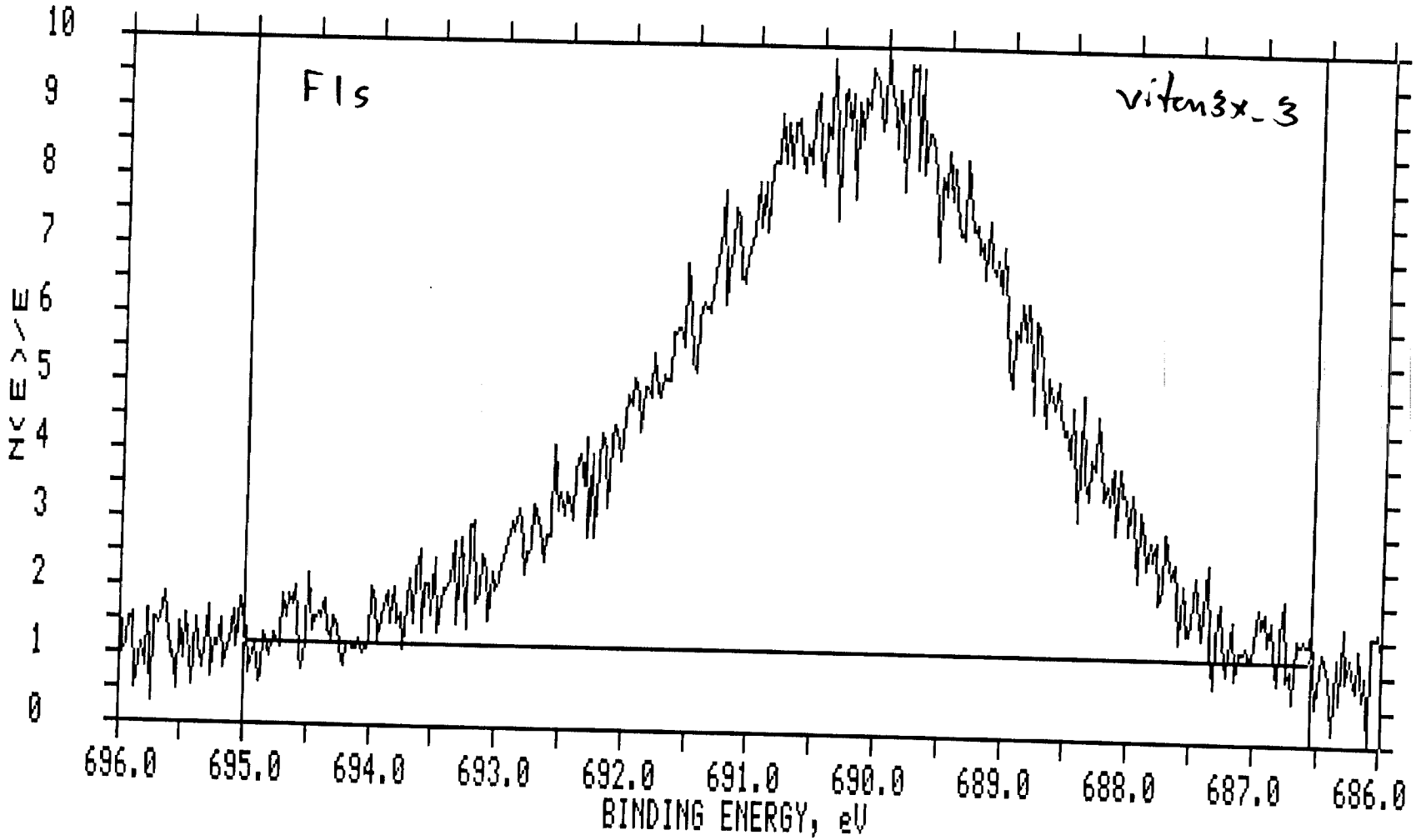
ut Lens: Large Area Omni Focus

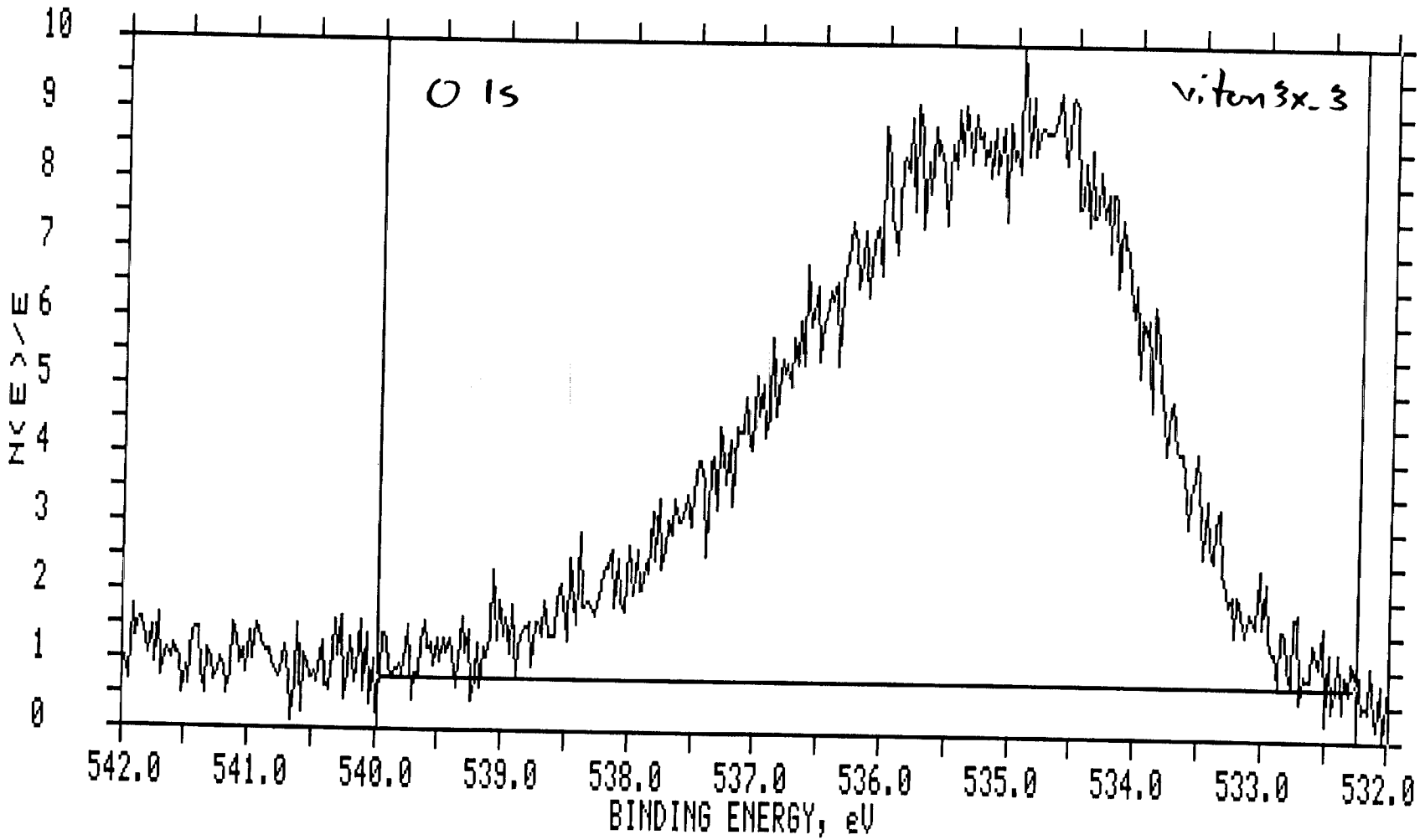
Element	Concentration(%)	Sens. Factor
F1s	28.21	1.000
O1s	34.43	0.711
C1s	21.47	0.296
Ca2p	2.86	1.833
Cu2p3	0.60	3.547
Mg2s	8.52	0.252
Mo3d	3.90	3.321

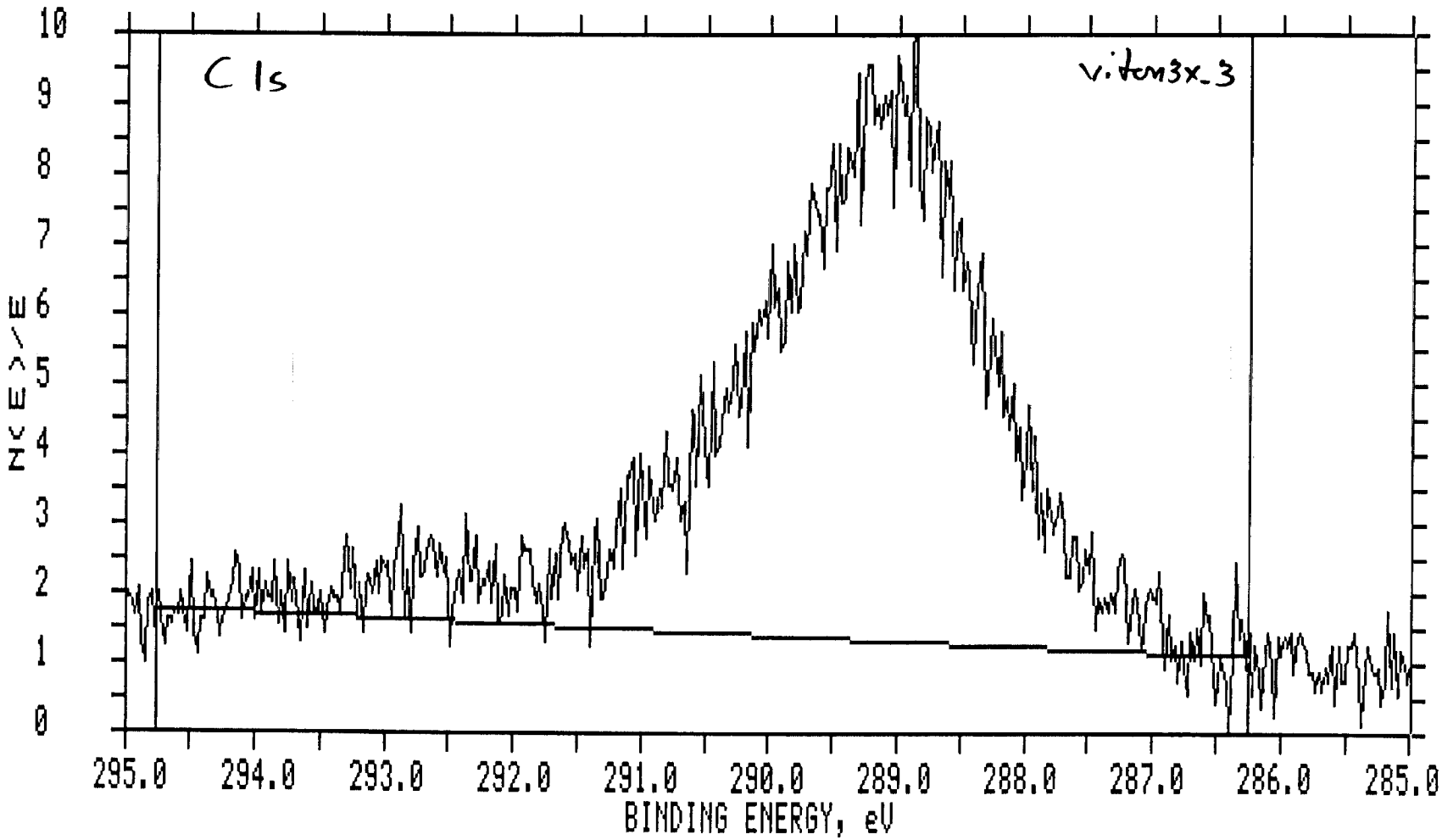
AC Table AC to AC Summary Omit All Exit

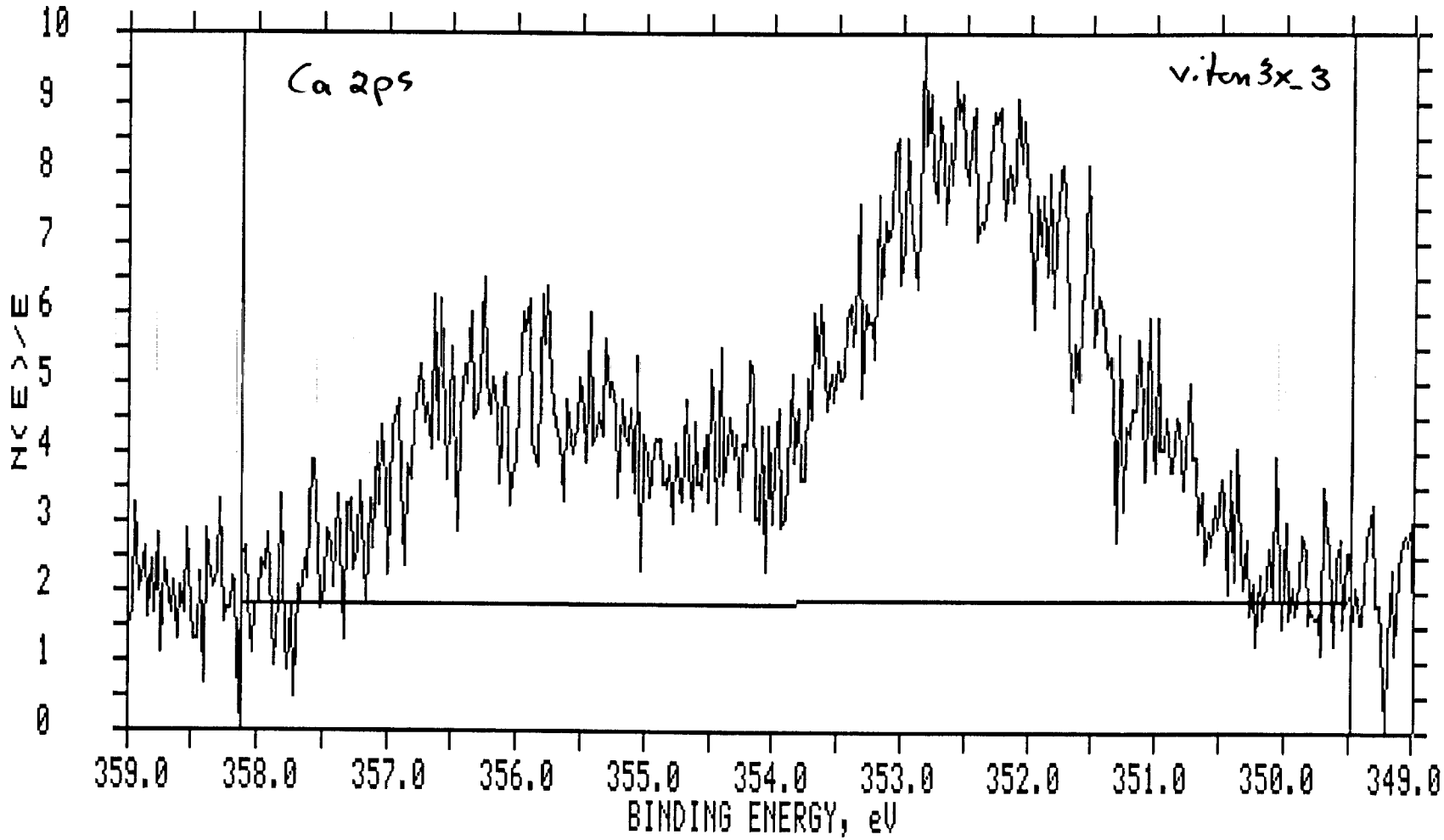

Viton3x_1
C AES
Cu 2ps
O AES
F1s
F AES
O 1s
Mo 3ps
Ca 2ps
C 1s
Mo 3ds
others
N(E)/E
BINDING ENERGY, eV
10
9
8
7
6
5
4
3
2
1
0
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0

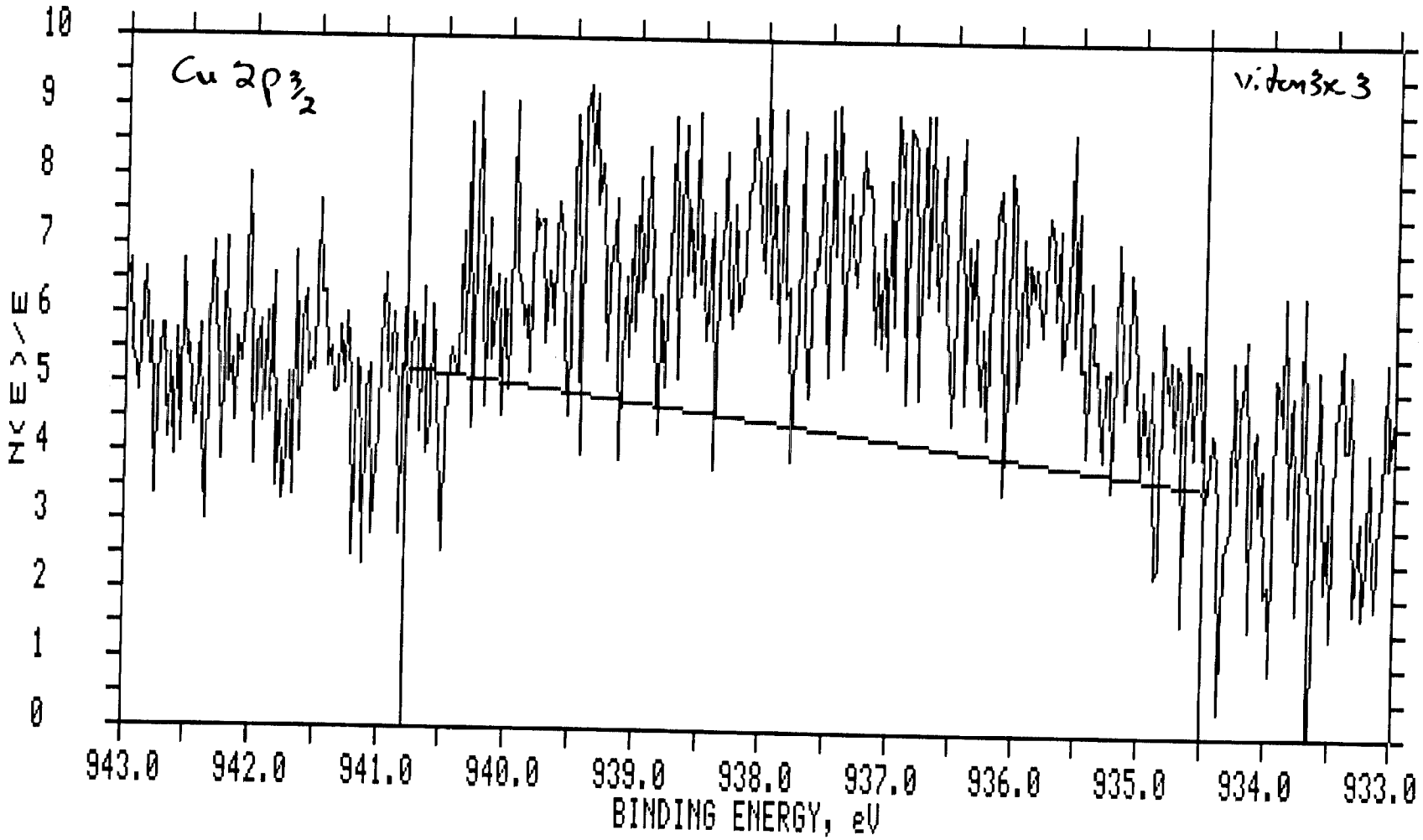

Viton3x_2
C 1s
Mo 3ds
Mg 2s
Cu 3p
Mg 2p
Ca
F
Ca
N(E)/E
BINDING ENERGY, eV
300.0
270.0
240.0
210.0
180.0
150.0
120.0
90.0
60.0
30.0
0.0
0
1
2
3
4
5
6
7
8
9
10

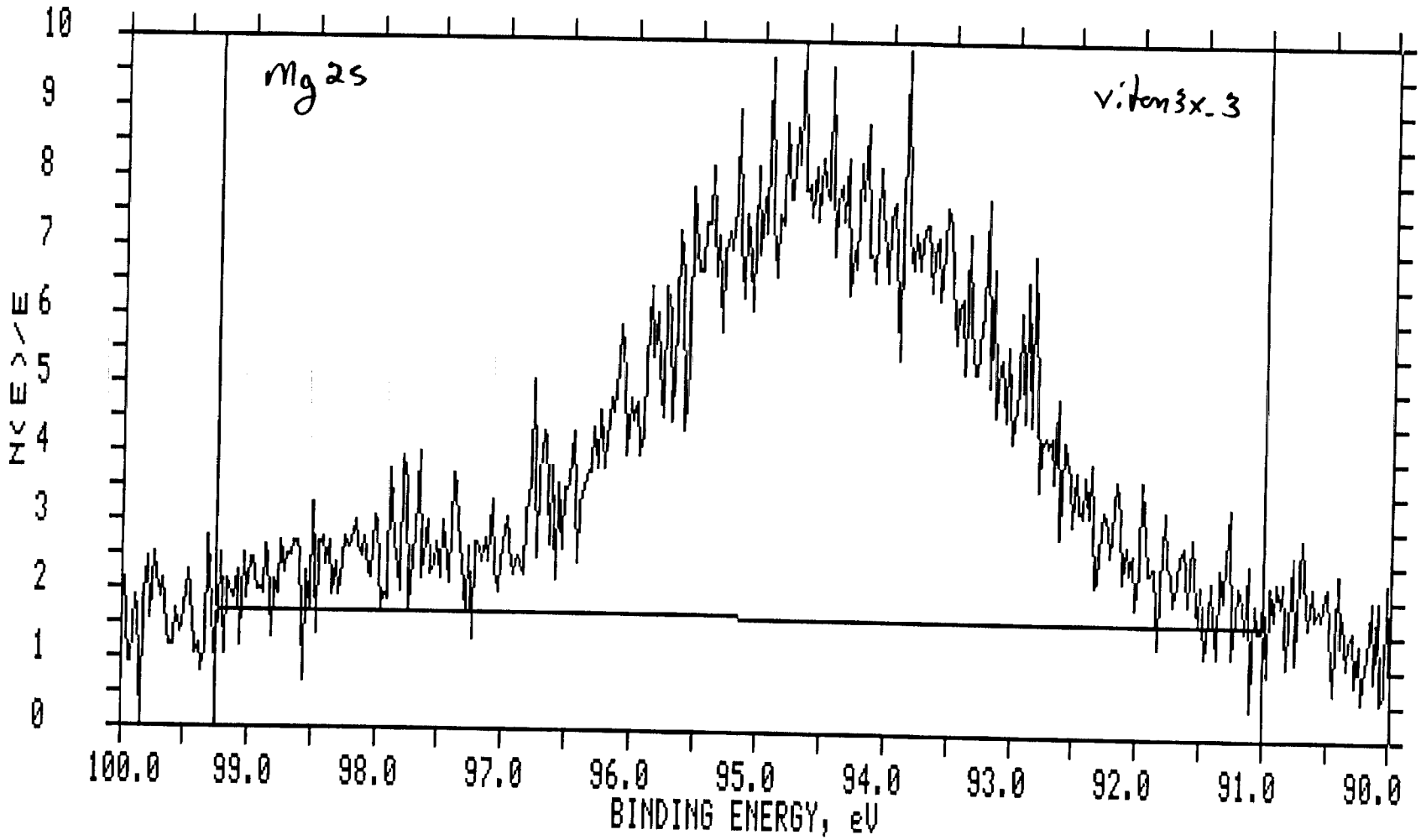

F1s
viton3x_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
696.0
695.0
694.0
693.0
692.0
691.0
690.0
689.0
688.0
687.0
686.0
BINDING ENERGY, eV

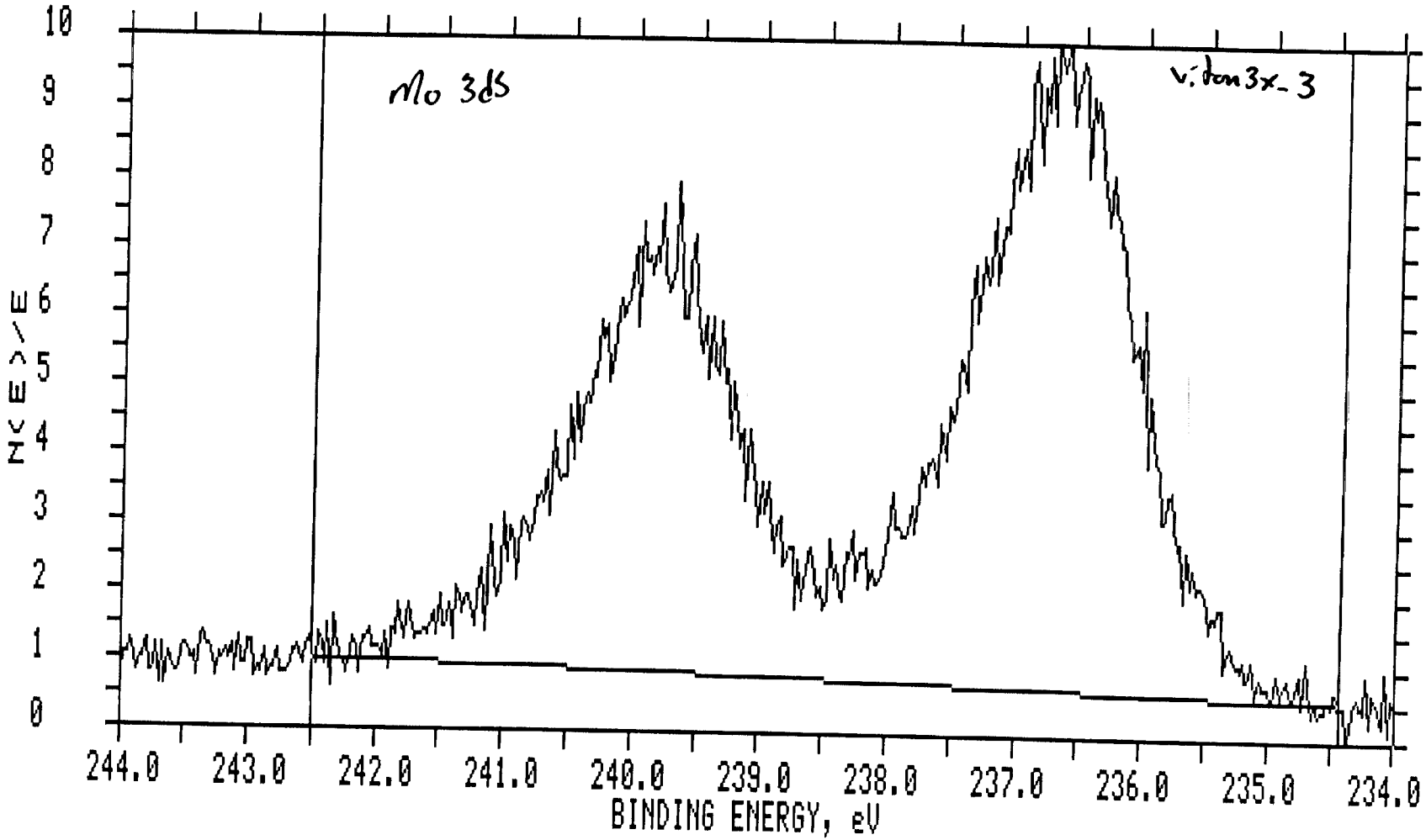

O 1s
viton3x_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
542.0
541.0
540.0
539.0
538.0
537.0
536.0
535.0
534.0
533.0
532.0
BINDING ENERGY, eV


C 1s
vitom3x_3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
295.0
294.0
293.0
292.0
291.0
290.0
289.0
288.0
287.0
286.0
285.0
BINDING ENERGY, eV


Ca 2ps
viton3x_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
359.0
358.0
357.0
356.0
355.0
354.0
353.0
352.0
351.0
350.0
349.0
BINDING ENERGY, eV


Cu 2p3/2
vidon3x3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
943.0
942.0
941.0
940.0
939.0
938.0
937.0
936.0
935.0
934.0
933.0
BINDING ENERGY, eV


Mg 2s
viton3x_3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
100.0
99.0
98.0
97.0
96.0
95.0
94.0
93.0
92.0
91.0
90.0
BINDING ENERGY, eV


Mo 3d5
V:Ion3x_3
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
244.0
243.0
242.0
241.0
240.0
239.0
238.0
237.0
236.0
235.0
234.0
BINDING ENERGY, eV

Ion Gun:OFF X-ray:OFF Mg

Technique:ESCA

0.6mPa

7/2/91 18:31

Atomic Concentration

1 Peak Measurement Use Height Area Element Name

2 Included Regions 1 2 3 4

Atomic Concentration Table

File: si383r_3

Comment: silicon rubber reference sample

Input Lens: Large Area Omni Focus

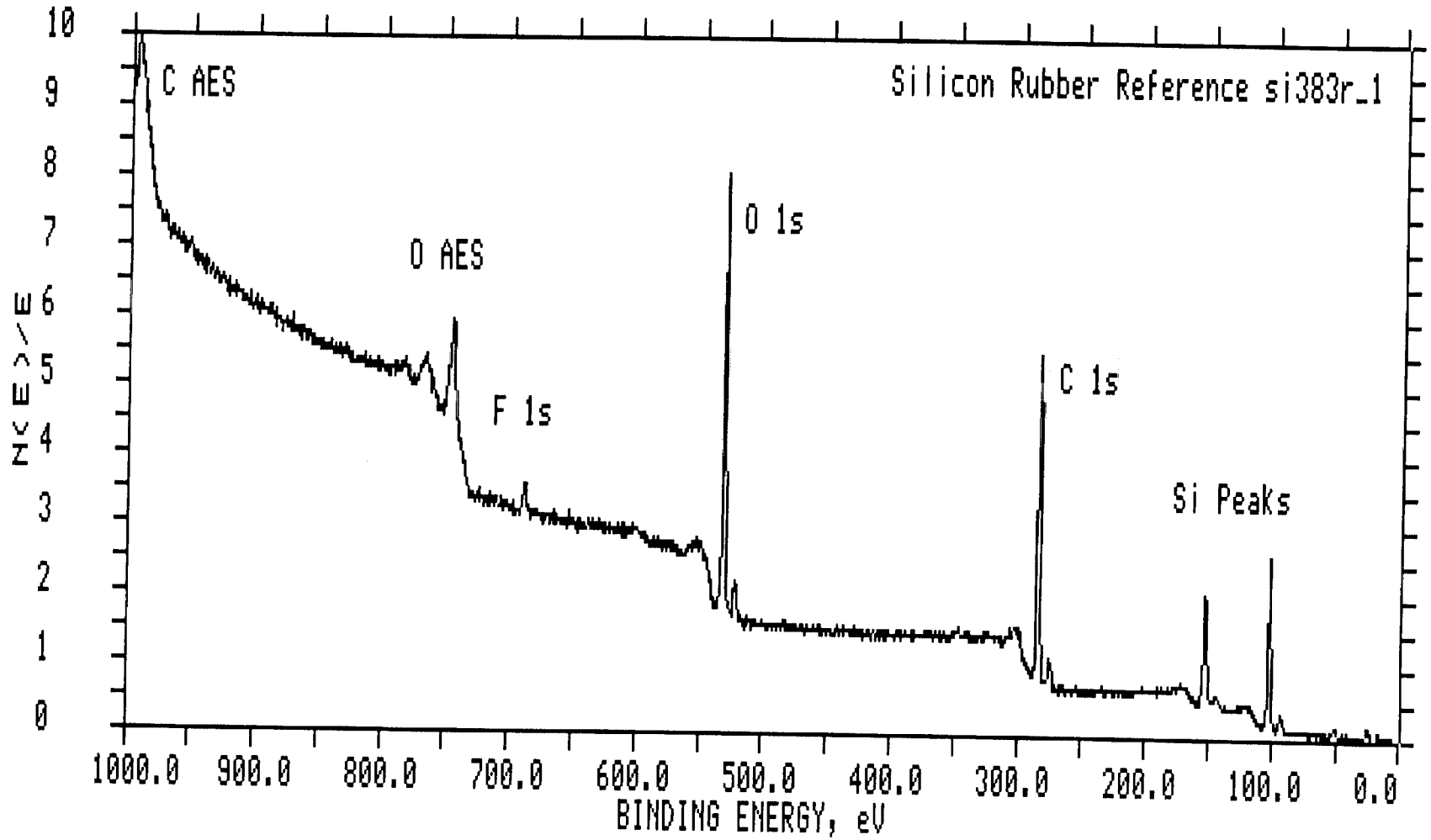
Element	Concentration(%)	Sens. Factor
F1s	0.55	1.000
O1s	28.26	0.711
C1s	52.26	0.296
Si2p	18.93	0.339

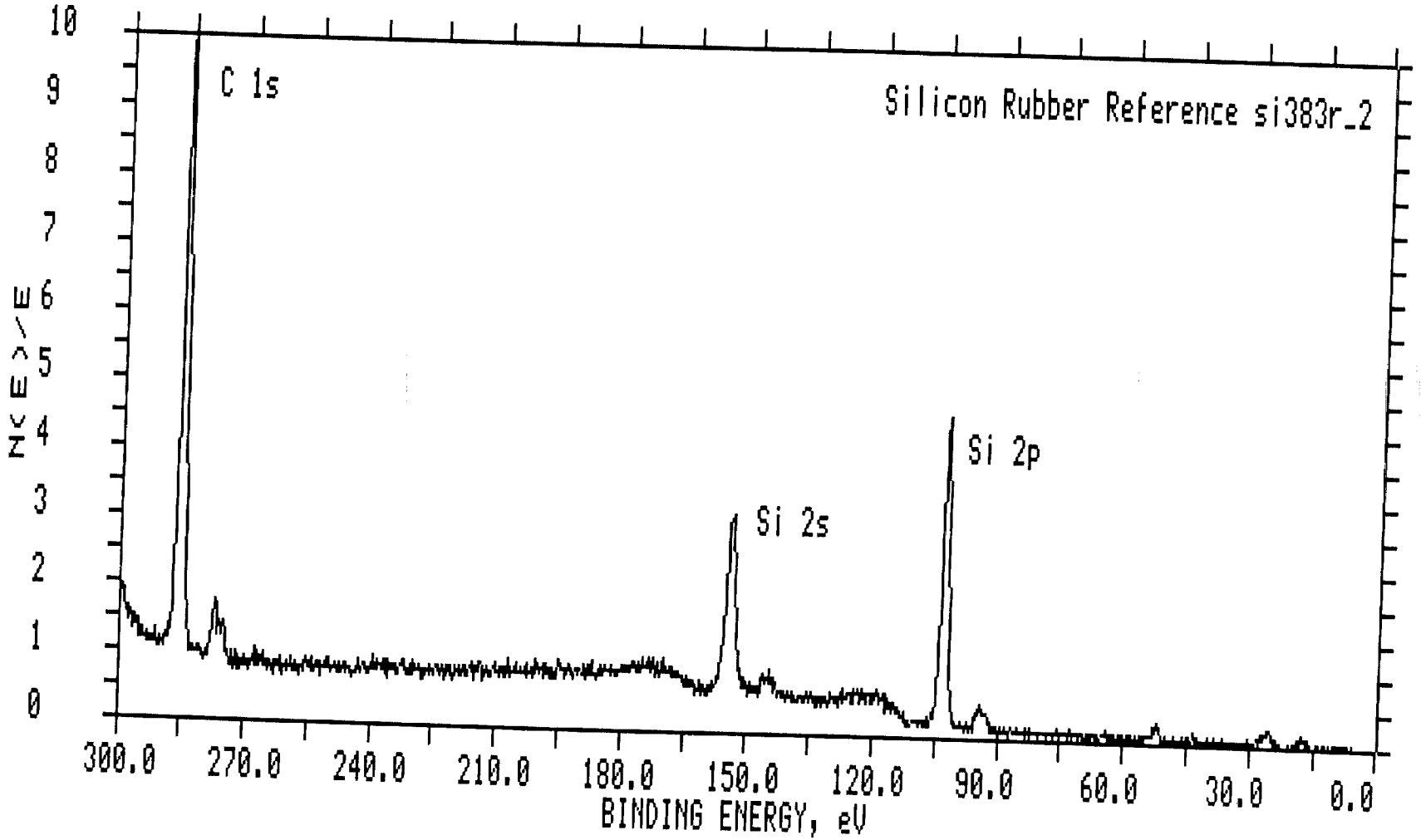
AC Table

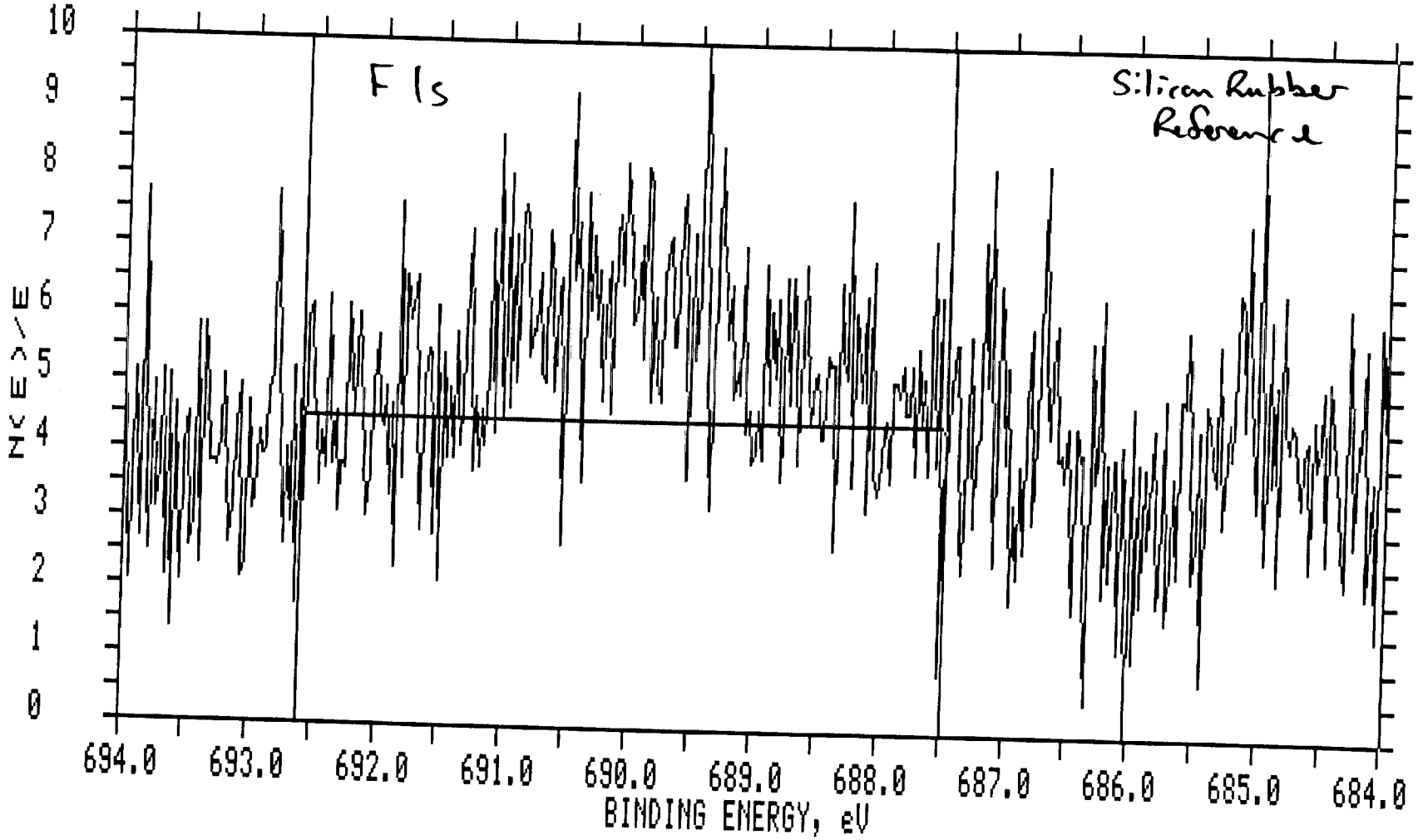
AC to AC Summary

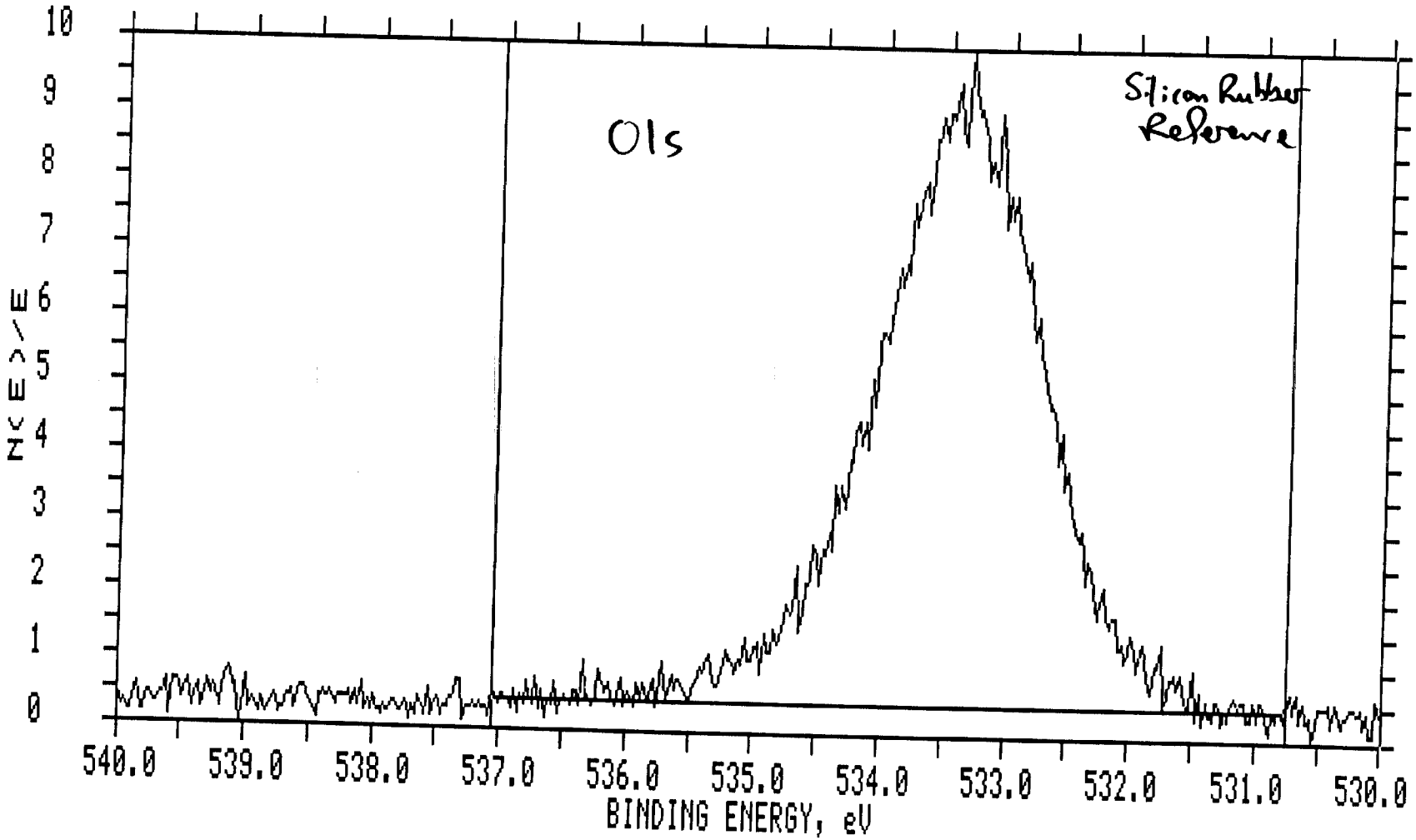
Omit All

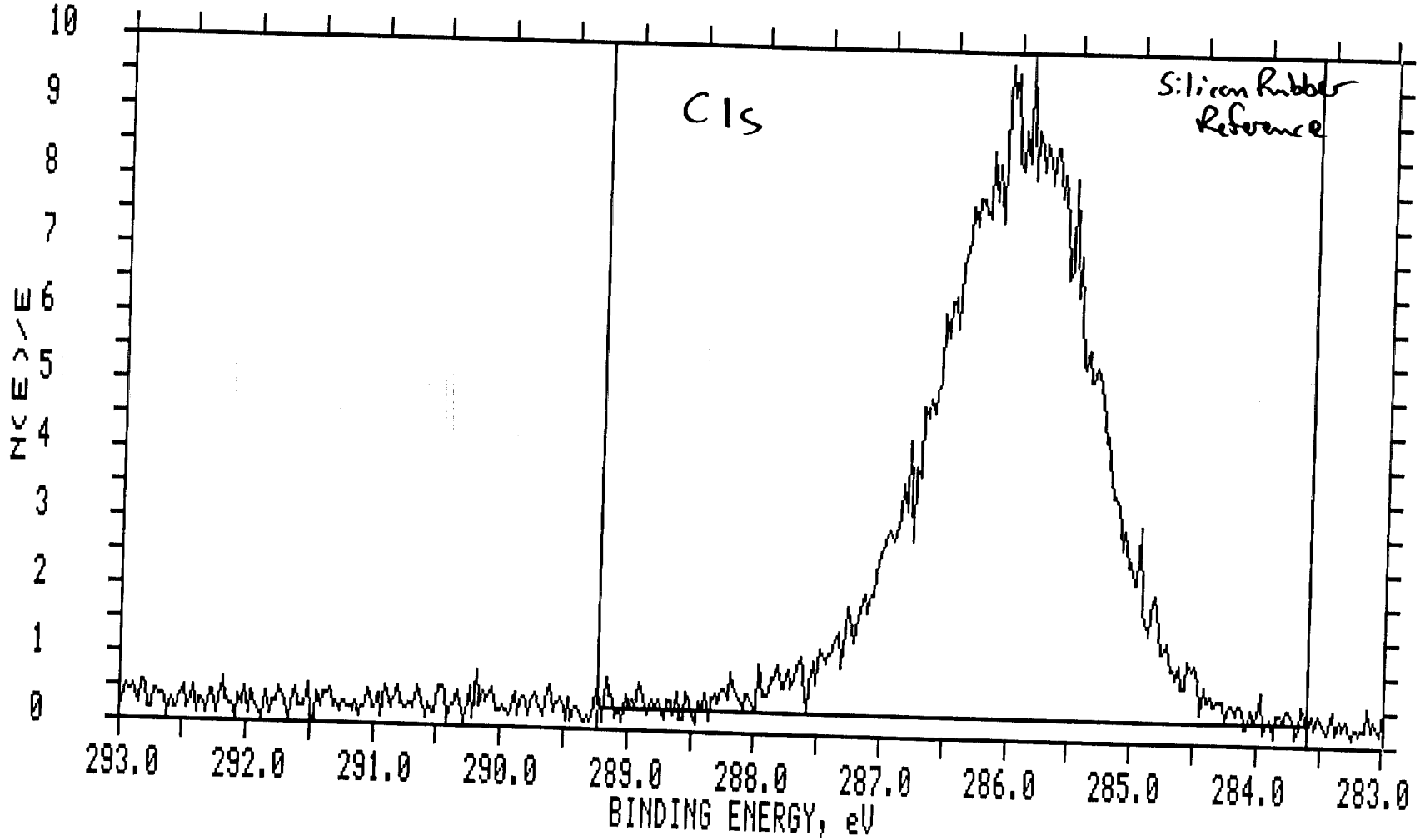
Exit

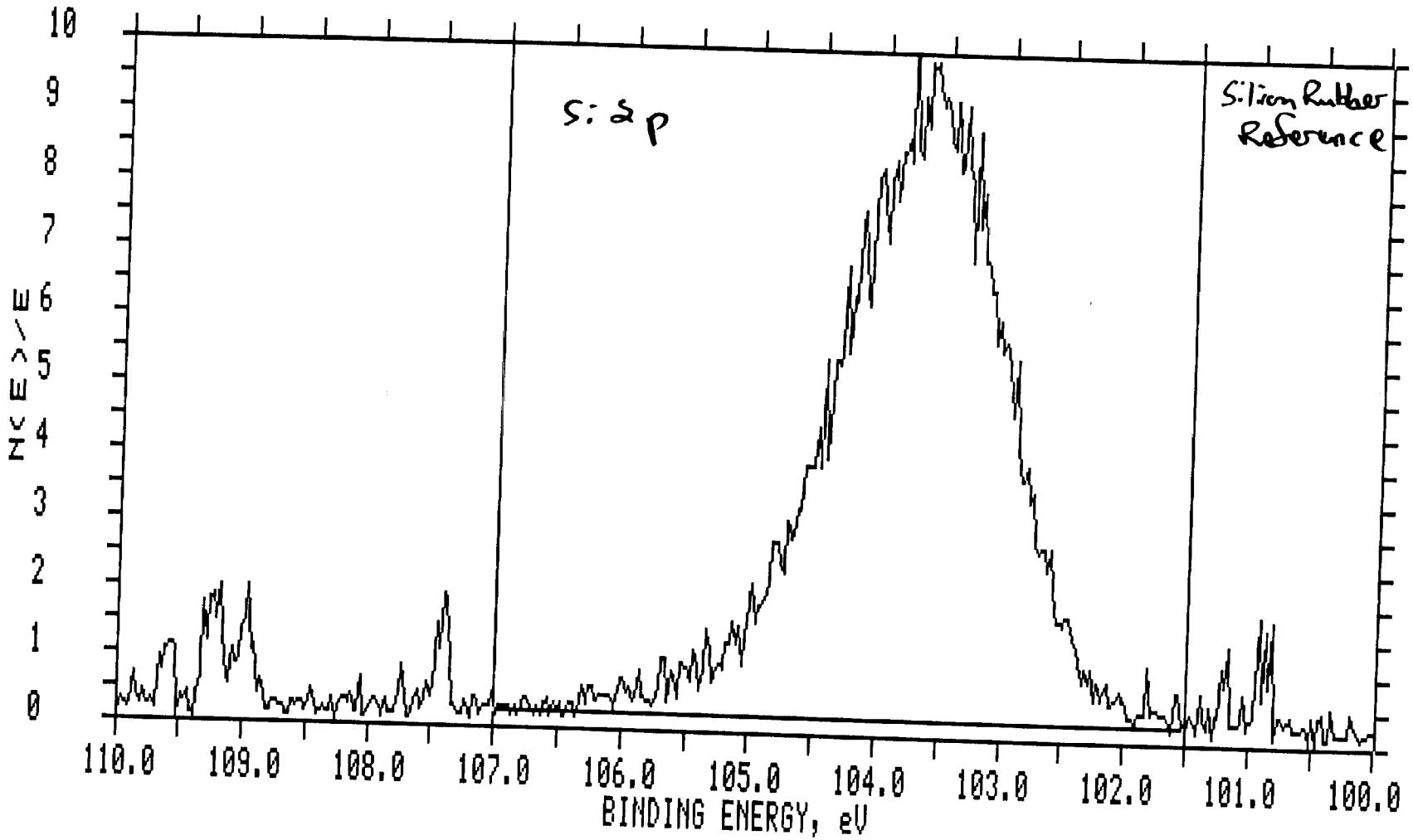

Silicon Rubber Reference si383r_1
C AES
O AES
F 1s
O 1s
C 1s
Si Peaks
N<E>/E
BINDING ENERGY, eV
10
9
8
7
6
5
4
3
2
1
0
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0


Silicon Rubber Reference si383r_2
C 1s
Si 2s
Si 2p
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
300.0
270.0
240.0
210.0
180.0
150.0
120.0
90.0
60.0
30.0
0.0
BINDING ENERGY, eV


F 1s
Silicon Rubber
Reference
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
694.0
693.0
692.0
691.0
690.0
689.0
688.0
687.0
686.0
685.0
684.0
BINDING ENERGY, eV


O1s
Silicon Rubber Reference
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
540.0
539.0
538.0
537.0
536.0
535.0
534.0
533.0
532.0
531.0
530.0
BINDING ENERGY, eV


C1s
Silicon Rubber Reference
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
293.0
292.0
291.0
290.0
289.0
288.0
287.0
286.0
285.0
284.0
283.0
BINDING ENERGY, eV


Si 2p
Silicon Rubber Reference
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
110.0
109.0
108.0
107.0
106.0
105.0
104.0
103.0
102.0
101.0
100.0
BINDING ENERGY, eV

Atomic Concentration

1 Peak Measurement Use Height Area Element Name ___

Included Regions 1 2 3

Atomic Concentration Table

File: si383a_3

Comment: silicon rubber sts41 sample 383a

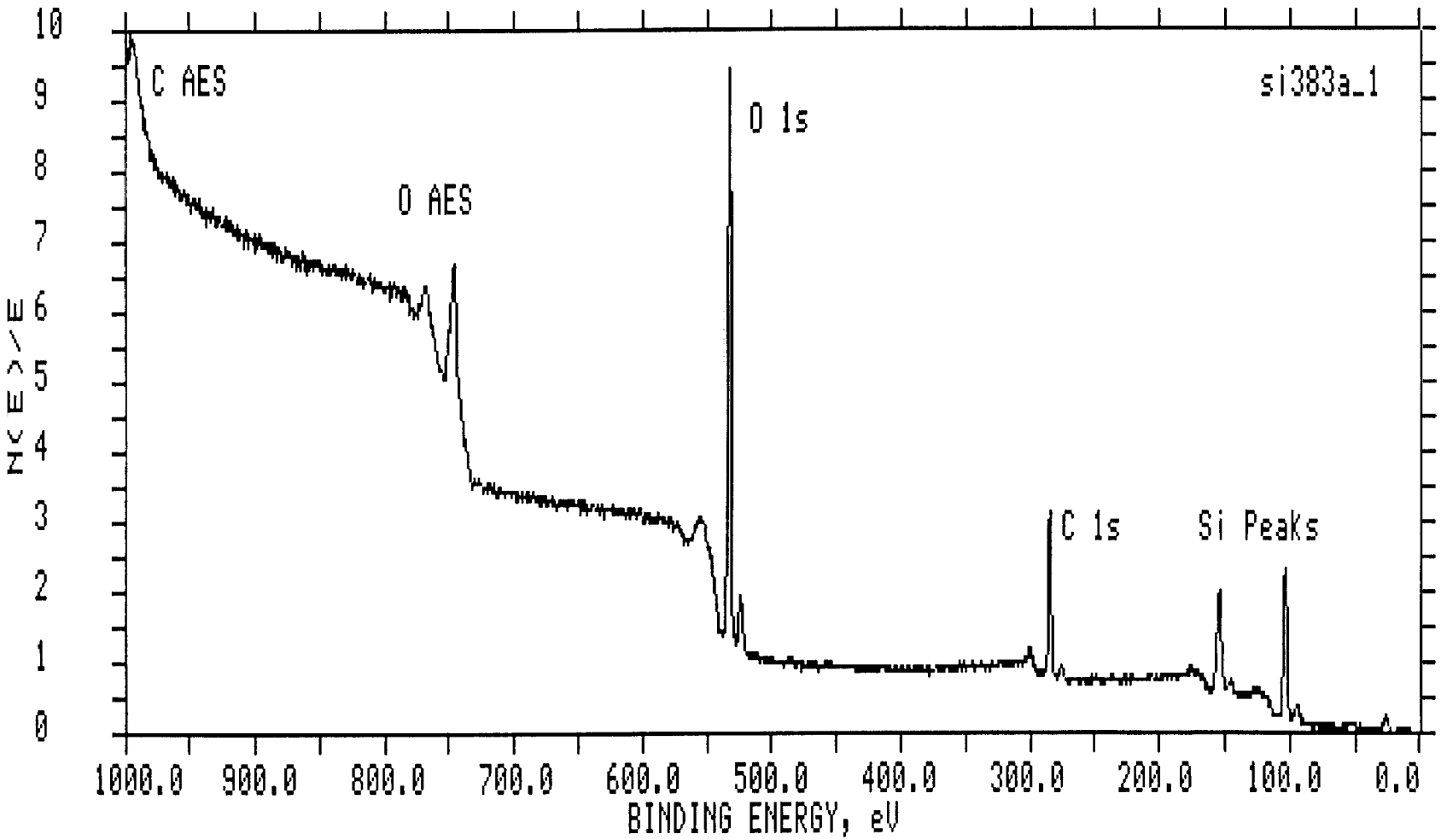
Input Lens: Large Area Omni Focus

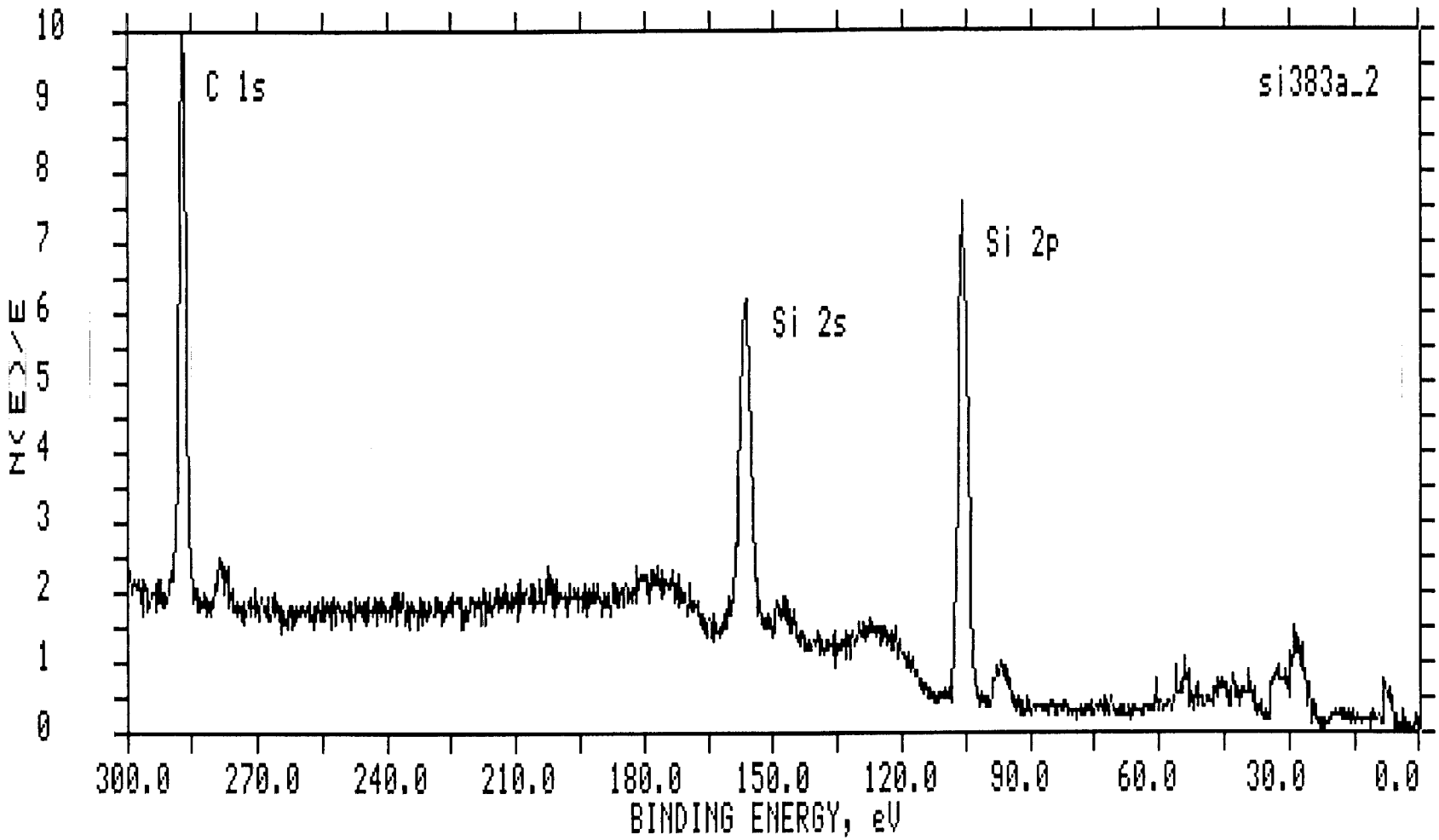
Element	Concentration(%)	Sens. Factor
O1s	50.76	0.711
C1s	25.57	0.296
Si2p	23.67	0.339

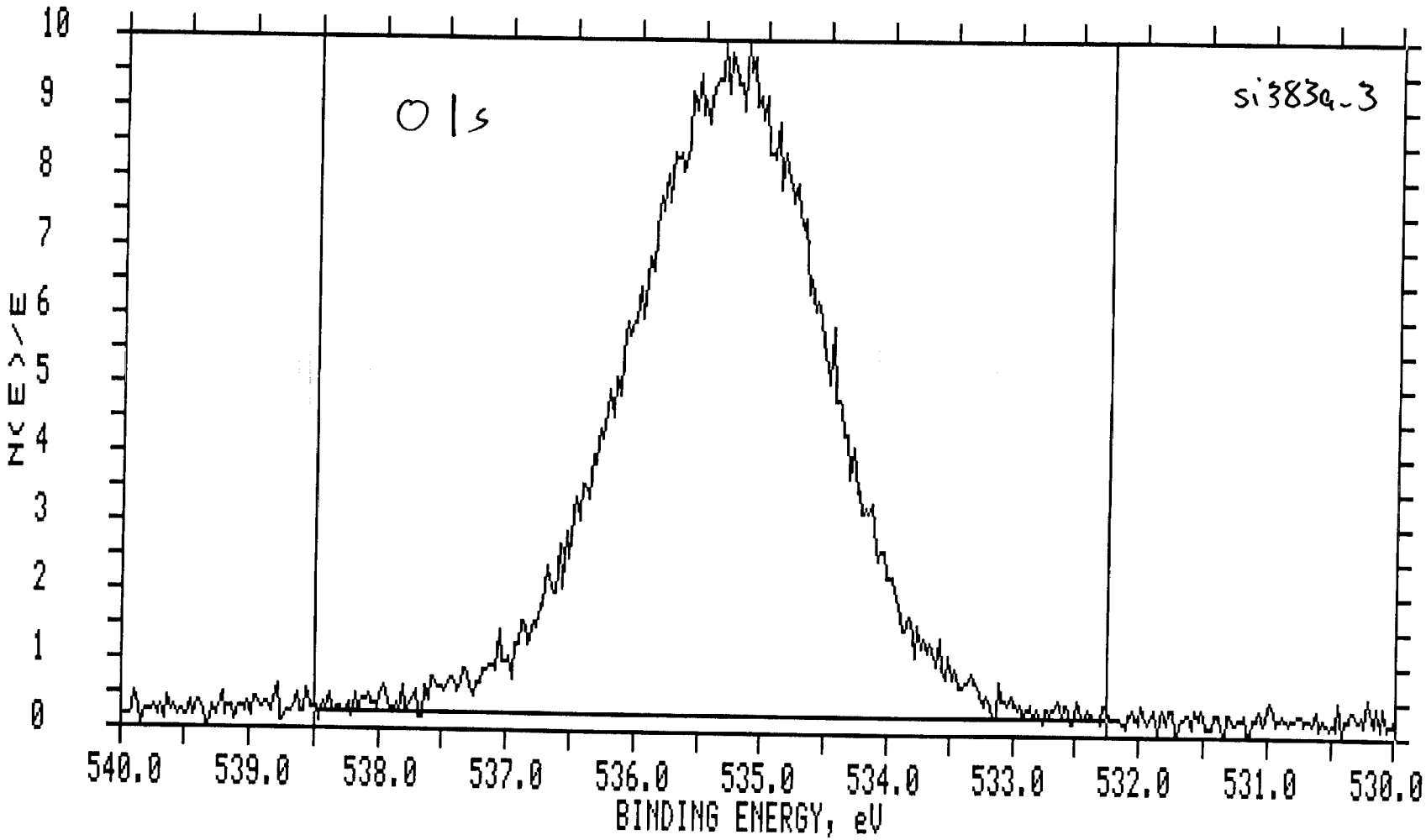
IEEE-488: can't take synchronous control

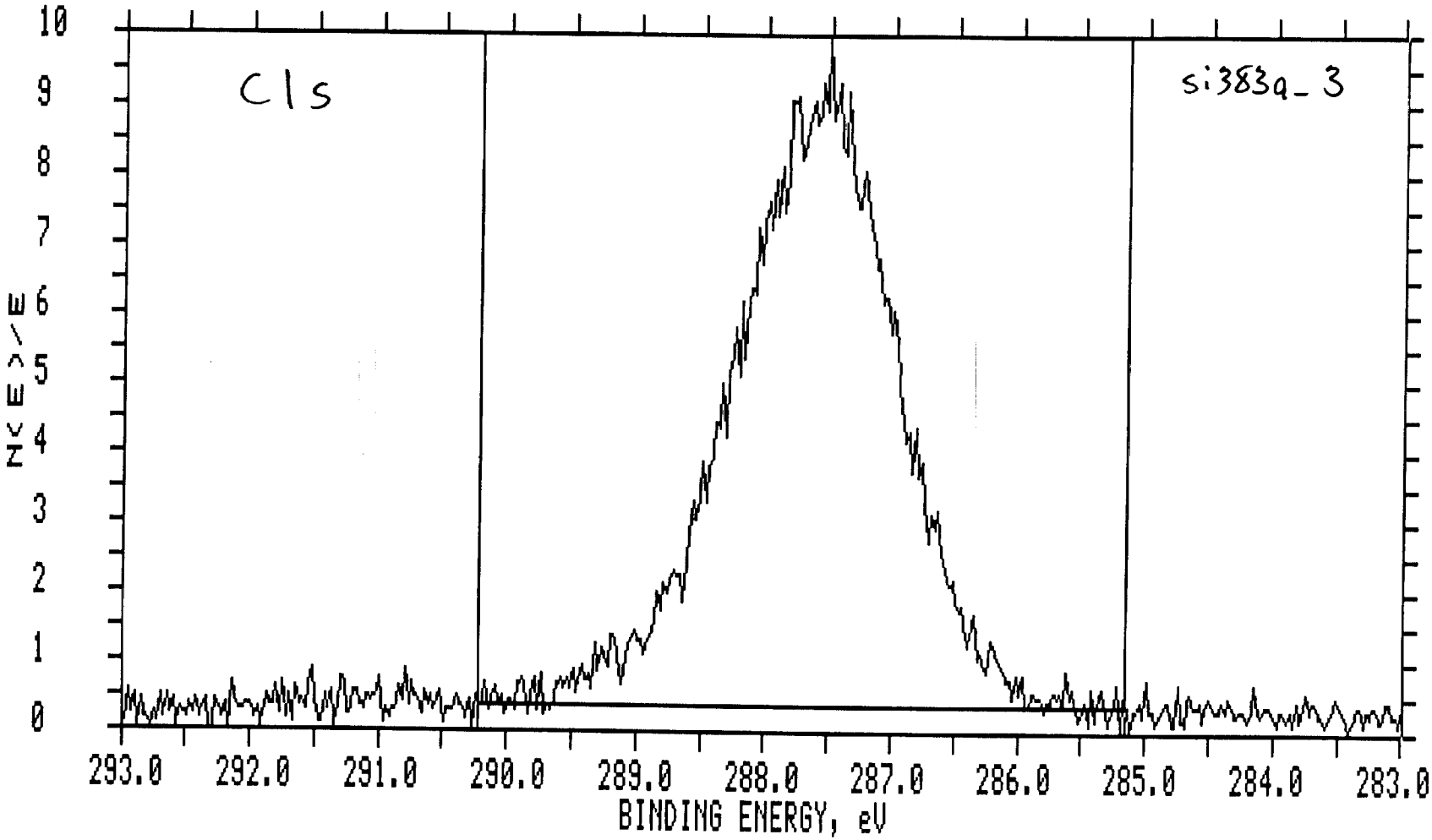
AC AC to AC Omit Exit

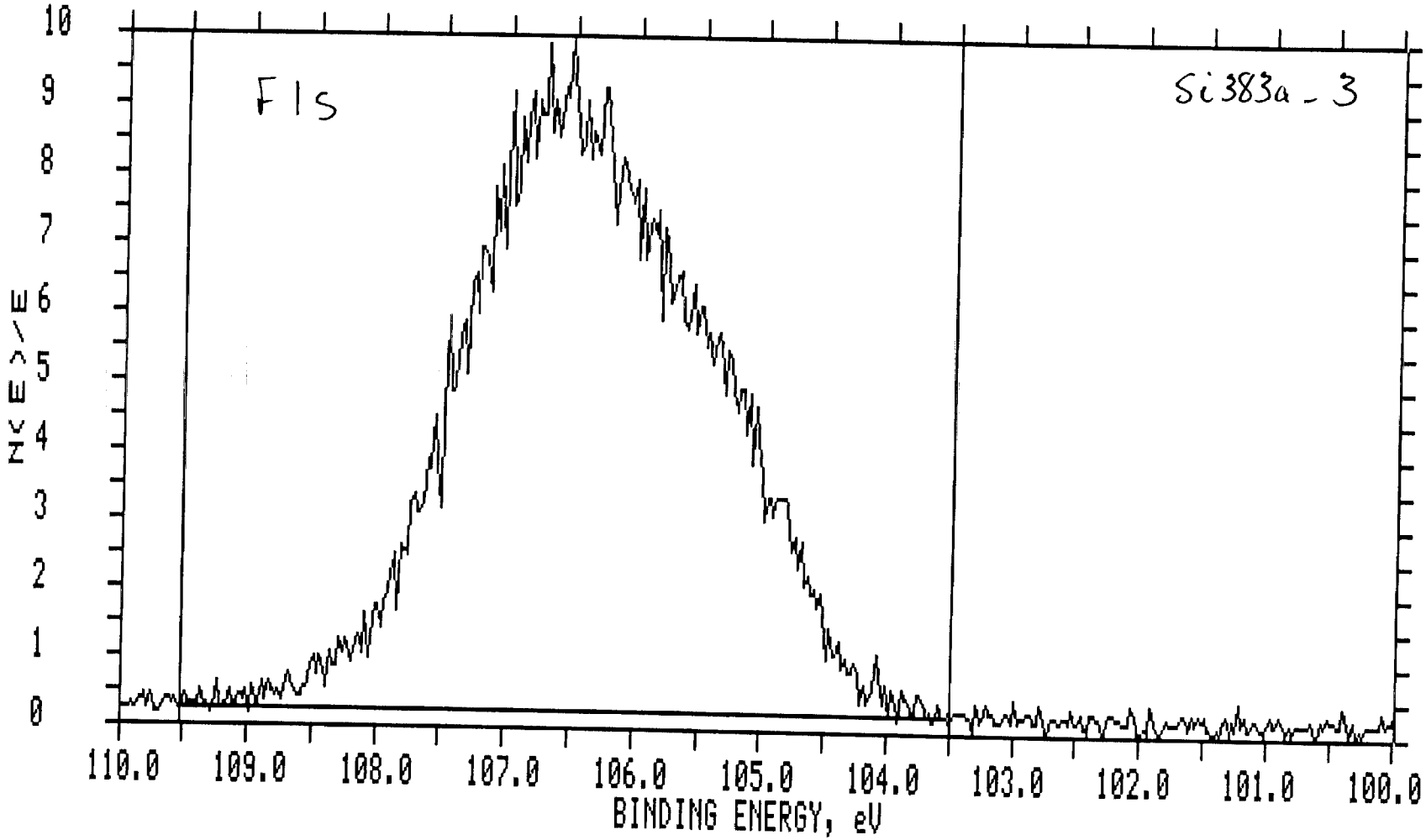
able Summary All


C AES
O AES
O 1s
C 1s
Si Peaks
si383a_1
N<E>/E
BINDING ENERGY, eV
10
9
8
7
6
5
4
3
2
1
0
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0


C 1s
si383a_2
Si 2p
Si 2s
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
300.0
270.0
240.0
210.0
180.0
150.0
120.0
90.0
60.0
30.0
0.0
BINDING ENERGY, eV


O 1s
si383a-3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
540.0
539.0
538.0
537.0
536.0
535.0
534.0
533.0
532.0
531.0
530.0
BINDING ENERGY, eV


C1s
si383a_3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
293.0
292.0
291.0
290.0
289.0
288.0
287.0
286.0
285.0
284.0
283.0
BINDING ENERGY, eV


F1s
Si383a_3
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
110.0
109.0
108.0
107.0
106.0
105.0
104.0
103.0
102.0
101.0
100.0
BINDING ENERGY, eV

Ion Gun:OFF X-ray: ON Mg Acquiring Technique:ESCA

0.6mPa 7/5/91 12:30

Atomic Concentration

1 Peak Measurement Use Height Area Element Name

2 Included Regions 1 2 3 4

Atomic Concentration Table

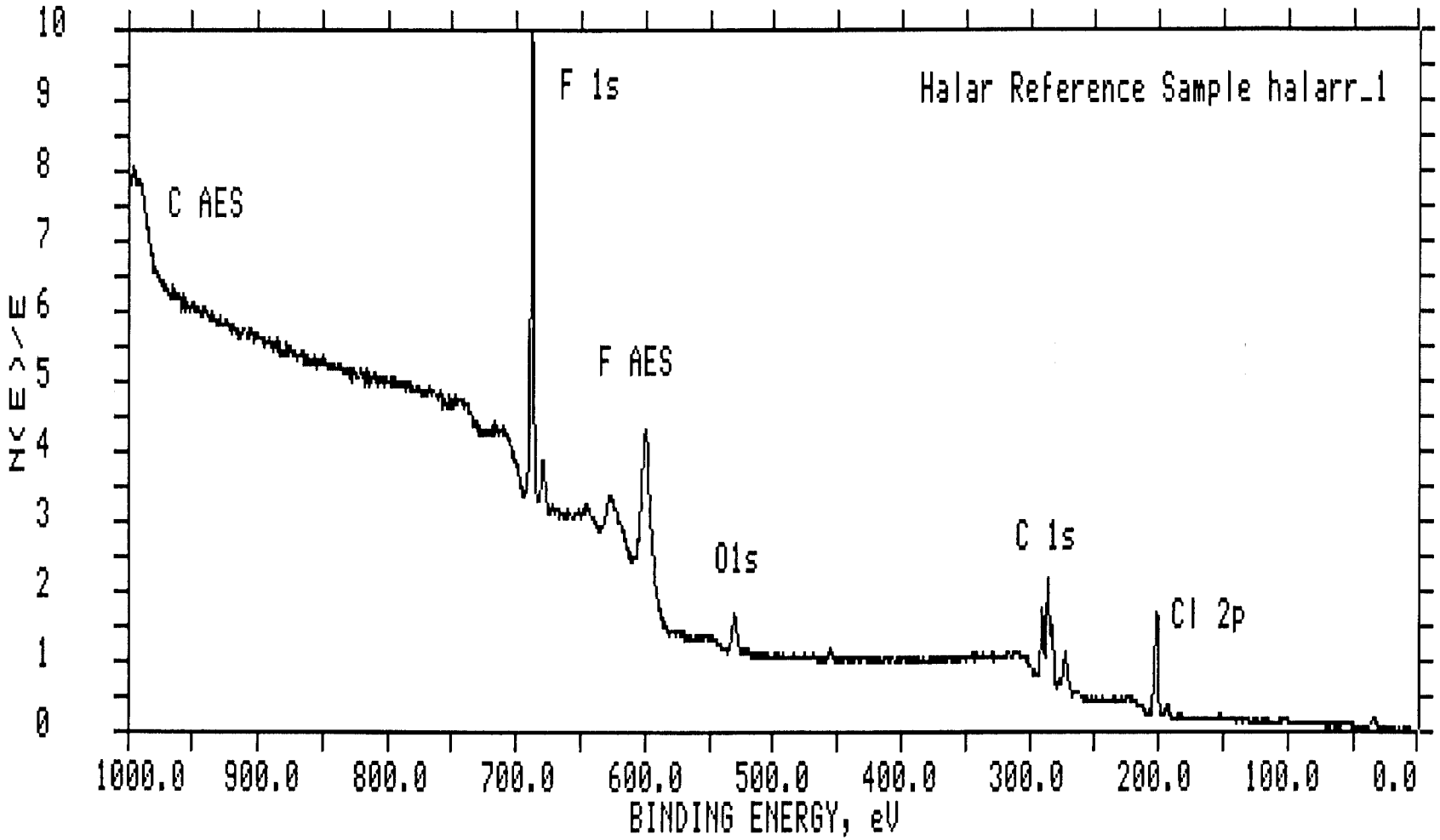
File: halarr_4

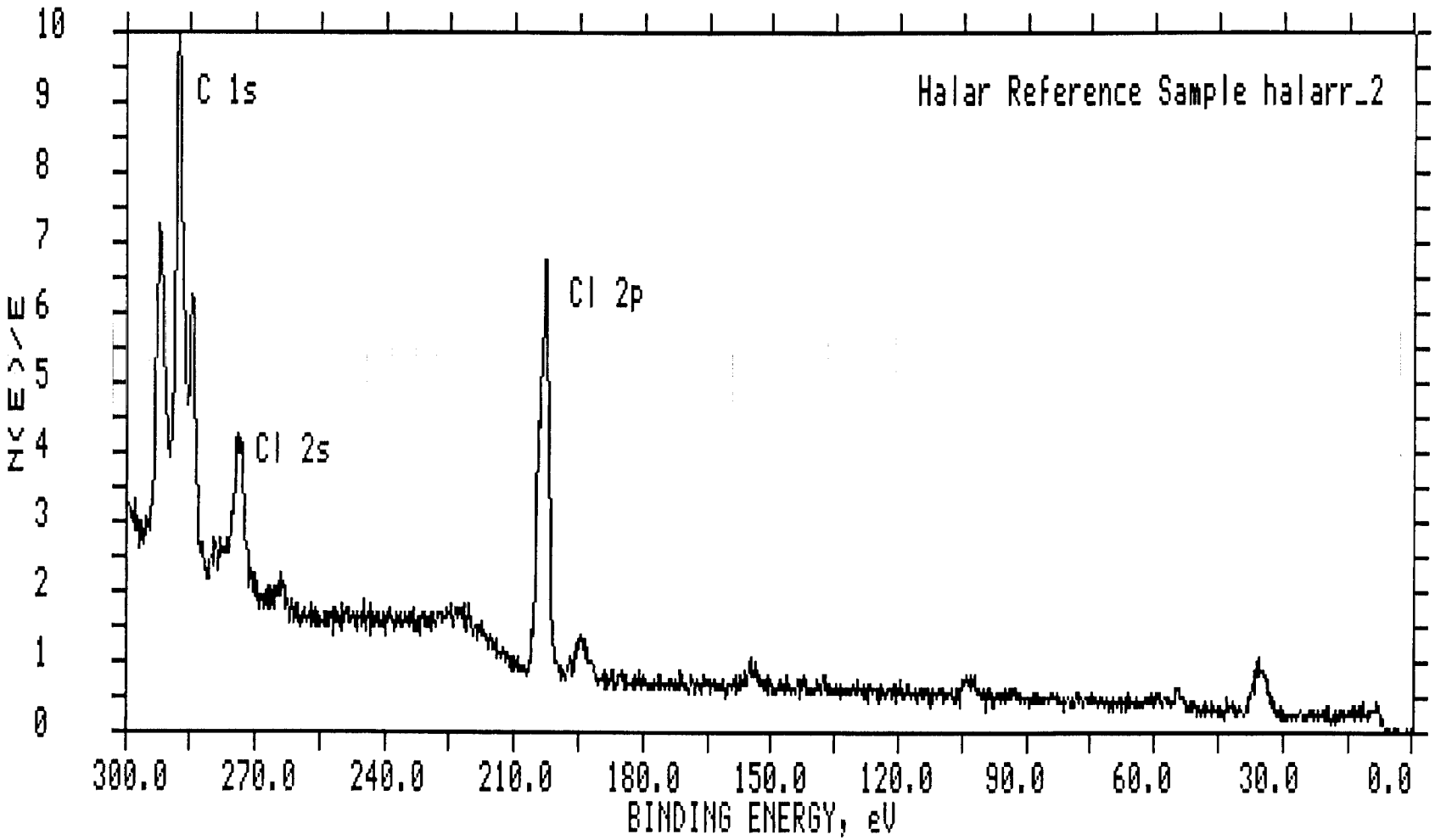
Comment: Halar reference sample

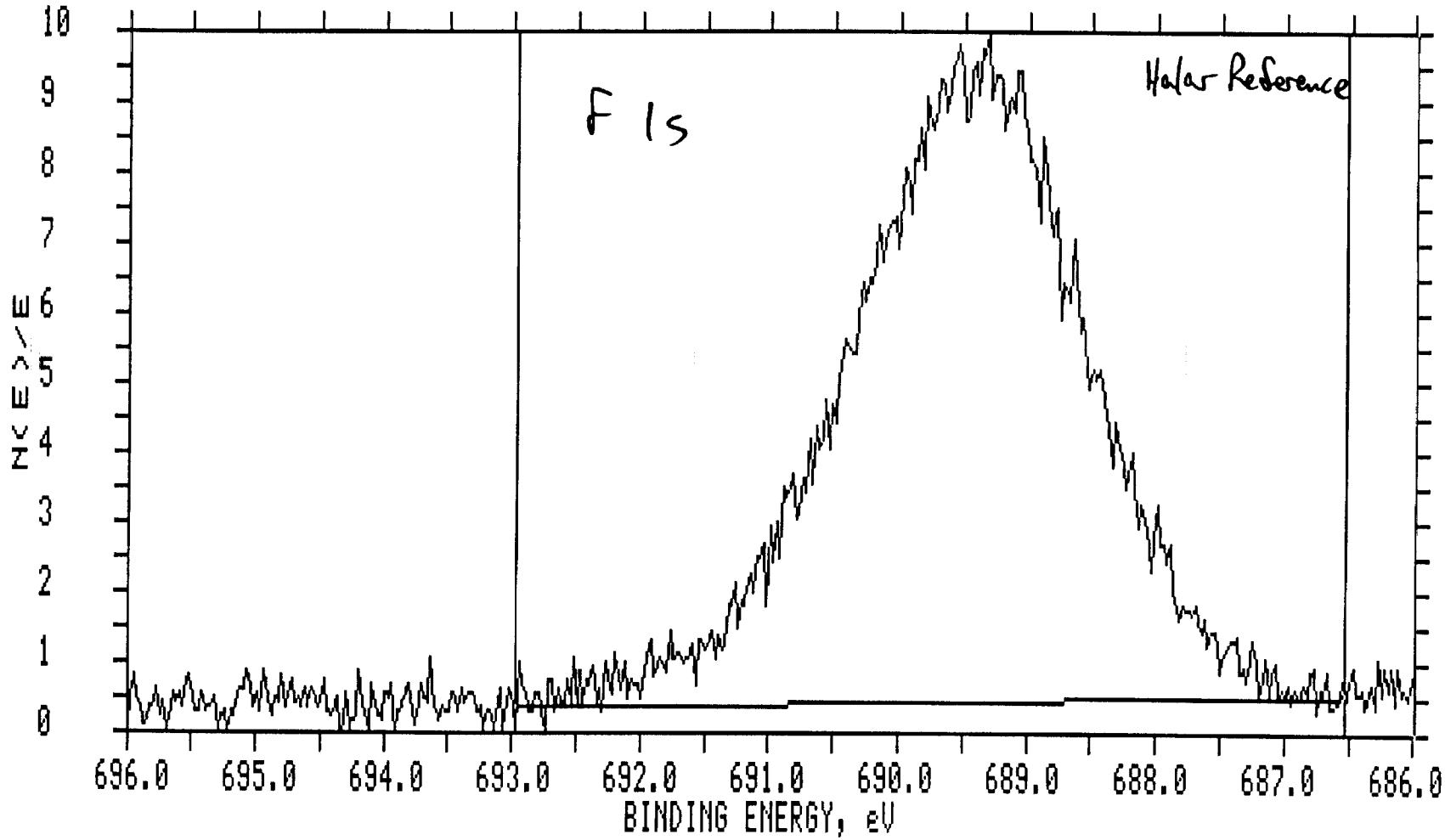
Input Lens: Large Area Omni Focus

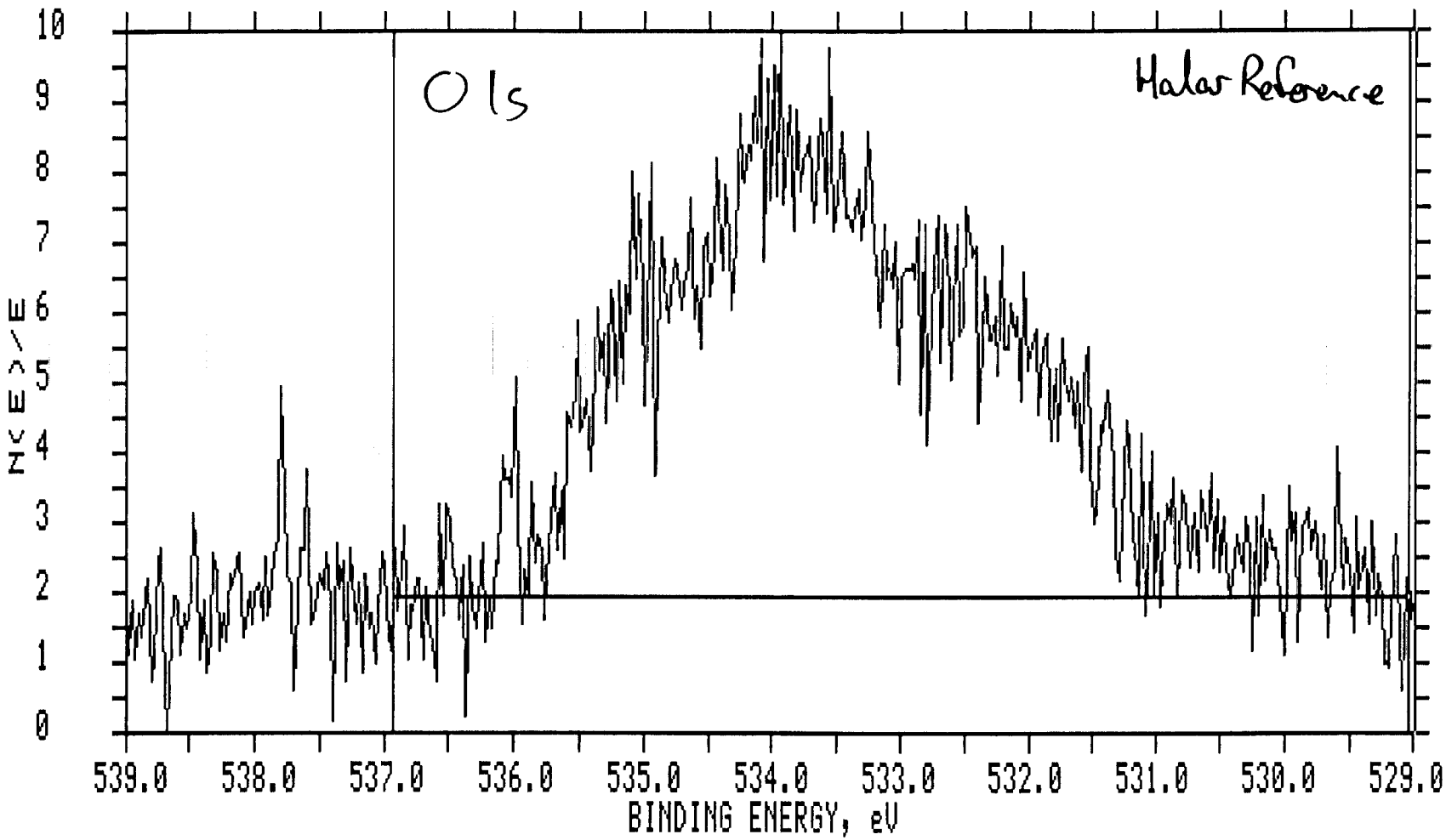
Element	Concentration(%)	Sens. Factor
F1s	39.93	1.000
O1s	4.10	0.711
C1s	52.69	0.296
Cl2p	3.28	0.891

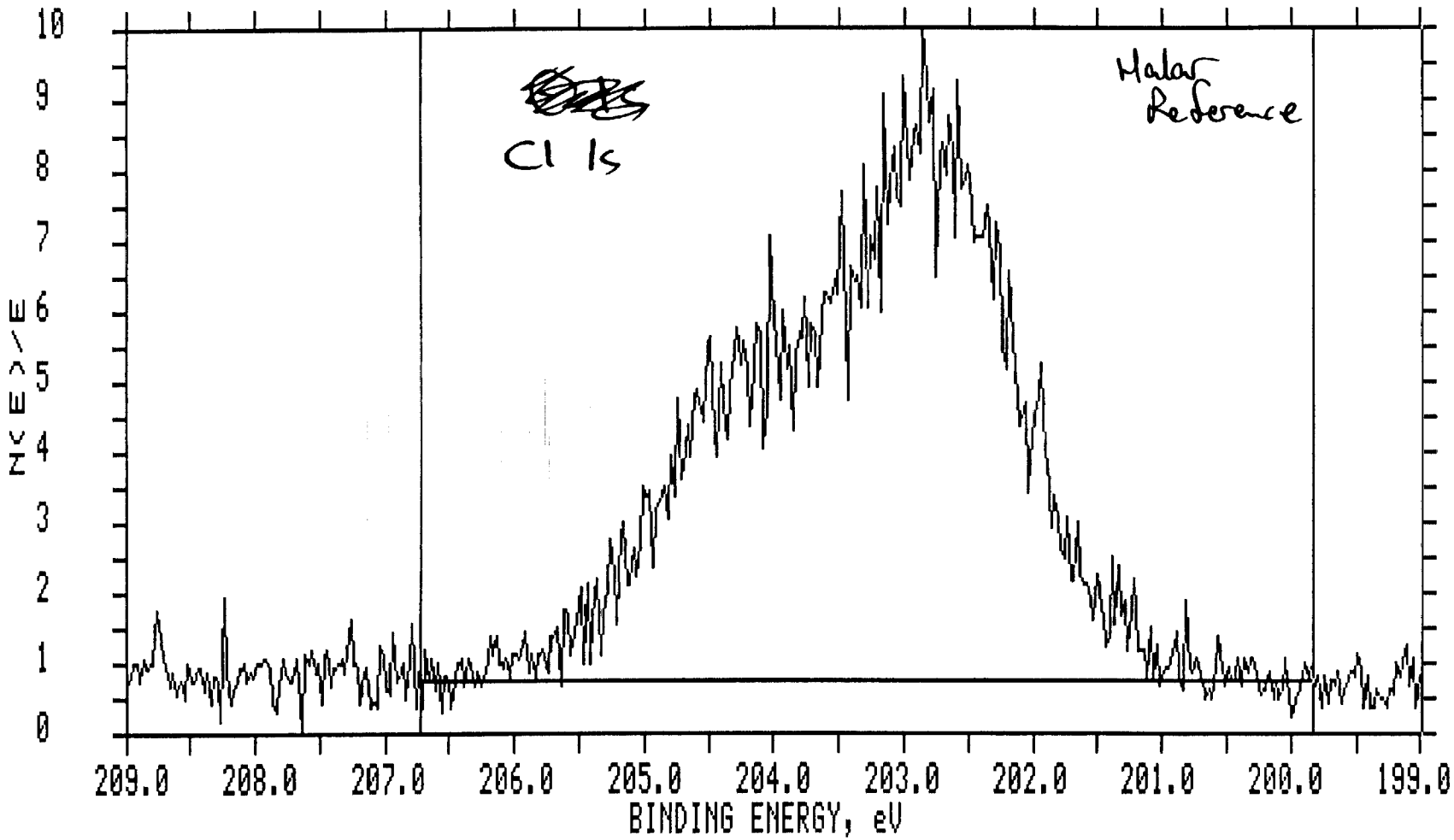
AC Table | AC to AC Summary | Omit All | Exit

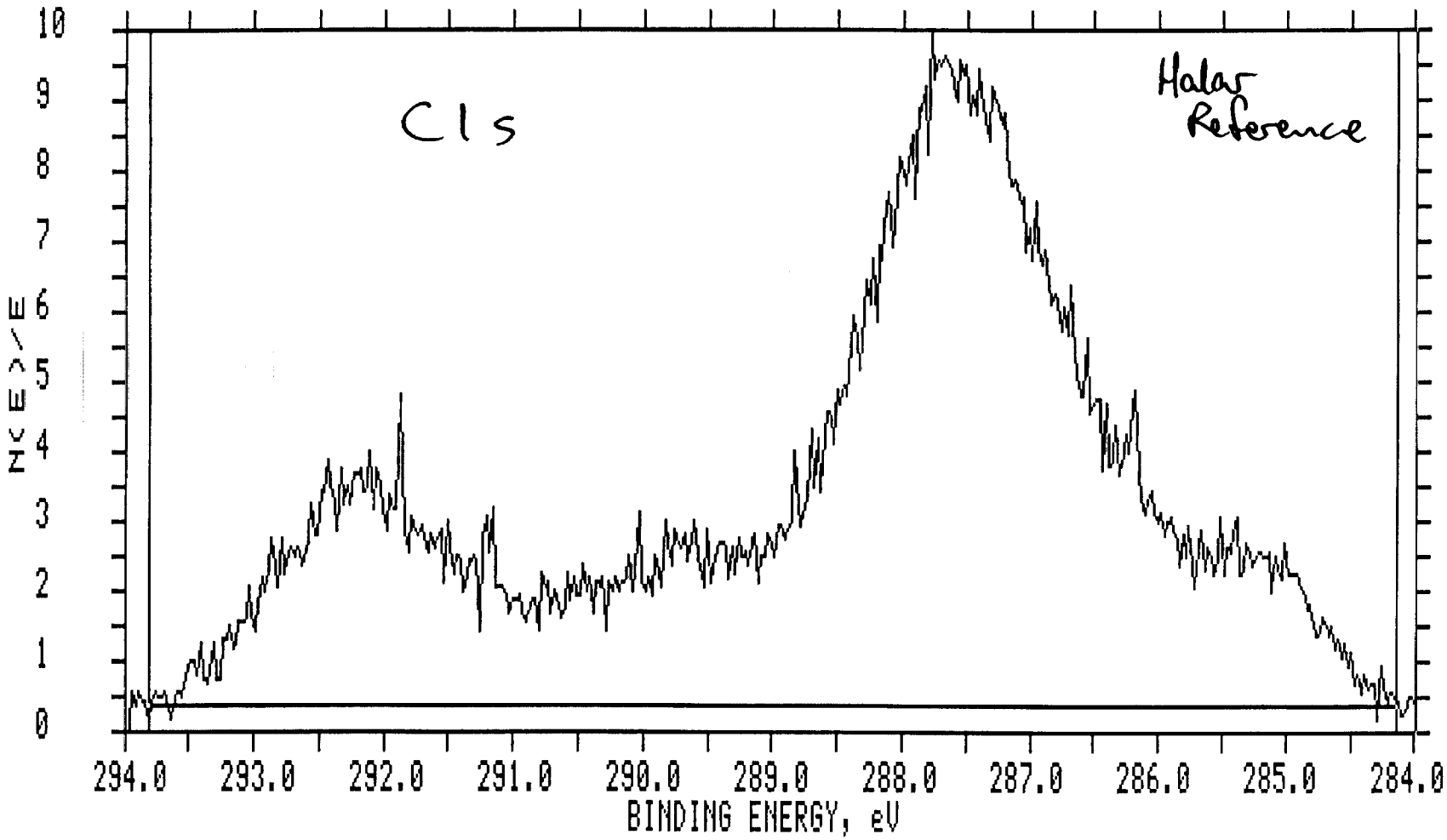

Halar Reference Sample halarr_1
F 1s
C AES
F AES
O1s
C 1s
Cl 2p
N(E)/E
BINDING ENERGY, eV
10
9
8
7
6
5
4
3
2
1
0
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0


Halar Reference Sample halarr_2
C 1s
Cl 2s
Cl 2p
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
300.0
270.0
240.0
210.0
180.0
150.0
120.0
90.0
60.0
30.0
0.0
BINDING ENERGY, eV


F 1s
Halar Reference
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
696.0
695.0
694.0
693.0
692.0
691.0
690.0
689.0
688.0
687.0
686.0
BINDING ENERGY, eV


O 1s
Halar Reference
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
539.0
538.0
537.0
536.0
535.0
534.0
533.0
532.0
531.0
530.0
529.0
BINDING ENERGY, eV


Cl 1s
Halar Reference
N(E)/E
10
9
8
7
6
5
4
3
2
1
0
209.0
208.0
207.0
206.0
205.0
204.0
203.0
202.0
201.0
200.0
199.0
BINDING ENERGY, eV


C1s
Halar Reference
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
294.0
293.0
292.0
291.0
290.0
289.0
288.0
287.0
286.0
285.0
284.0
BINDING ENERGY, eV

on Gun:OFF X-ray:OFF Mg Technique:ESCA

0.6mPa 7/3/91 14:40

Atomic Concentration

1 Peak Measurement Use Height Area Element Name

2 Included Regions 1 2 3 4 5

Atomic Concentration Table

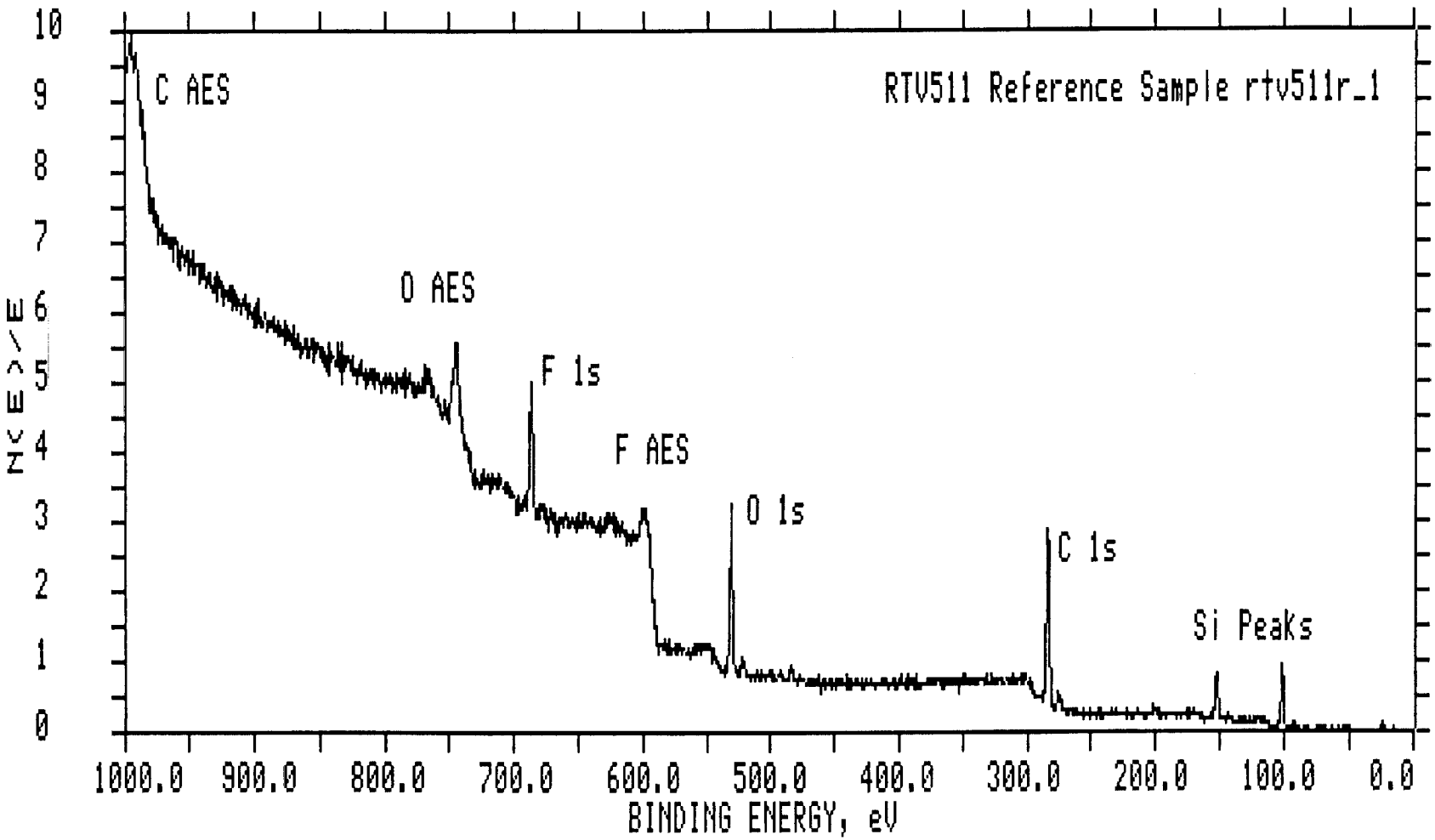
File: rtv511r_3

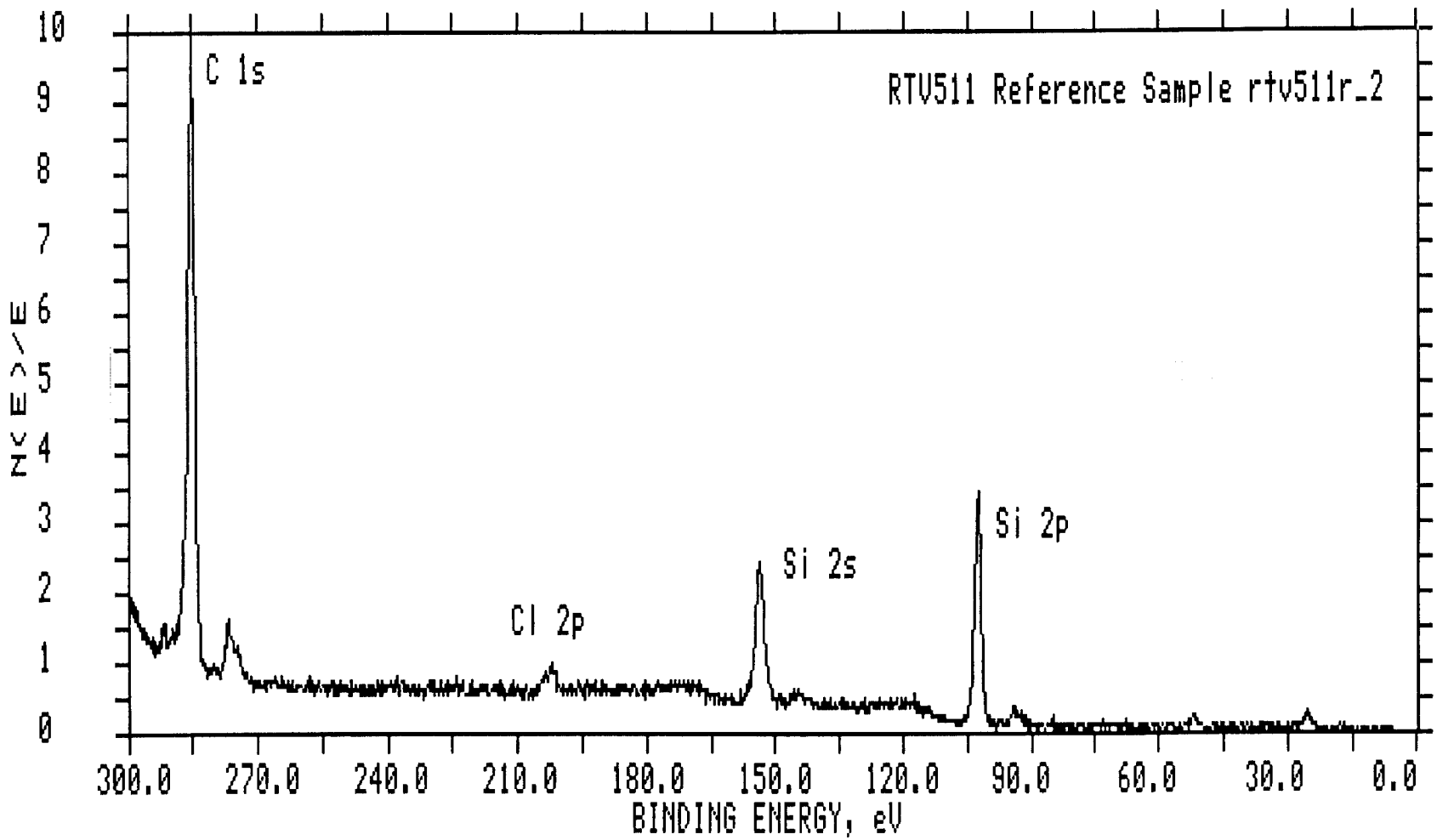
Comment: RTV 511 Reference sample

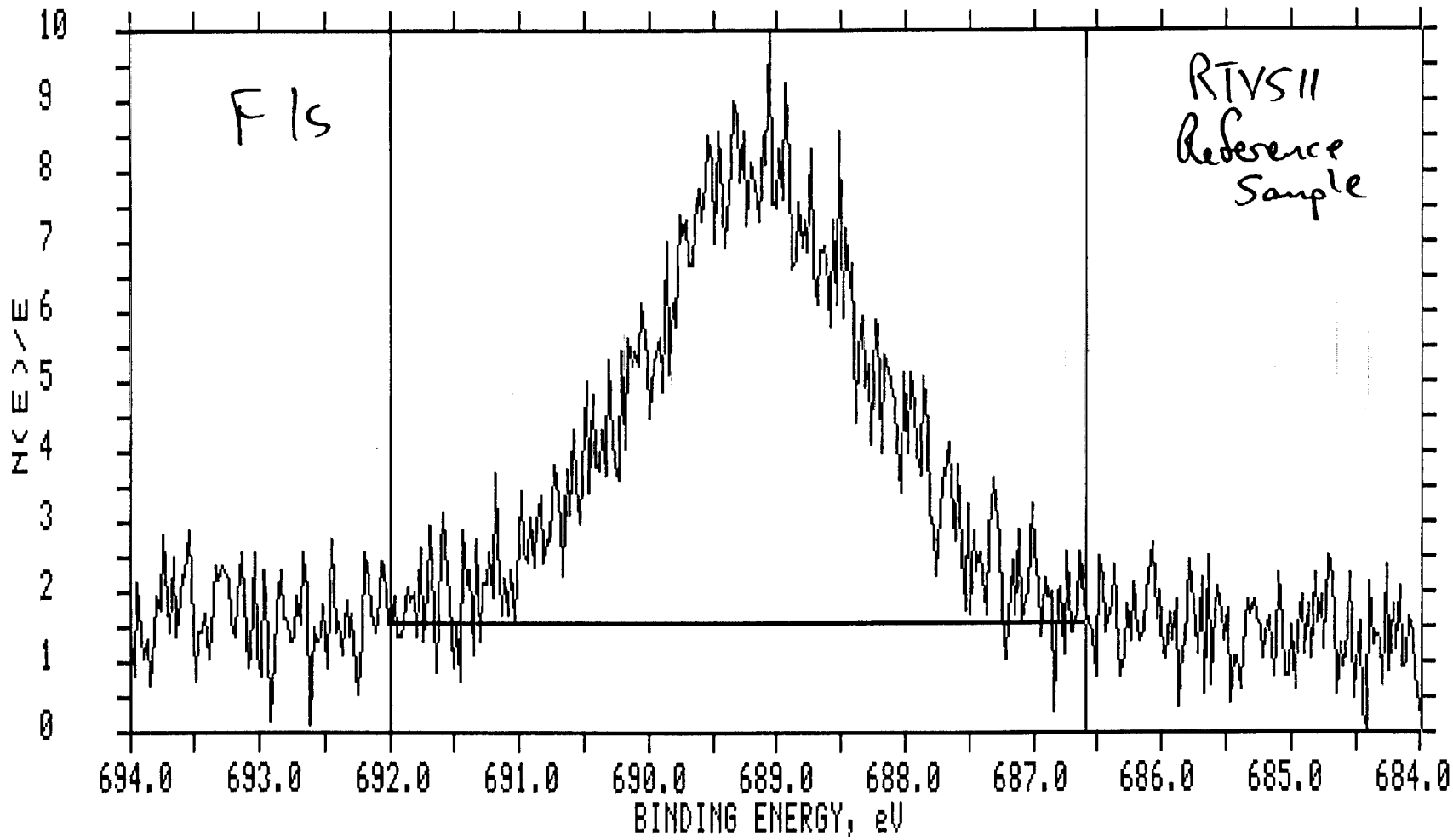
Input Lens: Large Area Omni Focus

Element	Concentration(%)	Sens. Factor
F1s	5.39	1.000
O1s	23.01	0.711
C1s	58.36	0.296
Cl2p	0.26	0.891
Si2p	12.97	0.339

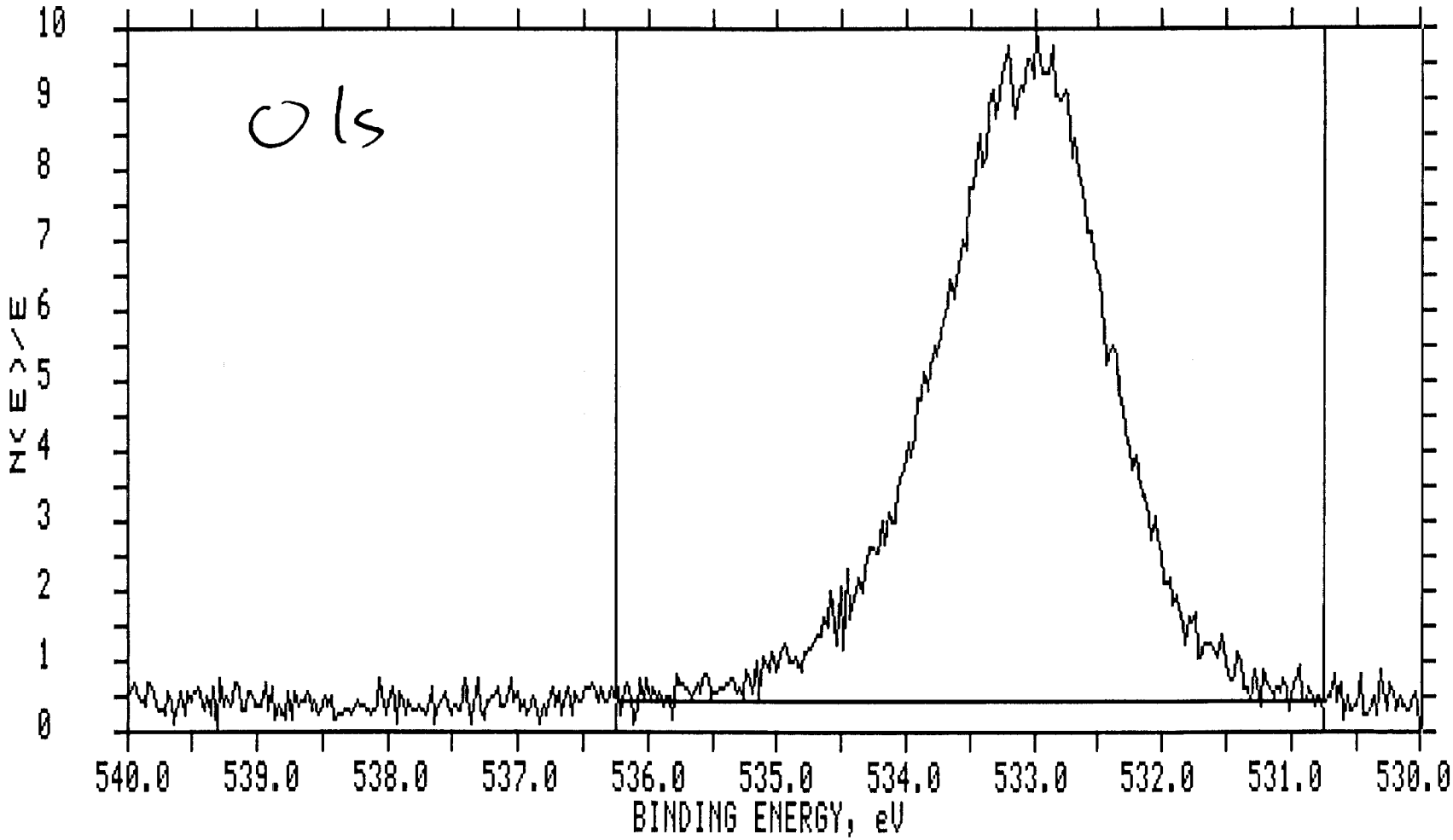
AC Table | AC to AC Summary | Omit All | Exit


RTV511 Reference Sample rtv511r_1
C AES
O AES
F 1s
F AES
O 1s
C 1s
Si Peaks
N(E)/E
BINDING ENERGY, eV
10
9
8
7
6
5
4
3
2
1
0
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0

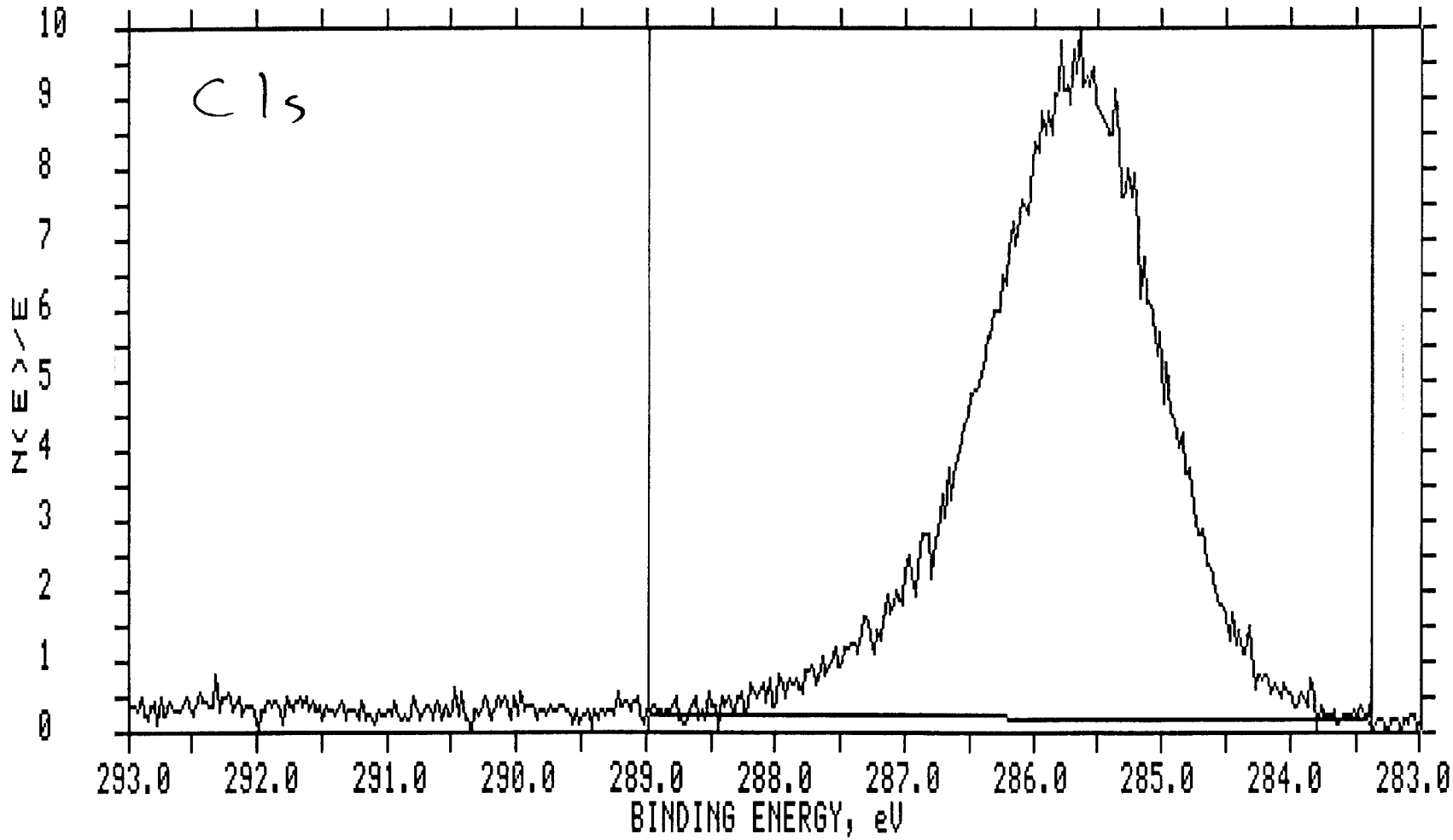

RTV511 Reference Sample rtv511r_2
C 1s
Cl 2p
Si 2s
Si 2p
N(E)/E
BINDING ENERGY, eV
300.0
270.0
240.0
210.0
180.0
150.0
120.0
90.0
60.0
30.0
0.0
0
1
2
3
4
5
6
7
8
9
10


F 1s
RTVS11
Reference
Sample
N<E>/E
10
9
8
7
6
5
4
3
2
1
0
694.0
693.0
692.0
691.0
690.0
689.0
688.0
687.0
686.0
685.0
684.0
BINDING ENERGY, eV

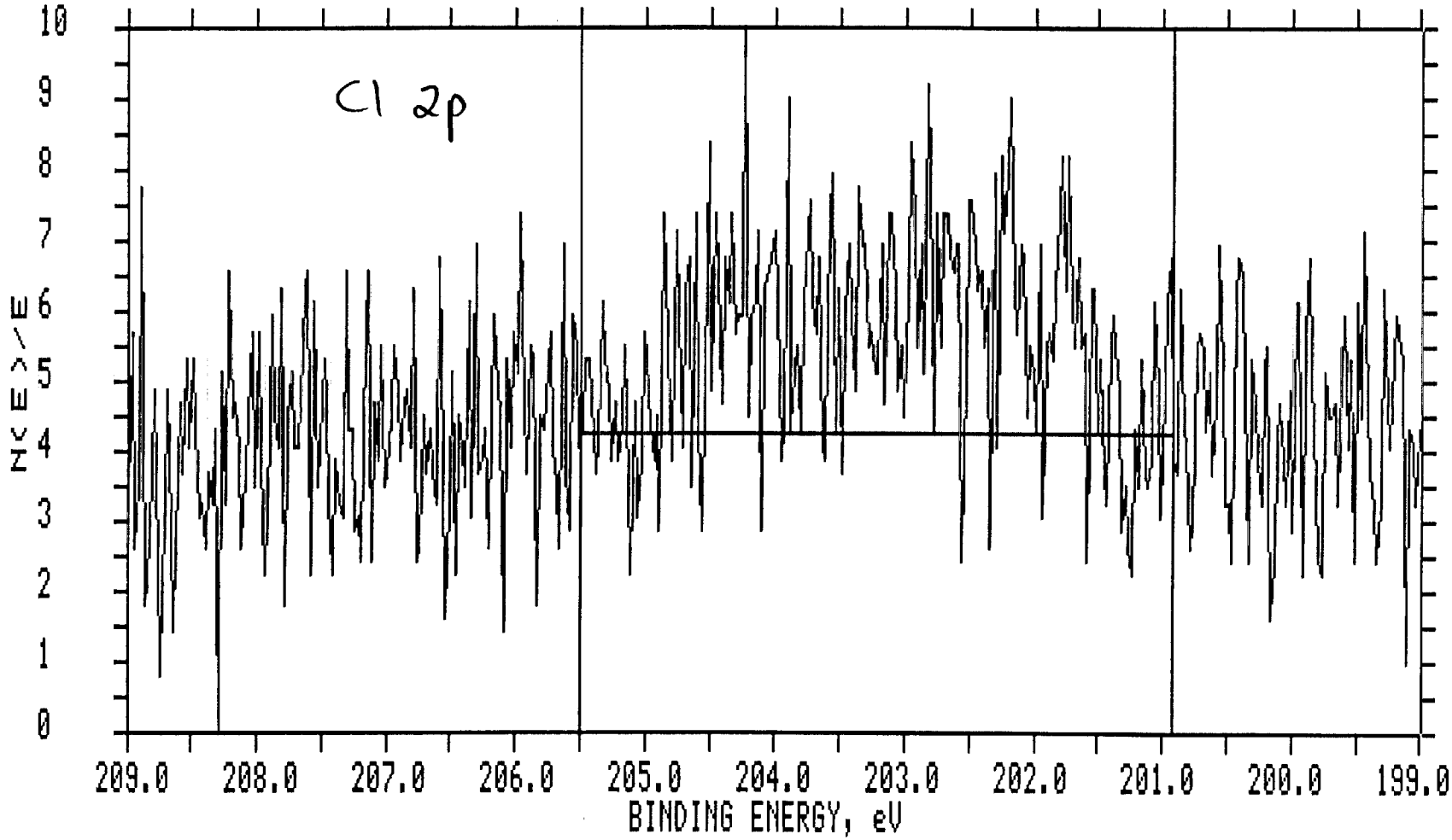
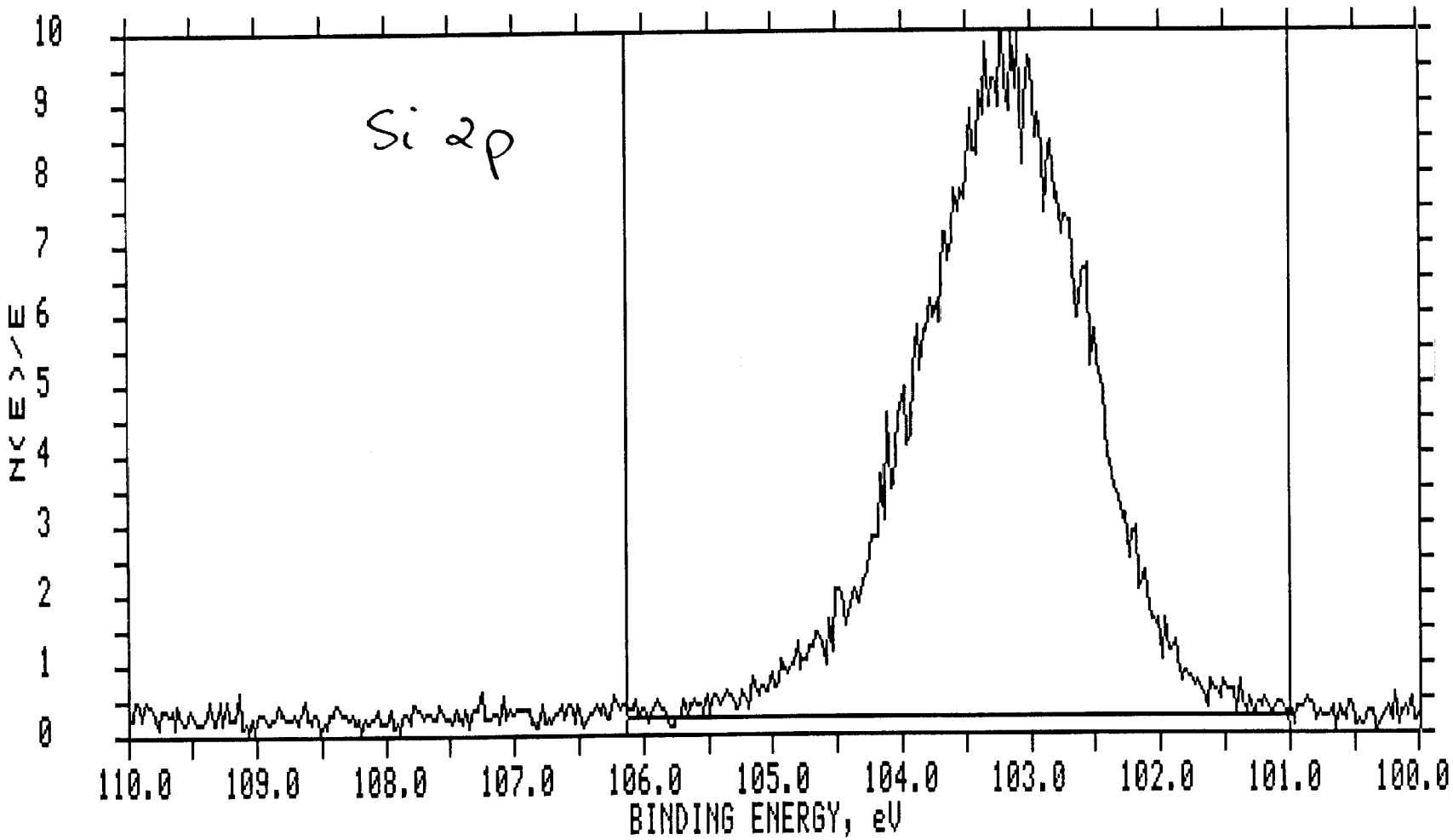
RTY511
Reference Sample



RTV511 Reference Sample



RTV 511 Reference Sample



RTV511 Reference Sample