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AD-A224 826

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NAME OF CONTRACTOR: Paul M. Raccah
CONTRACT NUMBER: DAAK 70-83-K-0047
EFFECTIVE DATE OF CONTRACT: 2/1/83
EXPIRATION DATE OF CONTRACT: 1/31/86
REPORTING PERIOD: SECOND QUARTER [Part One]
PRINCIPAL INVESTIGATOR: PAUL M. RACCAH
PHONE NUMBER: (312) 996-3403

*Plasma Passivation of Selected MCT Samples
Pt. 1*

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DISTRIBUTION STATEMENT A
Approved for public release
Distribution Unlimited

90 08 03 003

NVL - SAMPLE DATA

Plasma Conditions: 60 watts RF power
+40 VDC sample bias
.5 torr O₂

Samples:

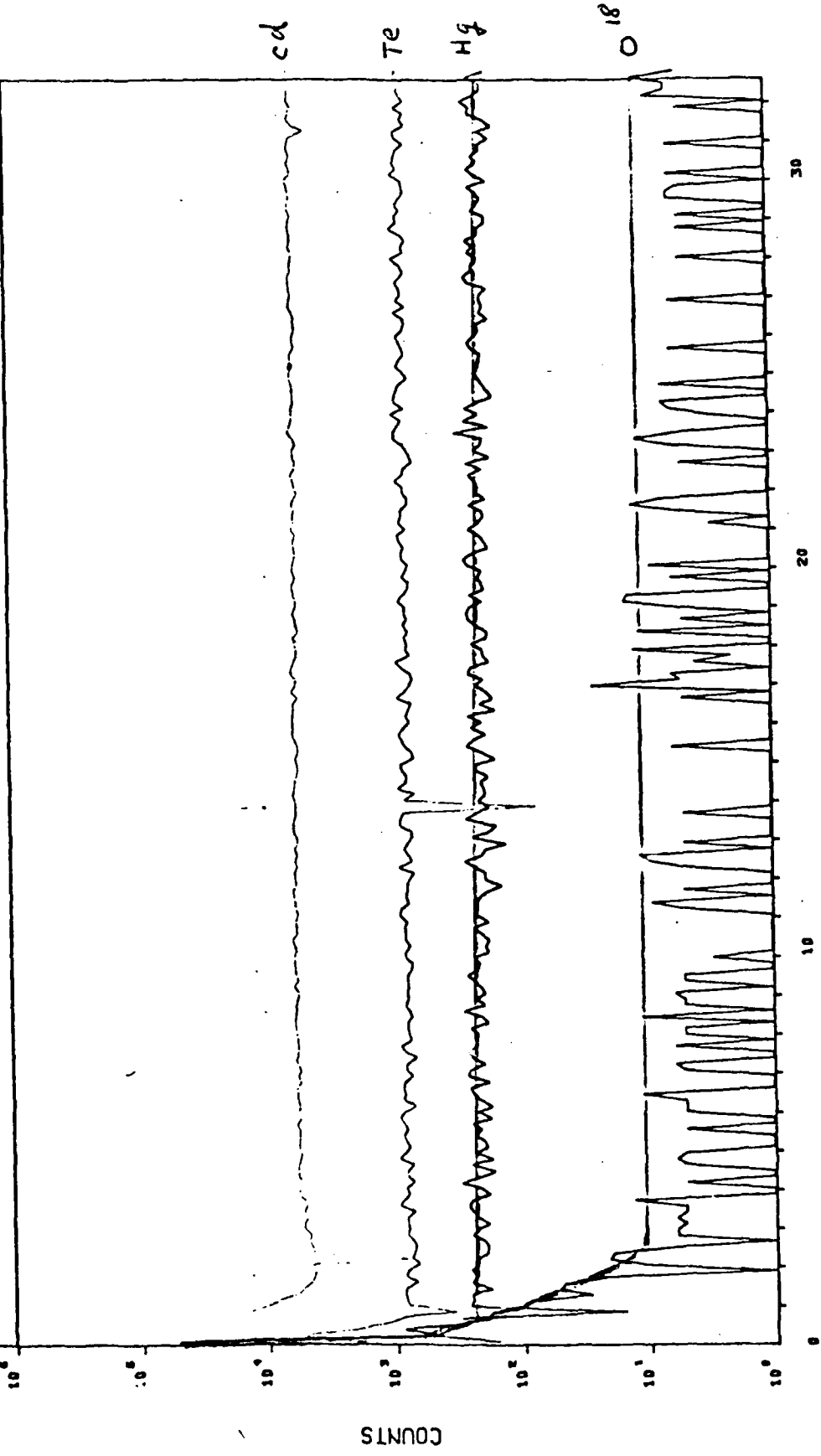
- #1 488Å Plasma oxide on LPE
6 min. growth time
Rockwell #5-271B LPE - (111), $\lambda = 3.87 \mu\text{m}$, 25-28 μm thick
p-type, $4.8 \times 10^{16}/\text{cm}^3$ @ 77K
mobility $238 \text{cm}^2 \text{v}^{-1} \text{s}^{-1}$ @ 77K
 $x = .32 \pm .01$ (by EER)
- #2 445Å Plasma oxide on Bulk
5 min. growth time
Cominco #15(321)-10B - (111), Bulk
n-type, $-2.7 \times 10^{15}/\text{cm}^3$ @ 300K
 $-1.7 \times 10^{14}/\text{cm}^3$ @ 77K
mobility $5.6 \times 10^3 \text{cm}^2 \text{v}^{-1} \text{s}^{-1}$ @ 300K
 $6.4 \times 10^4 \text{cm}^2 \text{v}^{-1} \text{s}^{-1}$ @ 77K
 $x = .295 \pm .05$
- #3 a 237Å Plasma oxide on LPE
2 min. growth time
- b 363Å Plasma oxide on LPE
6 min growth time
Fermionics #4318 LPE - (111), $\lambda = 12.5 \mu\text{m}$, 20 μm thick
n-type, $-1.1 \times 10^{14}/\text{cm}^3$ @ 77K
mobility $1.4 \times 10^5 \text{cm}^2 \text{v}^{-1} \text{s}^{-1}$ @ 77K
 $x = .2$

SIMS DATA

Control - only native surface oxide

USER NAME : N. DUTREUILIN
 COMMENT : N. MARCHON N. S. 03 94
 PRIMARY ION : ELECTRON - DAYTON
 PRIMARY ION ENERGY : 30.00
 PRIMARY ION ENERGY : 3000 V
 PRIMARY BEAM CURRENT : 3.0 E-8 A
 SECONDARY ION : *
 PULSE : 10.00 115.00 125.00 222.00
 TIME (MS) : 500. 100. 100. 100.

DATE : 25/12/93
 SITE : 650 - 040 URB
 MINOR : 10 B



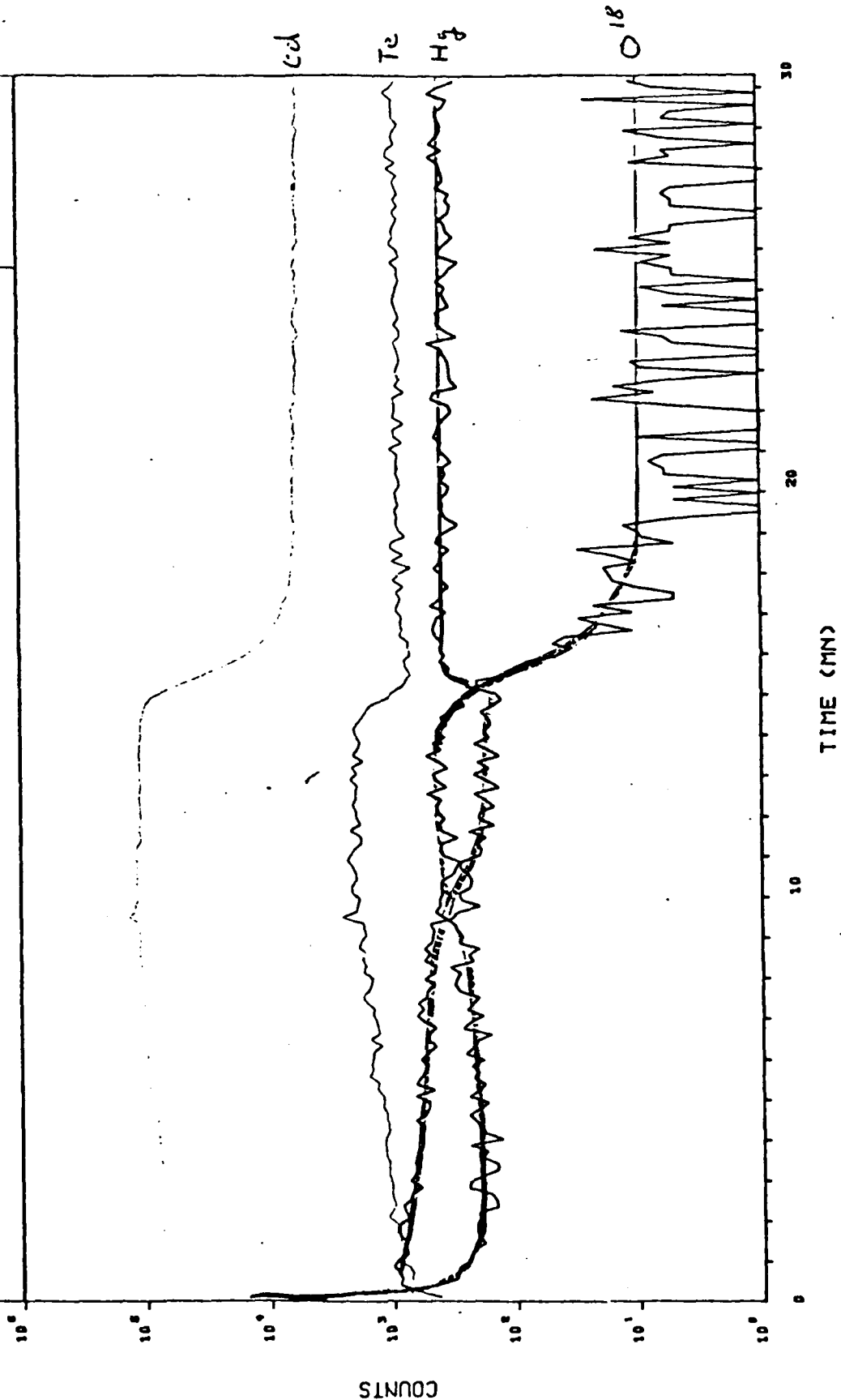
TIME (MIN)

Wet Anodic (T.I)

USER NAME : R. GUTHRIE
CONTROL : R. RICHMOND N. S. 83 44
ELEMENT : OXYGEN
PRIMARY ION : SELECTED MASS : 32.00
PRIMARY ION ENERGY : 3000 U
PRIMARY BEAM CURRENT : 3.0 E-8 A
SECONDARY ION :
MASS : 18.00 116.00 132.00 300.00
TIME (MS) : 800. 100. 100. 100.

DATE : 02/12/83

INPUT FILTRONS : 70349
WINDOW : 10.0
600.000 UVA



#1 488Å Plasma oxide on LPE (by ellipsometry)

6 min. growth time

Rockwell #5-271B LPE - (111), $\lambda = 3.87 \mu\text{m}$, 25-28 μm thick
p-type, $4.8 \times 10^{16} / \text{cm}^3$ @ 77K
mobility $238 \text{cm}^2 / \text{V} \cdot \text{s}$ @ 77K
 $x = .32 \pm .01$ (by EER)

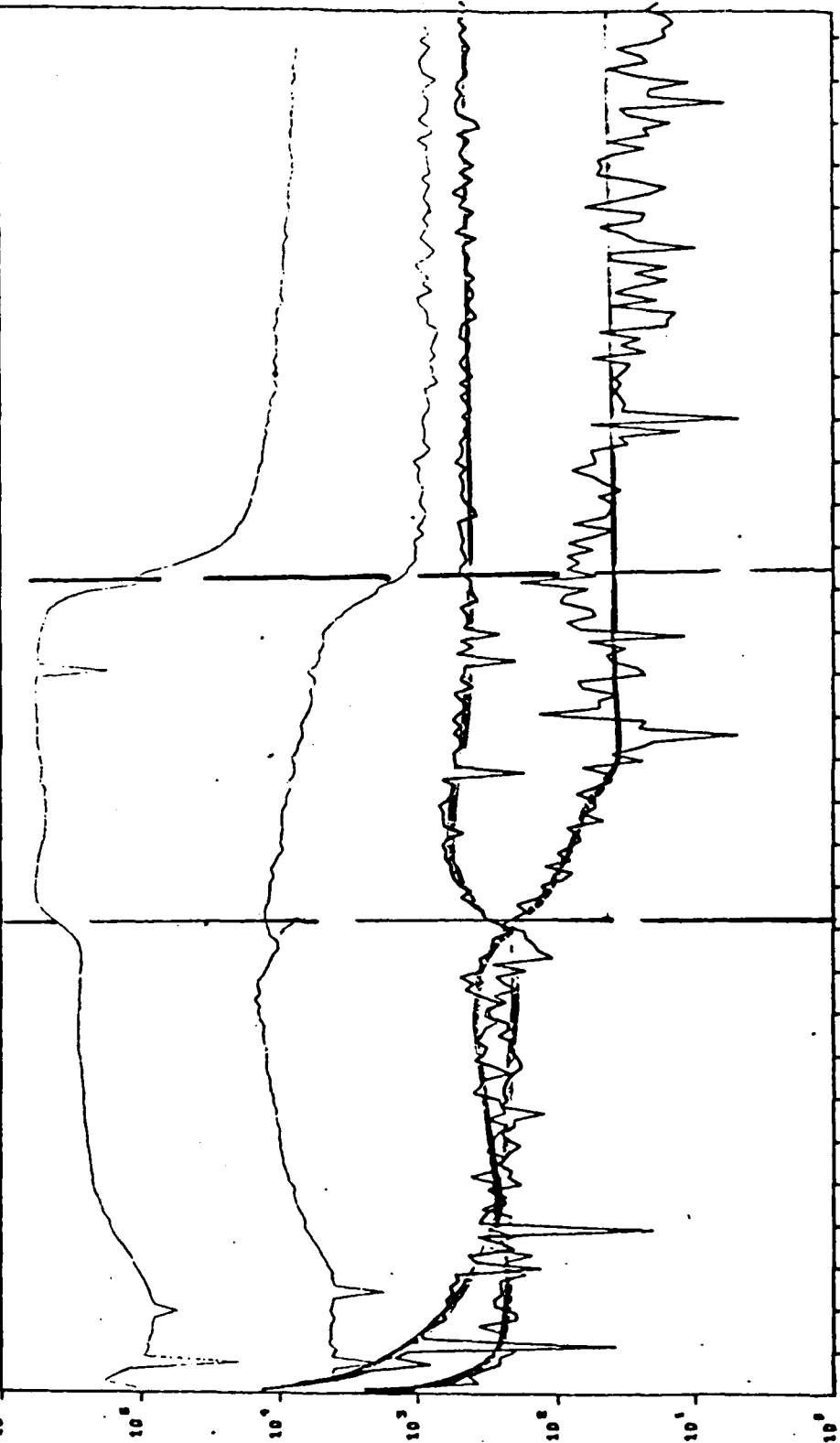
Sample #1

USER NAME . R. GUTRECHT
 CURRENT . 0. ANACON N 1.1 83 44
 ELEMENT . OXYGEN
 PRIMARY ION . SELECTED MASS . 32.00
 PRIMARY ION ENERGY . 3000 V
 PRIMARY BEAM CURRENT . 3.0 E-8 A
 SECONDARY ION .
 MASS . 16.00 115.00 132.00 302.00
 TIME (MS) . 500. 100. 100. 100.

DATE . 05/12/80
 INPUT FILENAME . 070411

MINIMUM . 10.0
 MAX . 940.00

ISA
 RIBER



Sample #2



INPUT FILENAME : P83000

DATE : 25/12/83

USER NAME : N. OULTRERGIN
 CONTROL : N. MANCON N. 2 93 44
 PRIMARY ION : ELEMENT : OXYGEN
 PRIMARY ION ENERGY : 30.00
 PRIMARY BEAM CURRENT : 3.0 E-08 A
 SECONDARY ION : *
 MASS : 10.00 114.00 125.00 898.00
 TIME (MS) : 500. 100. 100. 100.

600 - 910 UVE

#2 445Å Plasma oxide on Bulk (by ellipsometry)

5 min. growth time

Cominco #15(321)-10B - (111), Bulk

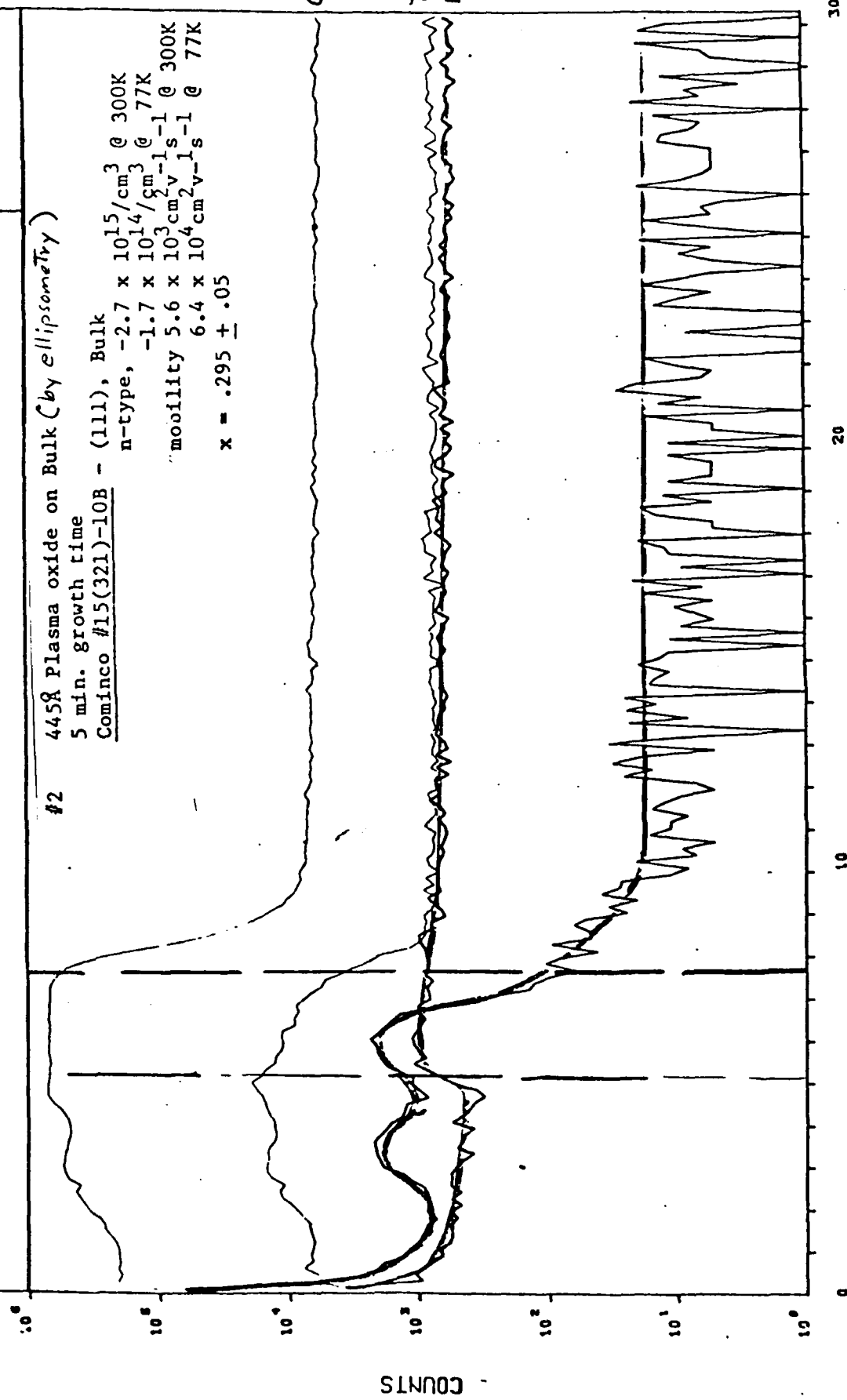
n-type, $-2.7 \times 10^{15}/\text{cm}^3$ @ 300K

$-1.7 \times 10^{14}/\text{cm}^3$ @ 77K

mobility $5.6 \times 10^3 \text{ cm}^2/\text{v} \cdot \text{s}$ -1 @ 300K

$6.4 \times 10^4 \text{ cm}^2/\text{v} \cdot \text{s}$ -1 @ 77K

$x = .295 \pm .05$



TIME (MIN)

Sample #3A

INSTR INSTR . P. OUTRCDUJH
COMMENT . PLASMA OXIDE . N . 20 . 83 . 99
PRIMARY ION . OXYGEN . OXYGEN
PRIMARY ION ENERGY . 3000 U
PRIMARY ION CURRENT . 3.0 E-8 A
SECONDARY ION .
PULSE . 10.00 115.00 125.00 200.00
TIME (MS) . 500. 100. 100. 100.

DATE . 25/12/83

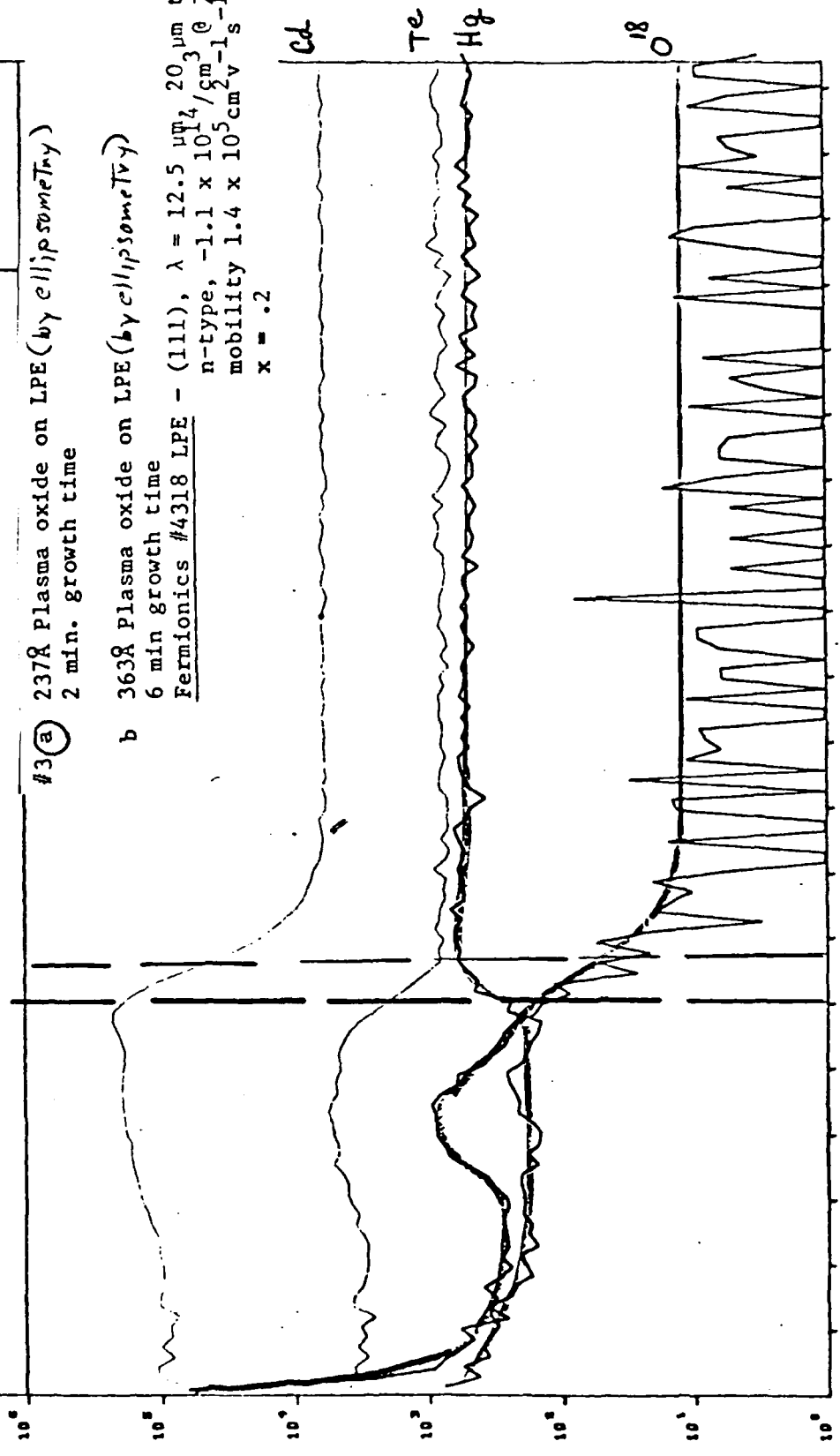
INPUT FILENAME . P2314J



WINDOW . 10 Z
600 . 800 LINES

#3 a) 237Å Plasma oxide on LPE (by ellipsometry)
2 min. growth time

b) 363Å Plasma oxide on LPE (by ellipsometry)
6 min growth time
Fermionics #4318 LPE - (111), $\lambda = 12.5 \mu\text{m}$, $20 \mu\text{m}$ thick
n-type, $-1.1 \times 10^{14} / \text{cm}^3$ @ 77K
mobility $1.4 \times 10^5 \text{ cm}^2 / \text{V} \cdot \text{s}$ @ 77K
 $x = .2$



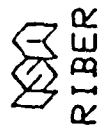
TIME (MIN)

Sample #3B

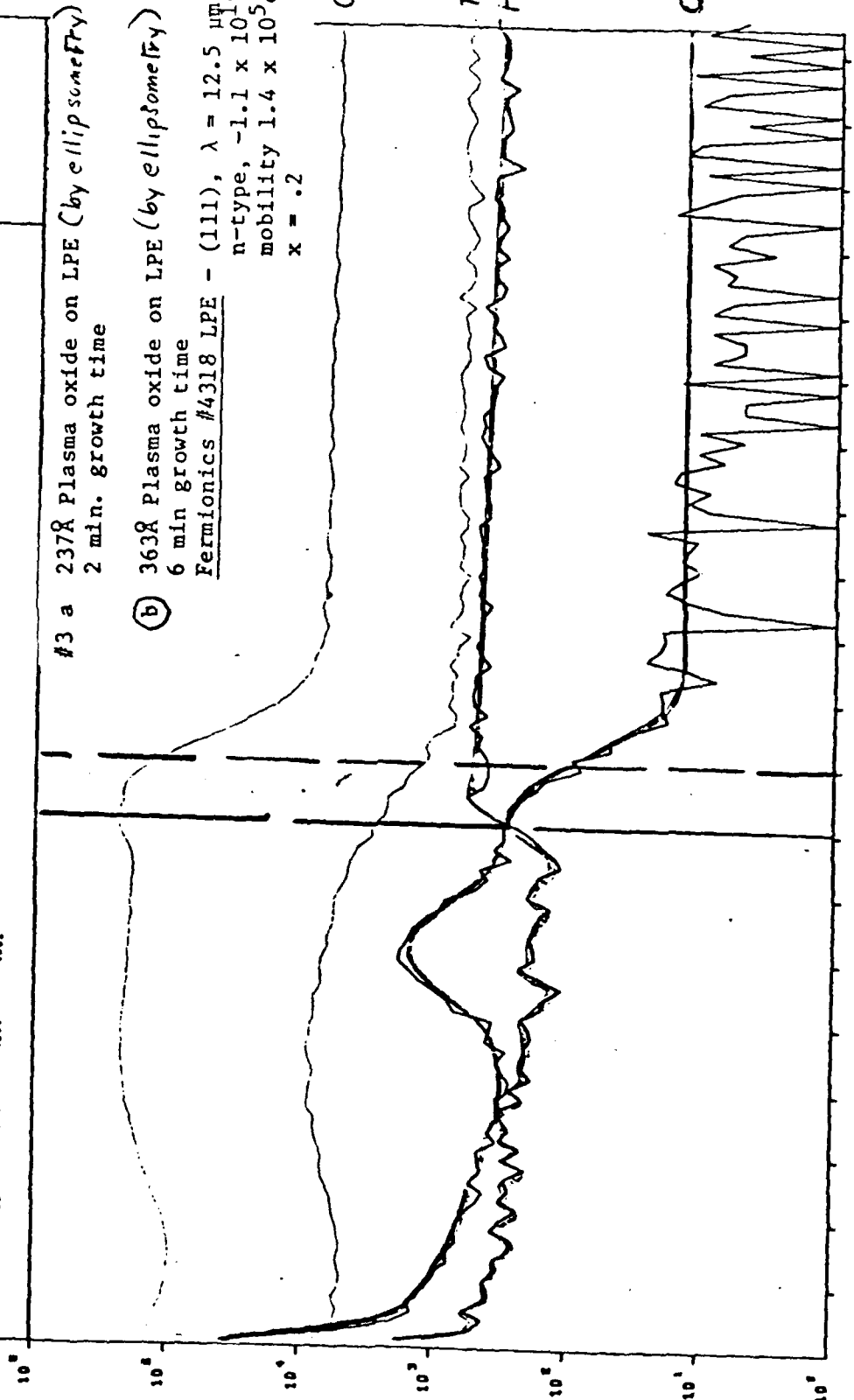
USER NAME : R. BURTON
 COMMENT : R. BURTON N. 32 02 44
 PRIMARY ION : ARGON
 SELECTED MASS : 34.00
 PRIMARY ION ENERGY : 3000 U
 PRIMARY ION CURRENT : 3.0 E-8 A
 SECONDARY ION :
 MASS : 10.00 110.00 126.00 132.00
 TIME (MS) : 500. 100. 100. 100.

DATE : 02/12/73

INPUT FILTHRE : P0310K



600 * 900 UMS



#3 a 237Å Plasma oxide on LPE (by ellipsometry)
 2 min. growth time

(b) 363Å Plasma oxide on LPE (by ellipsometry)
 6 min growth time
 Fermionics #4318 LPE - (111), $\lambda = 12.5 \mu\text{m}$, 20 μm thick
 n-type, $-1.1 \times 10^{14} / \text{cm}^3$ @ 77K
 mobility $1.4 \times 10^5 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ @ 77K
 $x = .2$

Cd
 Te
 Hg
 O

10 10 20
 TIME (MIN)

COUNTS