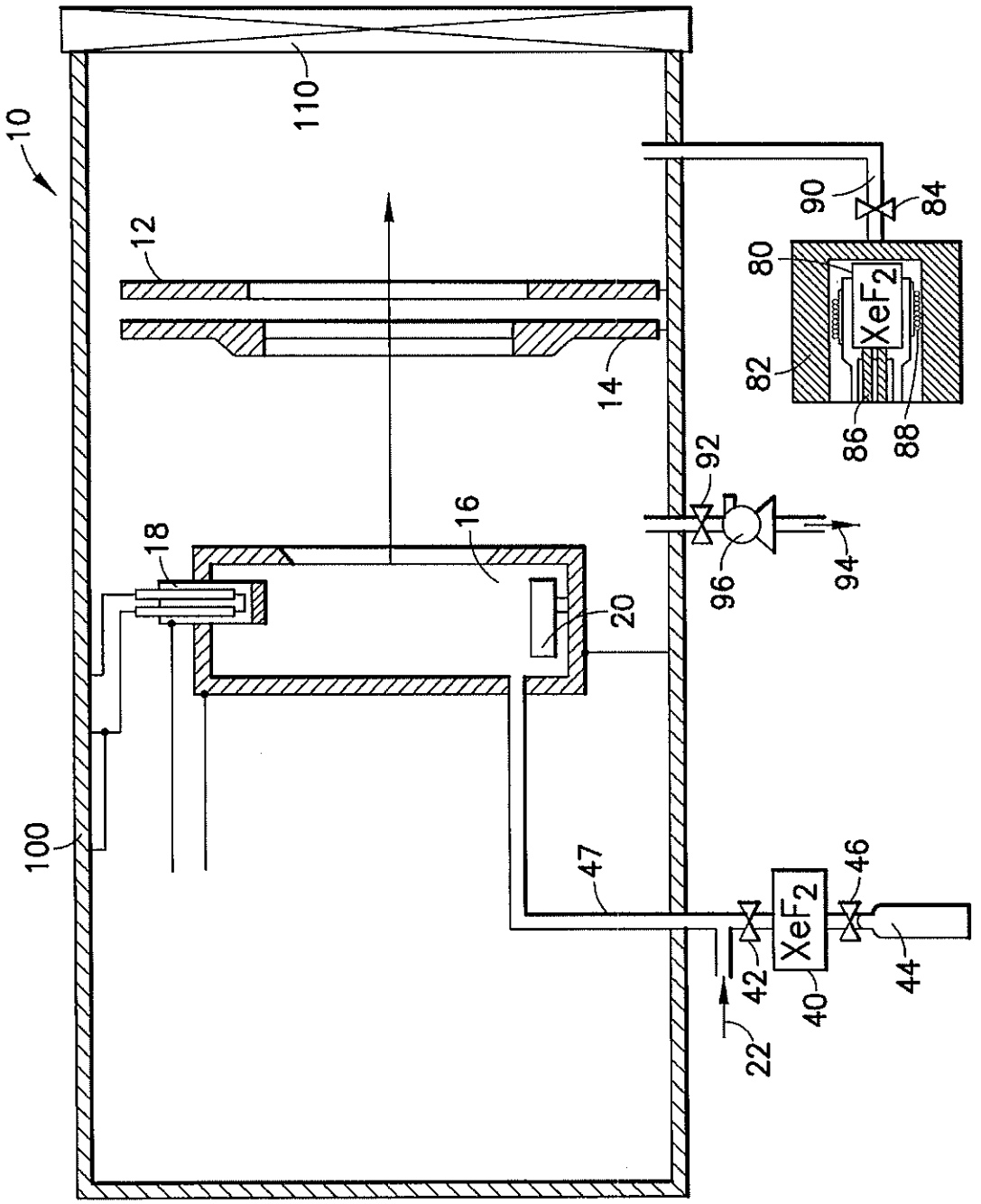

10
110
12
14
80
XeF_2
82
86
88
90
84
92
96
94
16
18
20
100
47
46
XeF_2
42
40
44
22

FIG.1

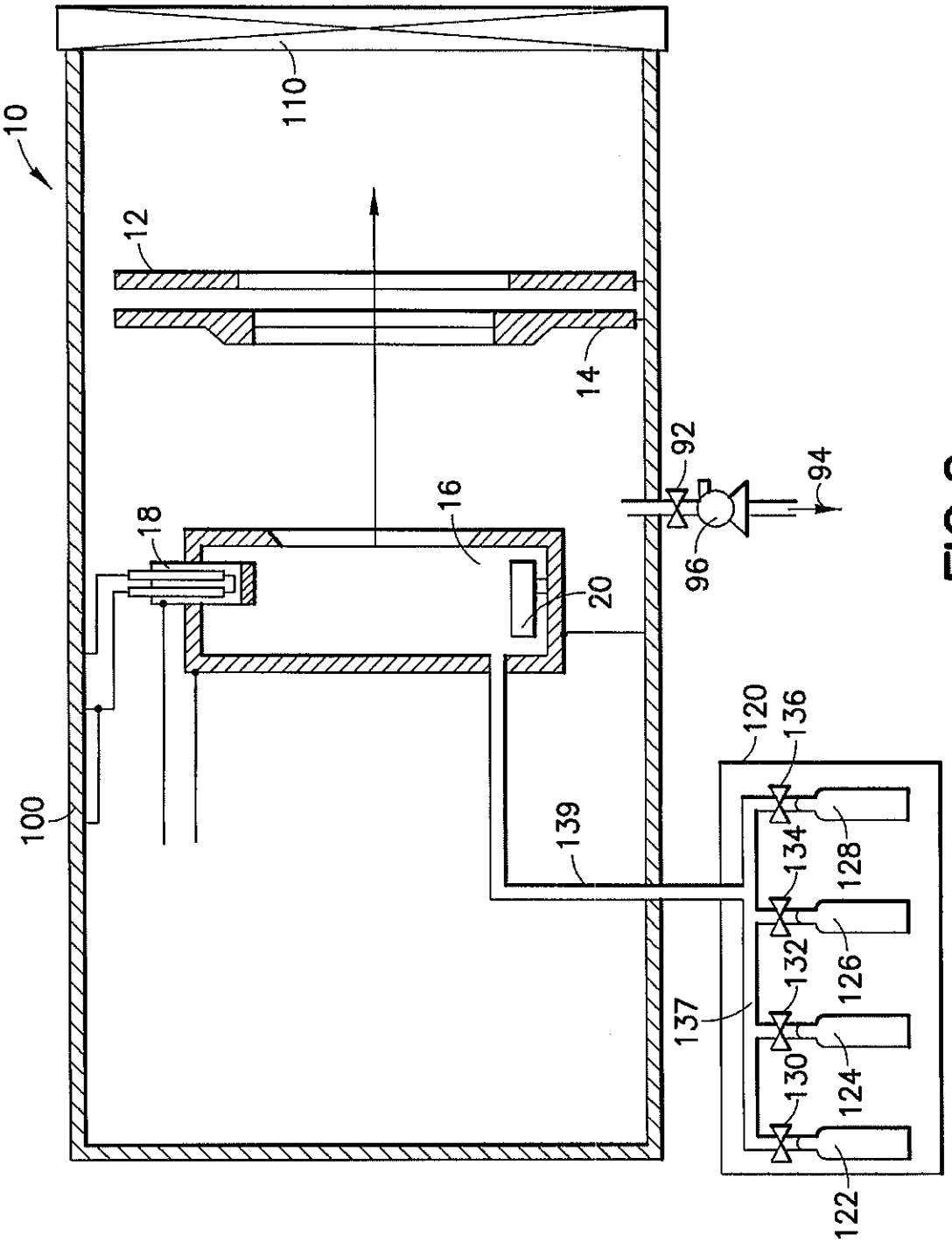

10
110
12
14
92
94
96
16
18
20
100
120
136
139
134
128
132
126
137
130
124
122

FIG.2

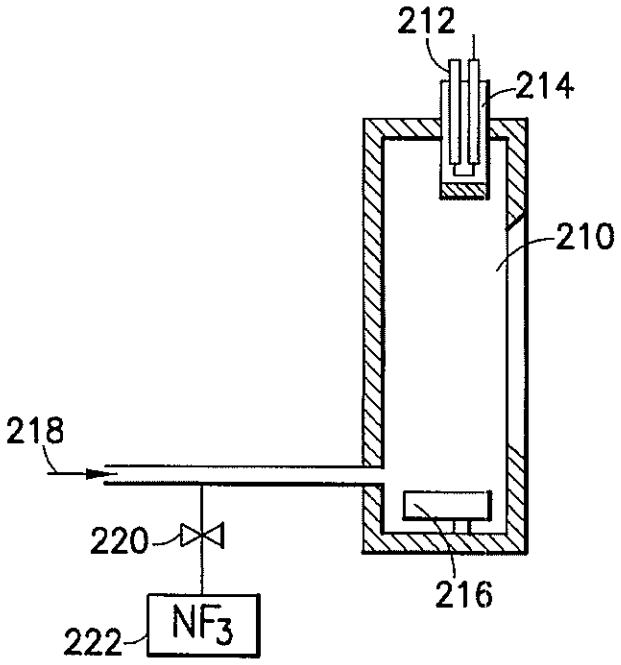


FIG.3

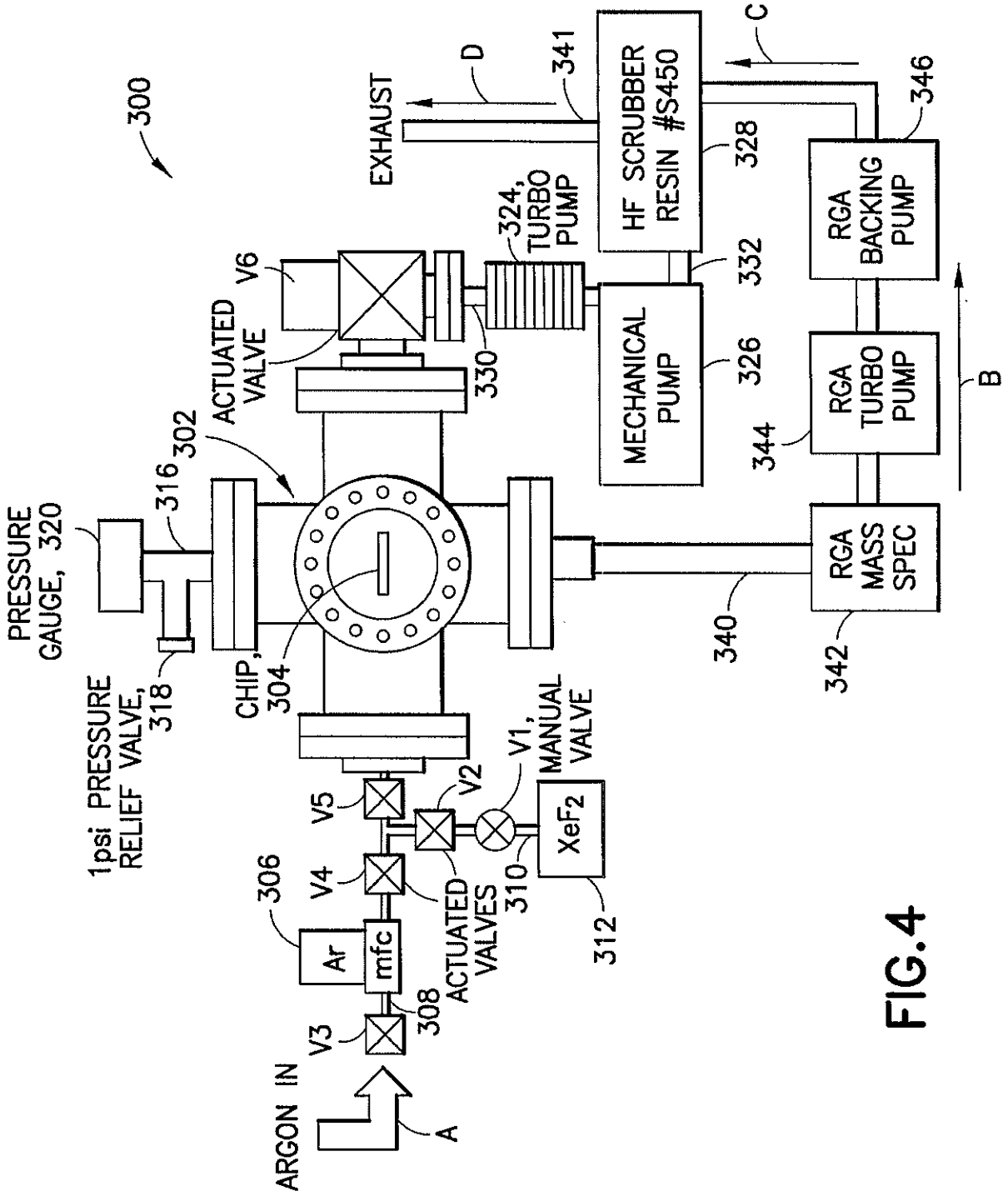
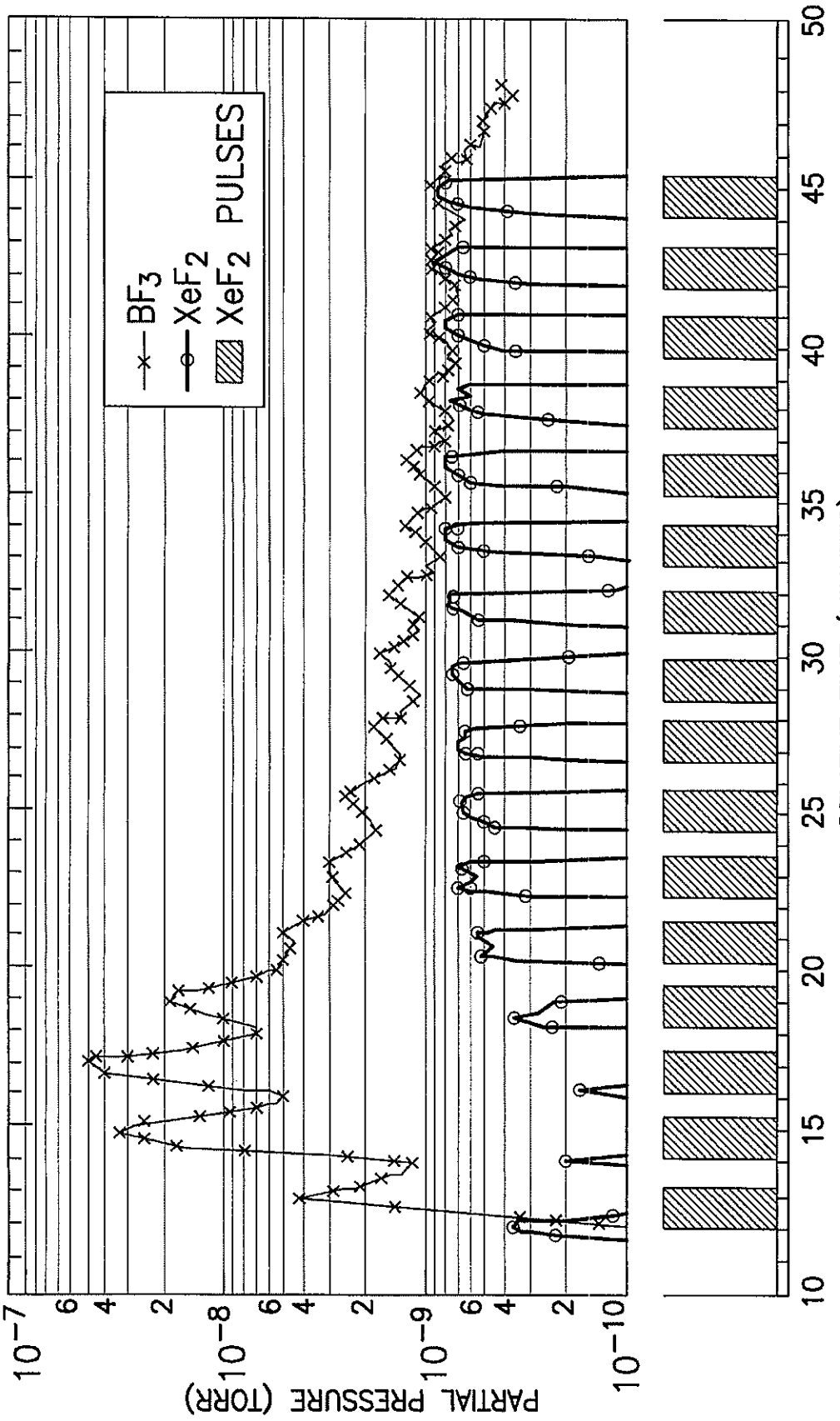

300
EXHAUST
D
341
HF SCRUBBER RESIN #S450
C
346
328
RGA BACKING PUMP
324, TURBO PUMP
332
V6
ACTUATED VALVE
330
MECHANICAL PUMP
326
RGA TURBO PUMP
344
B
302
316
PRESSURE GAUGE, 320
1psi PRESSURE RELIEF VALVE, 318
CHIP, 304
RGA MASS SPEC
340
342
V1, MANUAL VALVE
V2
V5
V4
306
Ar
mfc
308
V3
ACTUATED VALVES
310
XeF2
312
ARGON IN
A

FIG.4



RGA PRESSURE vs TIME FOR AI_B SAMPLE

FIG.5

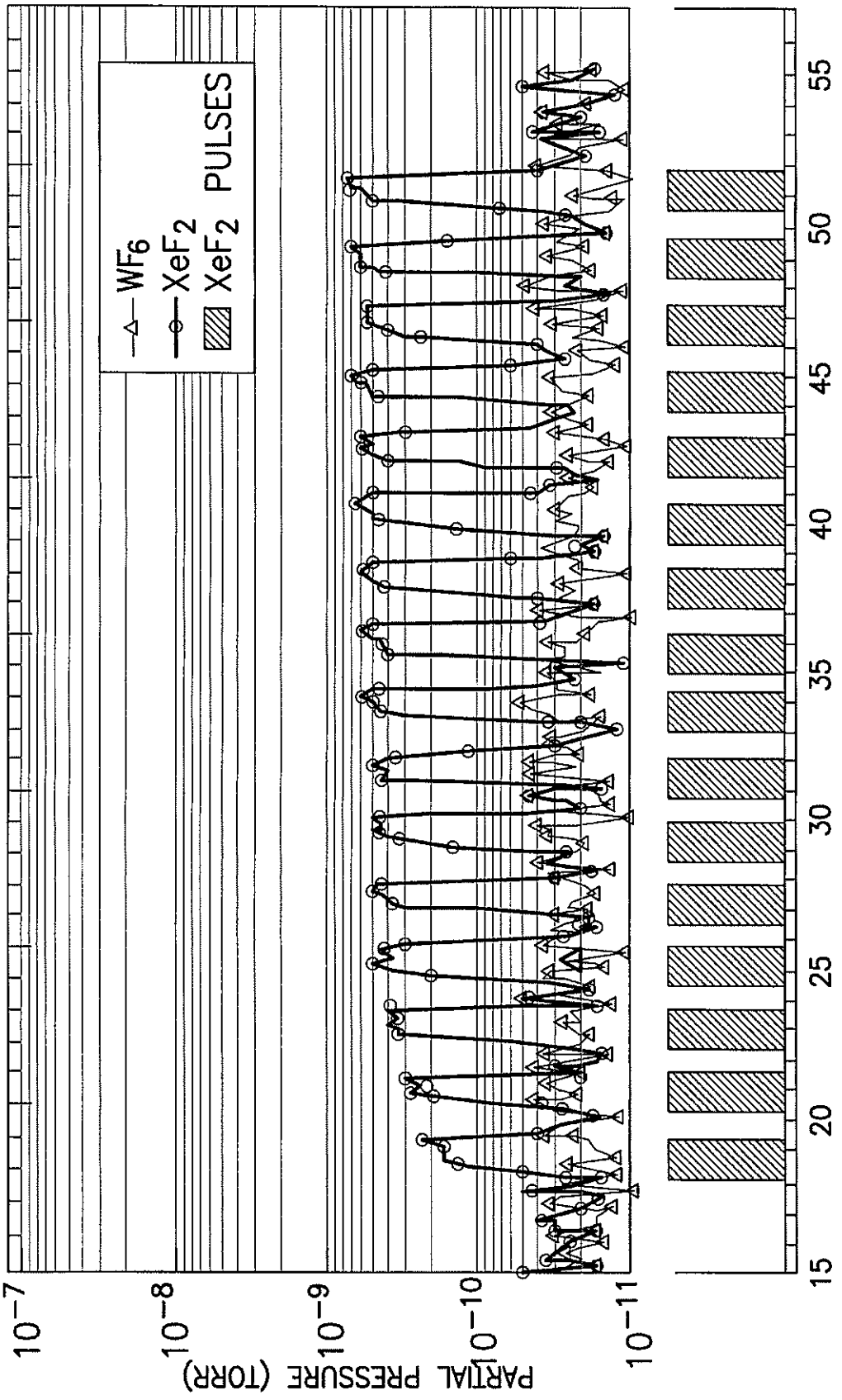

WF6
XeF2
XeF2 PULSES
PARTIAL PRESSURE (TORR)
10−7
10−8
10−9
10−10
10−11
15
20
25
30
35
40
45
50
55
RELATIVE TIME (MINUTES)
RGA PRESSURE vs TIME FOR Al_W SAMPLE

FIG.6

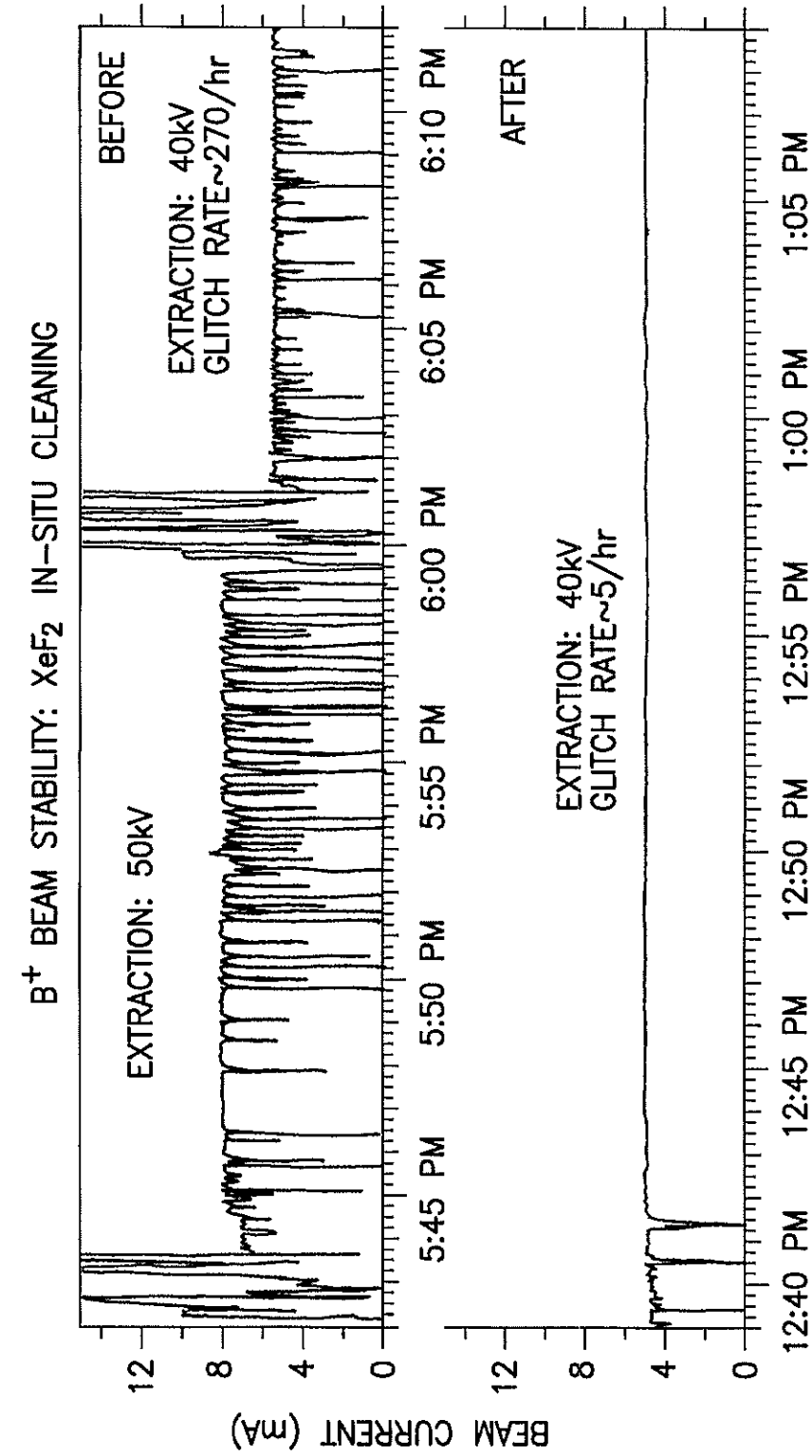

B+ BEAM STABILITY: XeF2 IN-SITU CLEANING
BEFORE
EXTRACTION: 40kV
GLITCH RATE~270/hr
EXTRACTION: 50kV
AFTER
EXTRACTION: 40kV
GLITCH RATE~5/hr
BEAM CURRENT (mA)
0
4
8
12
5:45 PM
5:50 PM
5:55 PM
6:00 PM
6:05 PM
6:10 PM
12:40 PM
12:45 PM
12:50 PM
12:55 PM
1:00 PM
1:05 PM
TIME
IN-SITU XeF2 ION SOURCE STABILIZATION - ION SOURCE ON

FIG.7

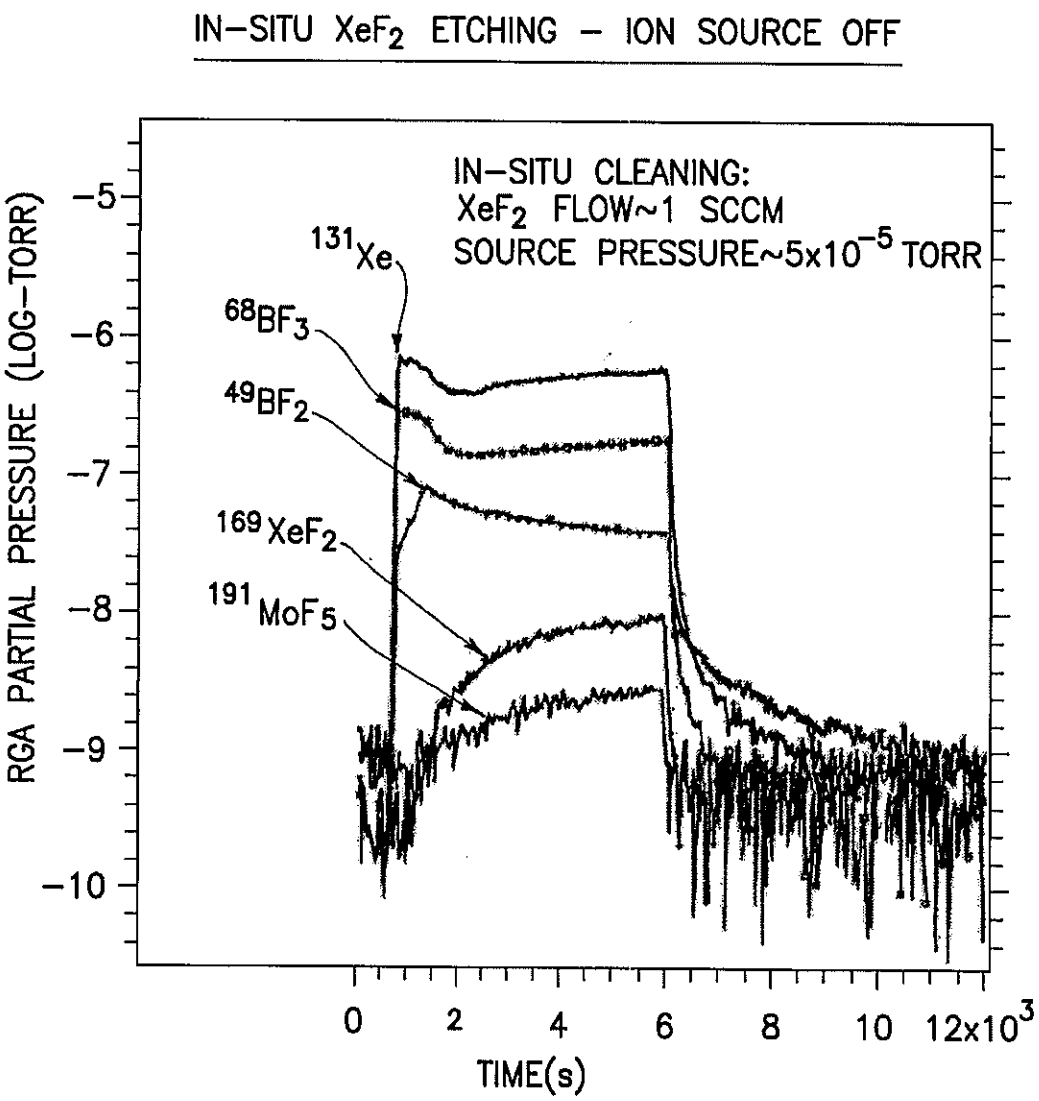

IN-SITU XeF_2 ETCHING - ION SOURCE OFF
IN-SITU CLEANING:
XeF_2 FLOW~1 SCCM
SOURCE PRESSURE~$5x10^{-5}$ TORR
^{131}Xe
$^{68}BF_3$
$^{49}BF_2$
$^{169}XeF_2$
$^{191}MoF_5$
RGA PARTIAL PRESSURE (LOG-TORR)
-5
-6
-7
-8
-9
-10
0
2
4
6
8
10
12x10^3
TIME(s)

FIG.8

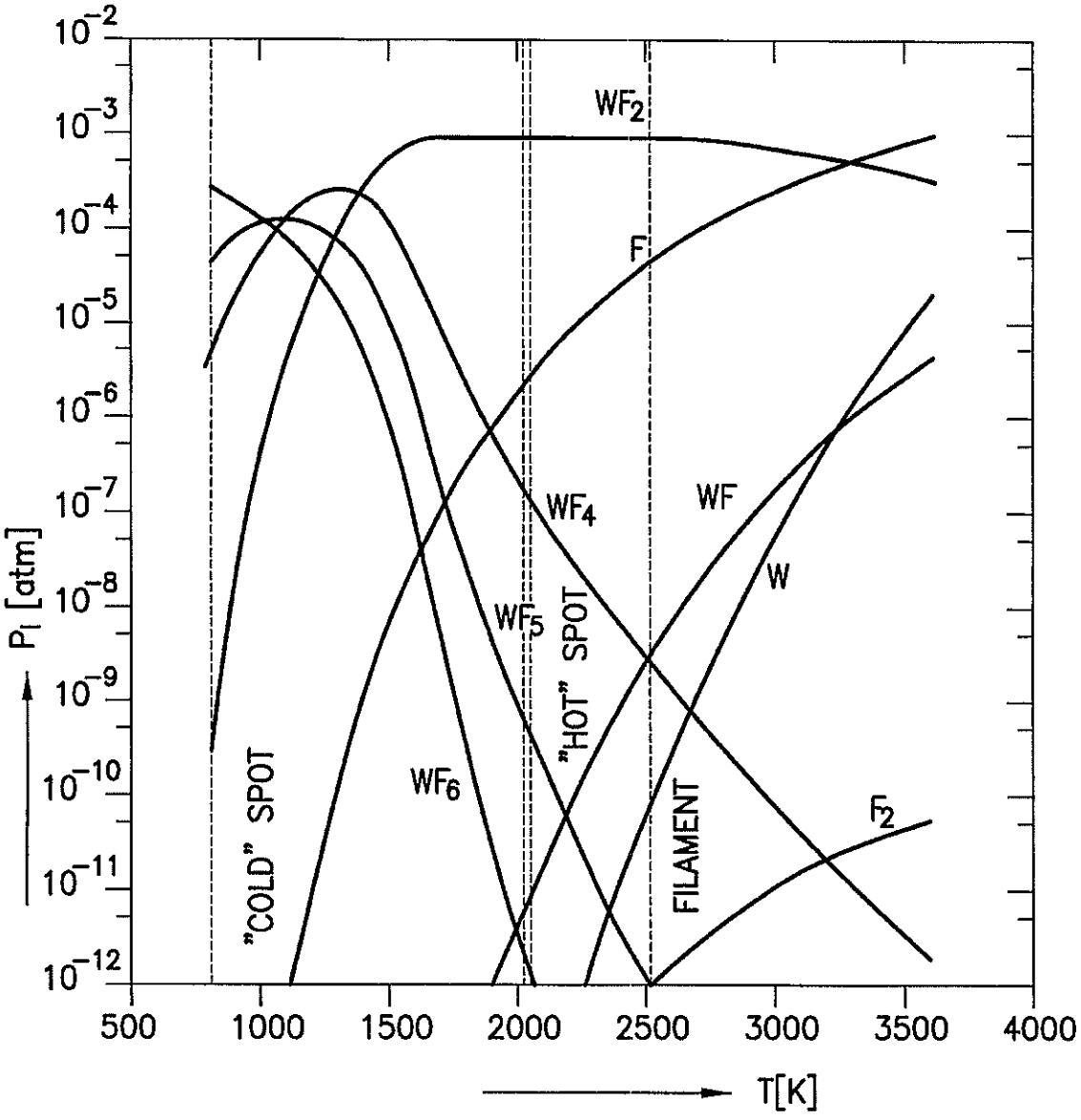
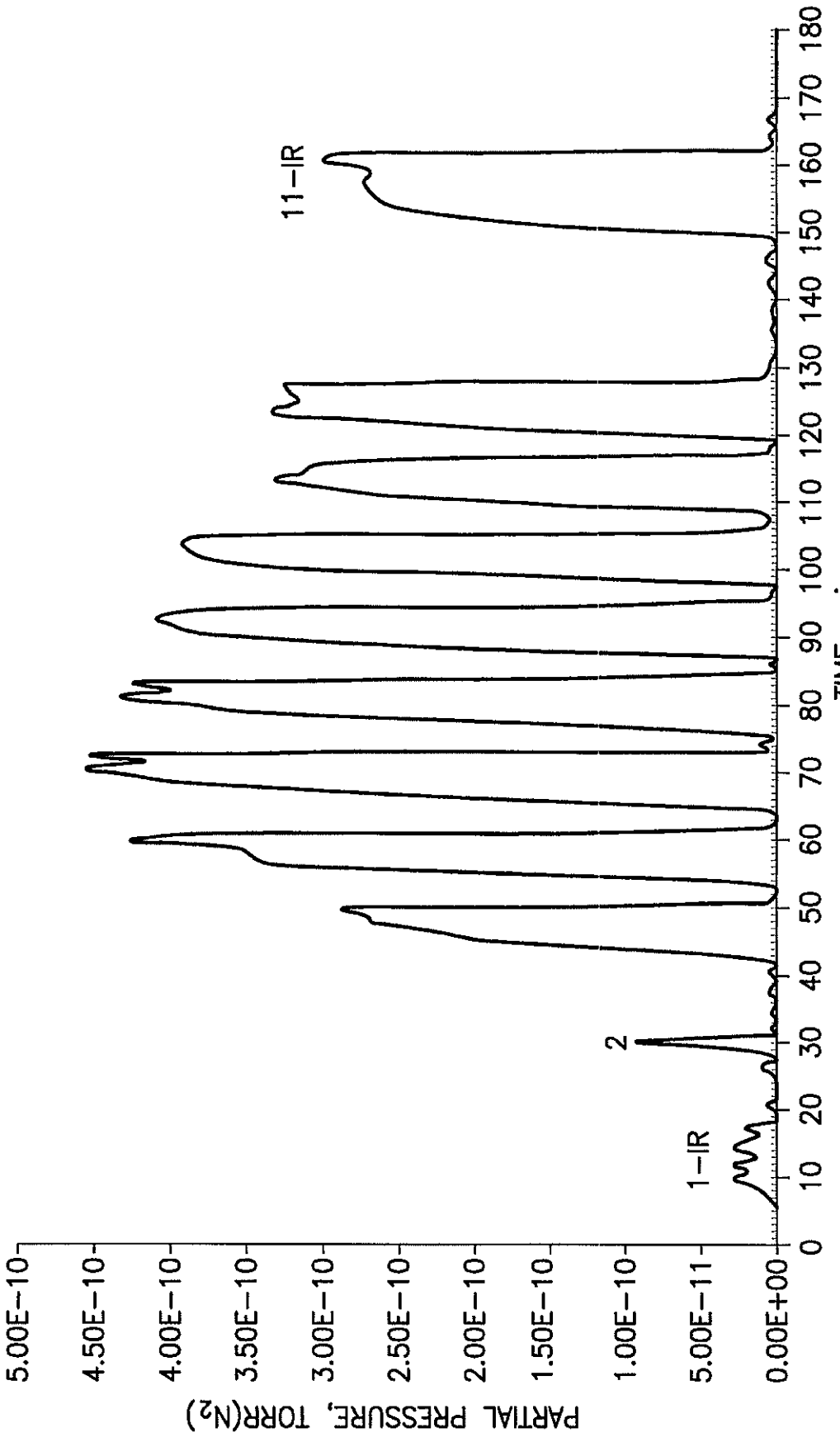

10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
10^{-9}
10^{-10}
10^{-11}
10^{-12}
P_i [atm]
500
1000
1500
2000
2500
3000
3500
4000
T[K]
WF_2
F
WF_4
WF
W
WF_5
"HOT" SPOT
"COLD" SPOT
WF_6
FILAMENT
F_2

FIG.9



TIME PROFILE OF $^{129}XeF^{+}$ RGA SIGNAL DURING CYCLE−ETCHING OF THE STS REPELLER INSULATORS

FIG.10

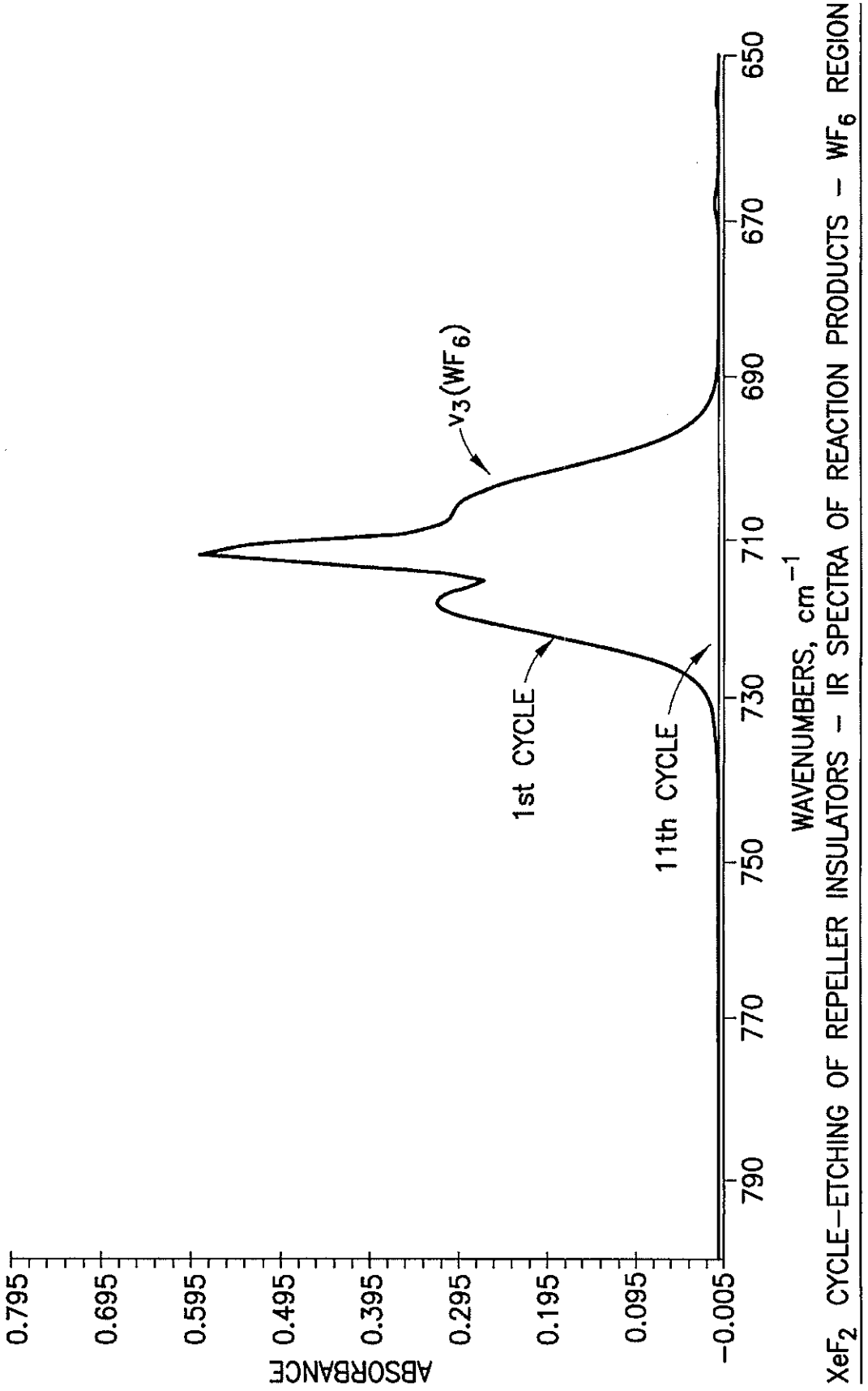
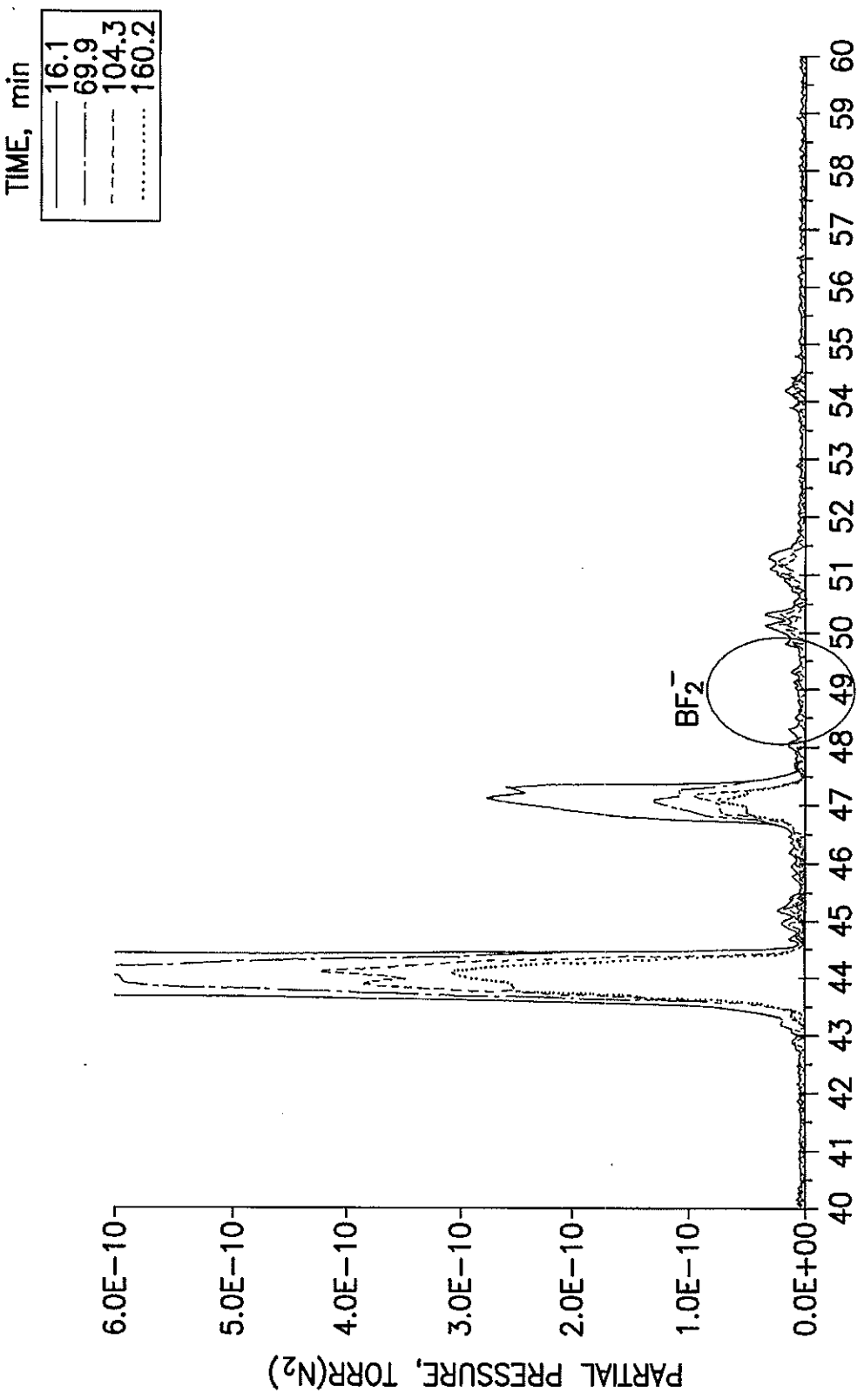
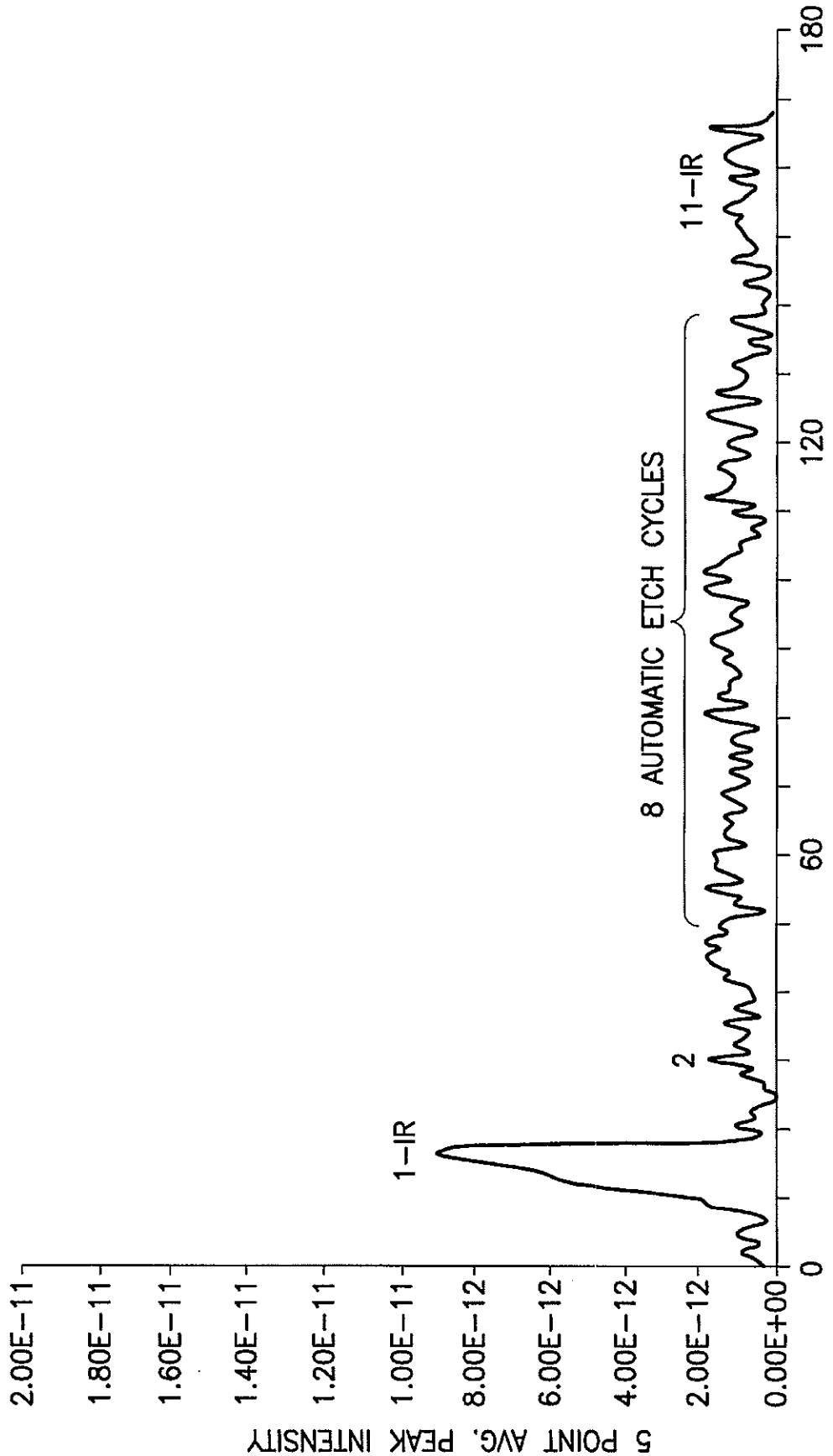

0.795
0.695
0.595
0.495
0.395
0.295
0.195
0.095
−0.005
ABSORBANCE
790
770
750
730
710
690
670
650
WAVENUMBERS, cm^{-1}
$\nu_3(WF_6)$
1st CYCLE
11th CYCLE
XeF_2 CYCLE–ETCHING OF REPELLER INSULATORS – IR SPECTRA OF REACTION PRODUCTS – WF_6 REGION

FIG. 11



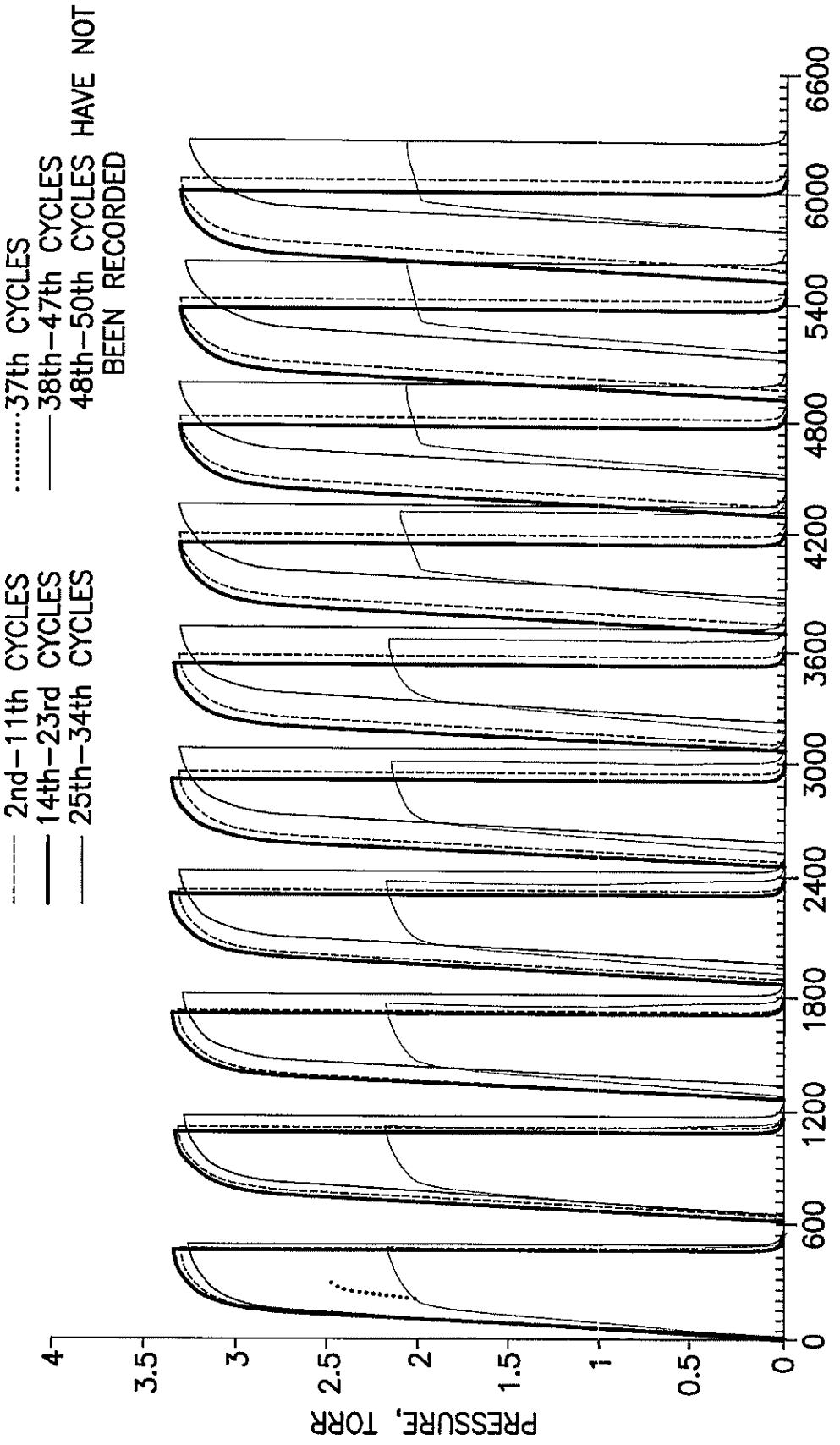
MASS SPECTRA OF BF2+ REGION, 1st,5th,8th AND 11th CYCLES

FIG.12



5 POINT AVG TIME PROFILE $^{222}WF_3^+$ RGA SIGNAL DURING CYCLE-ETCHING OF THE STS REPELLER INSULATORS

FIG.13



XeF_2 ETCHING OF STS GRAPHITE REPELLER COMPARISON OF FOUR AUTOMATIC CYCLE–ETCHING SETS

FIG.14

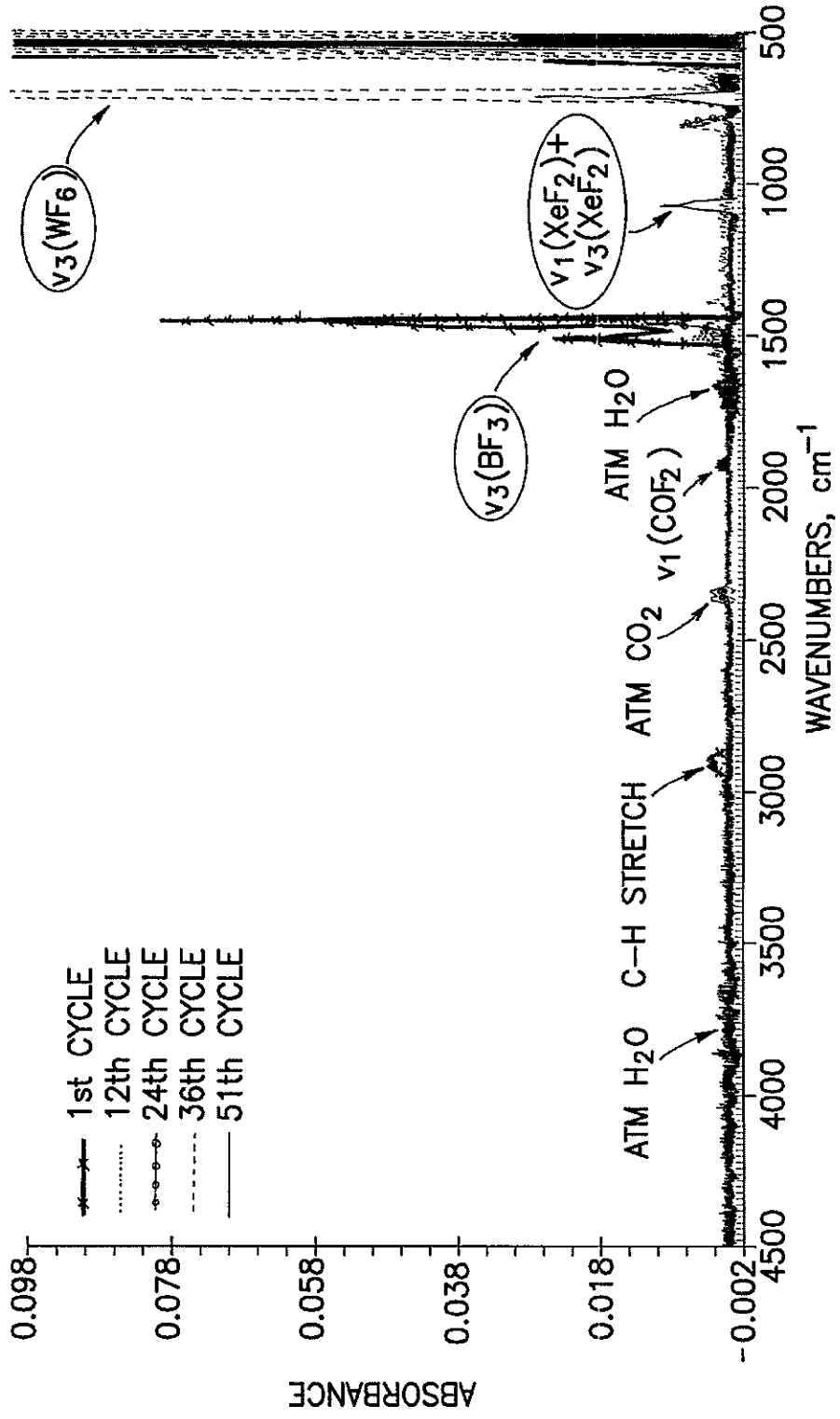
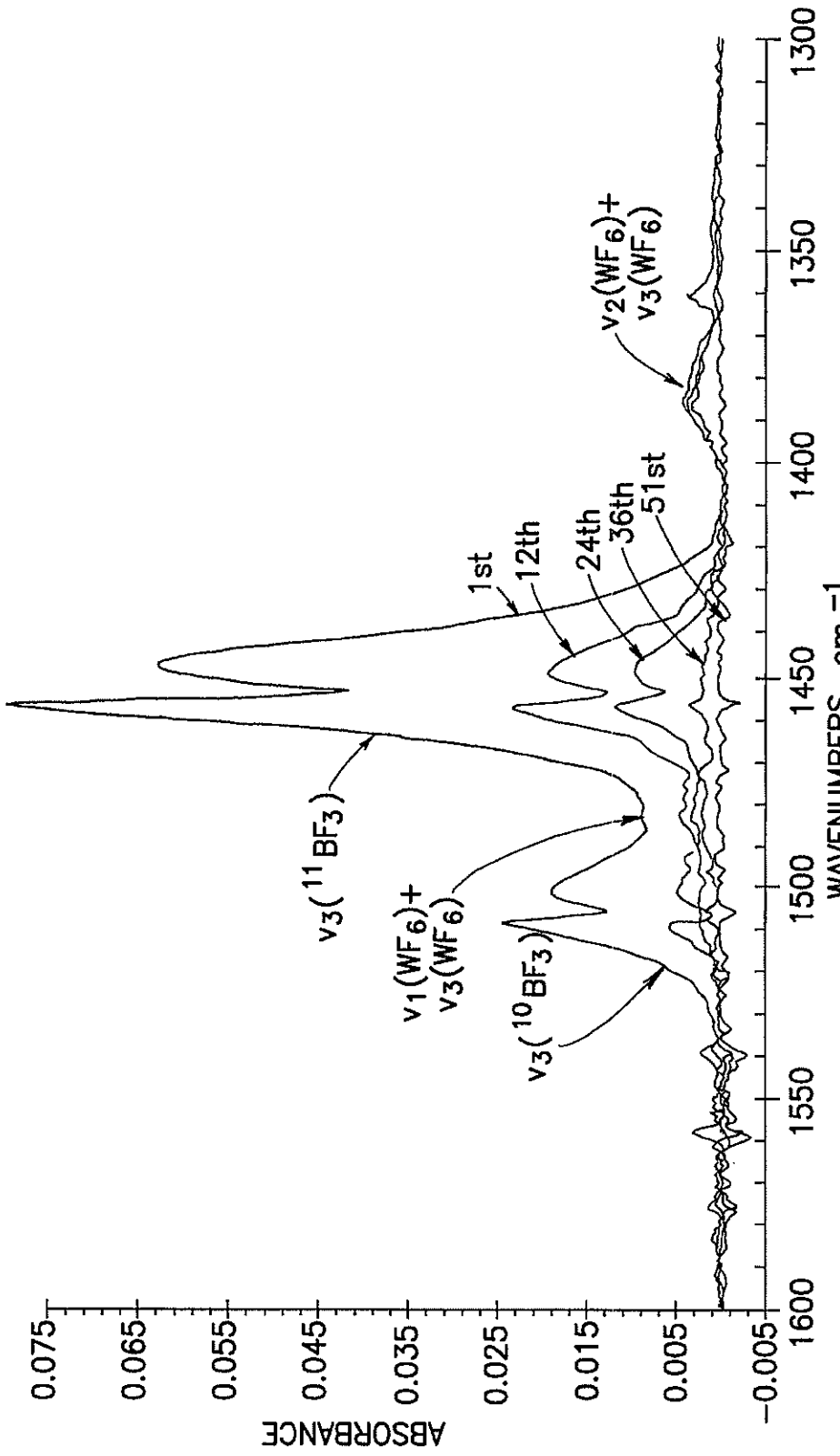


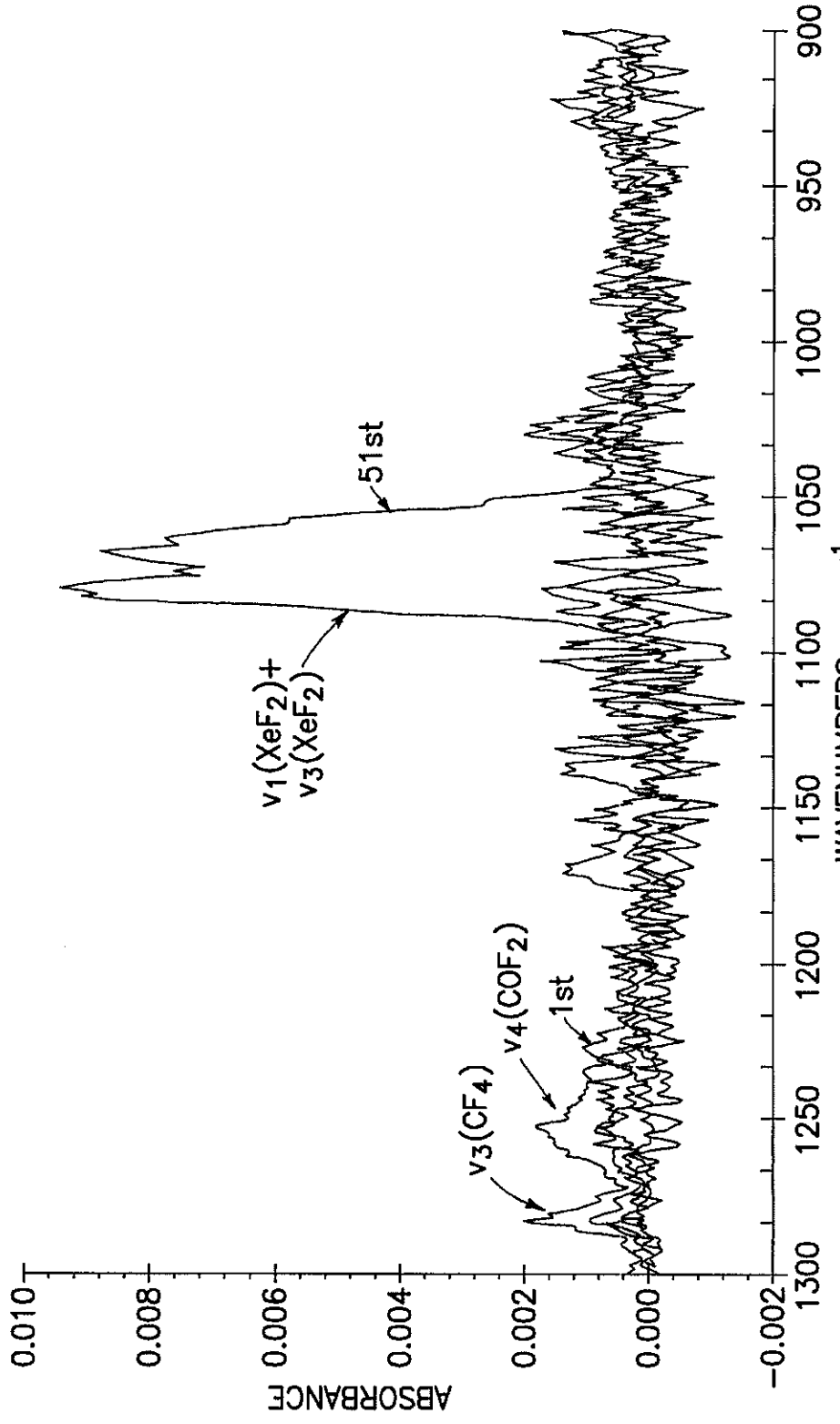
FIG.15

XeF_2 CYCLE-ETCHING OF GRAPHITE REPELLER-IR SPECTRA OF REACTION PRODUCTS



XeF_2 CYCLE−ETCHING OF GRAPHITE REPELLER−IR SPECTRA OF REACTION PRODUCTS−BF_3 REGION

FIG.16



XeF2 CYCLE-ETCHING OF GRAPHITE REPELLER-IR SPECTRA OF REACTION PRODUCTS-XeF2 REGION

FIG.17

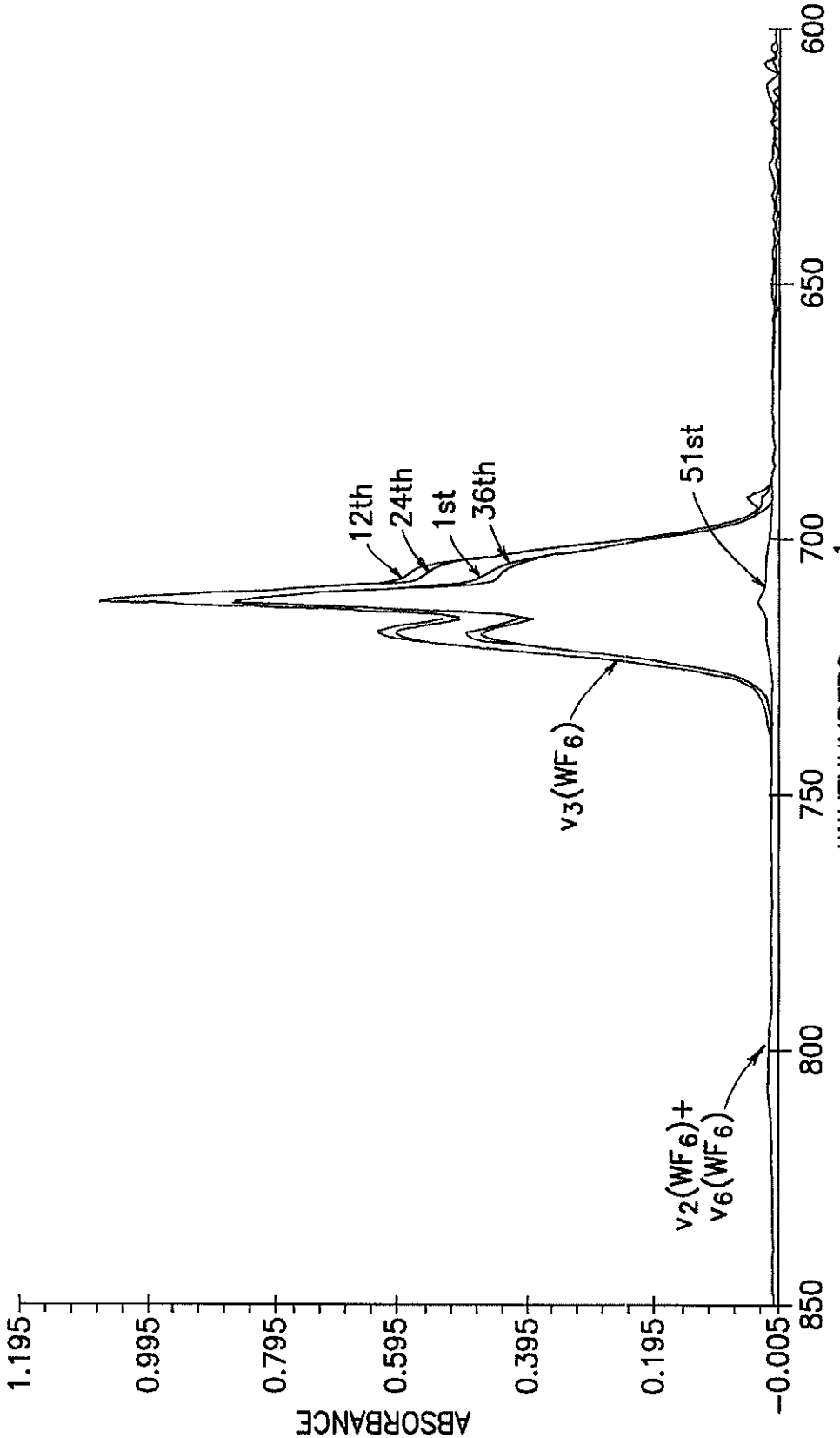
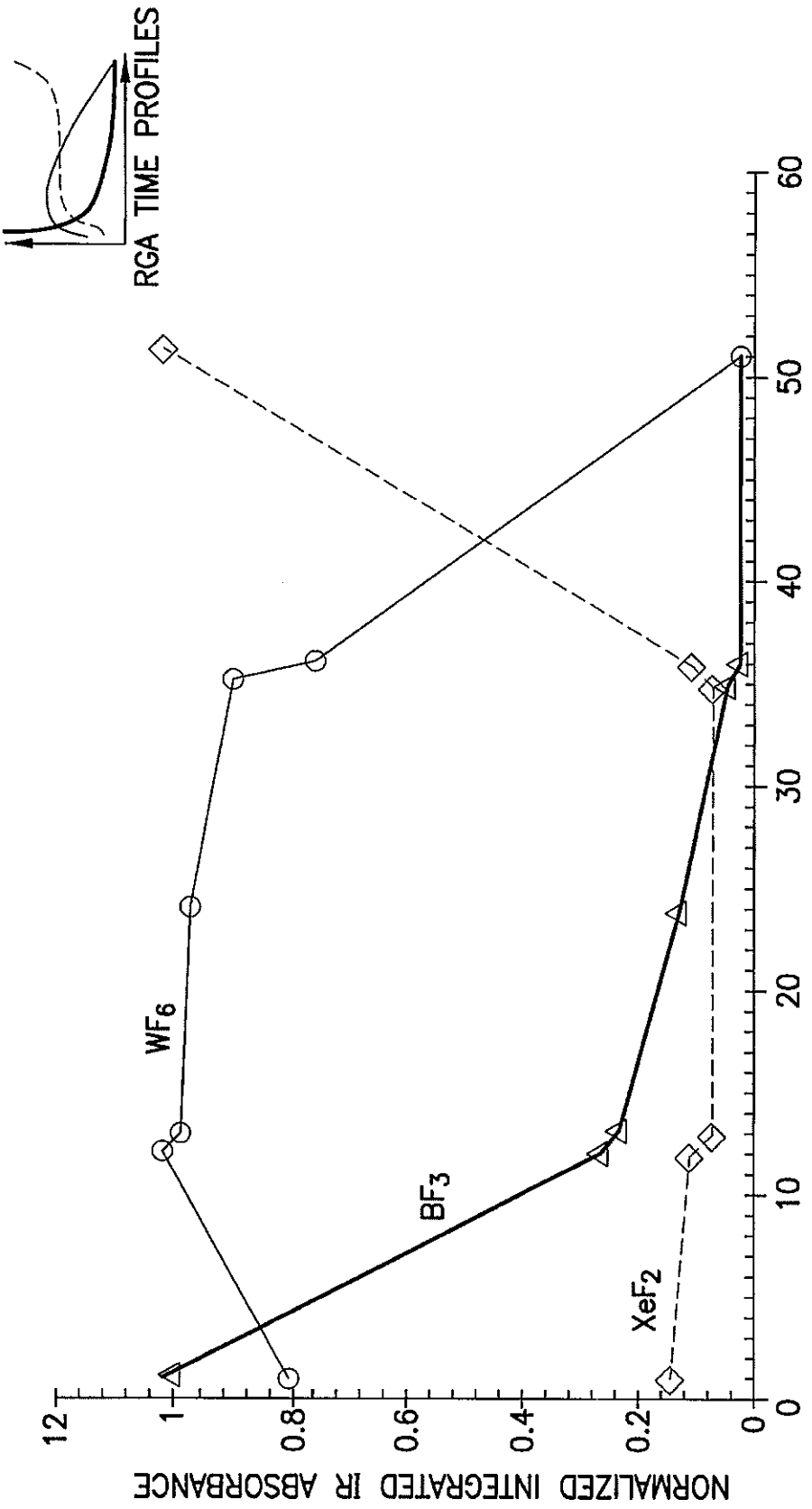


FIG.18

XeF_2 CYCLE−ETCHING OF GRAPHITE REPELLER−IR SPECTRA OF REACTION PRODUCTS−WF_6 REGION



RELATIVE CONCENTRATION PROFILES OF XeF_2, BF_2 AND WF_6 DURING XeF_2 CYCLE-ETCHING OF A GRAPHITE REPELLER

FIG.19