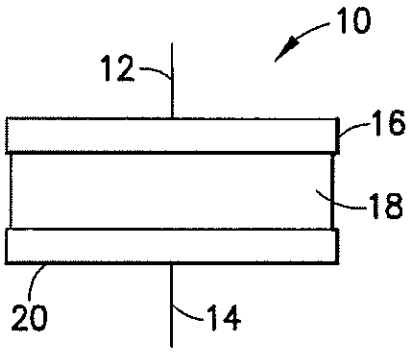

FIG. 1

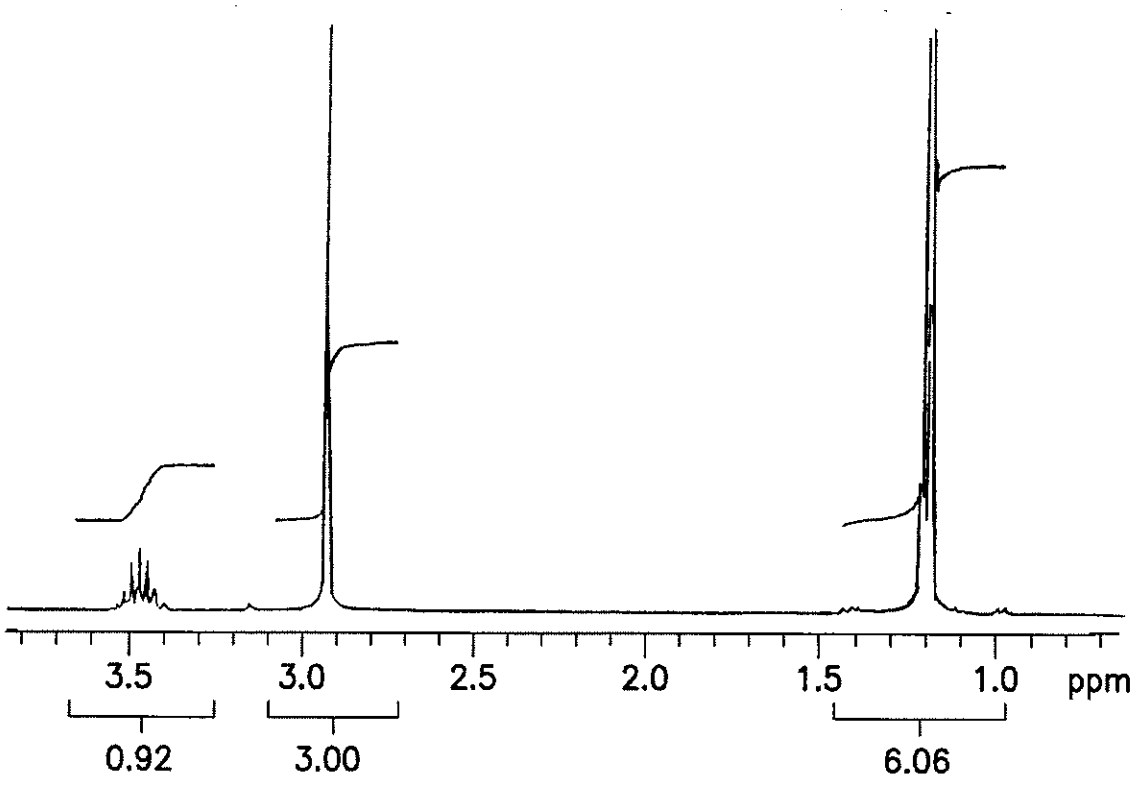

FIG. 2

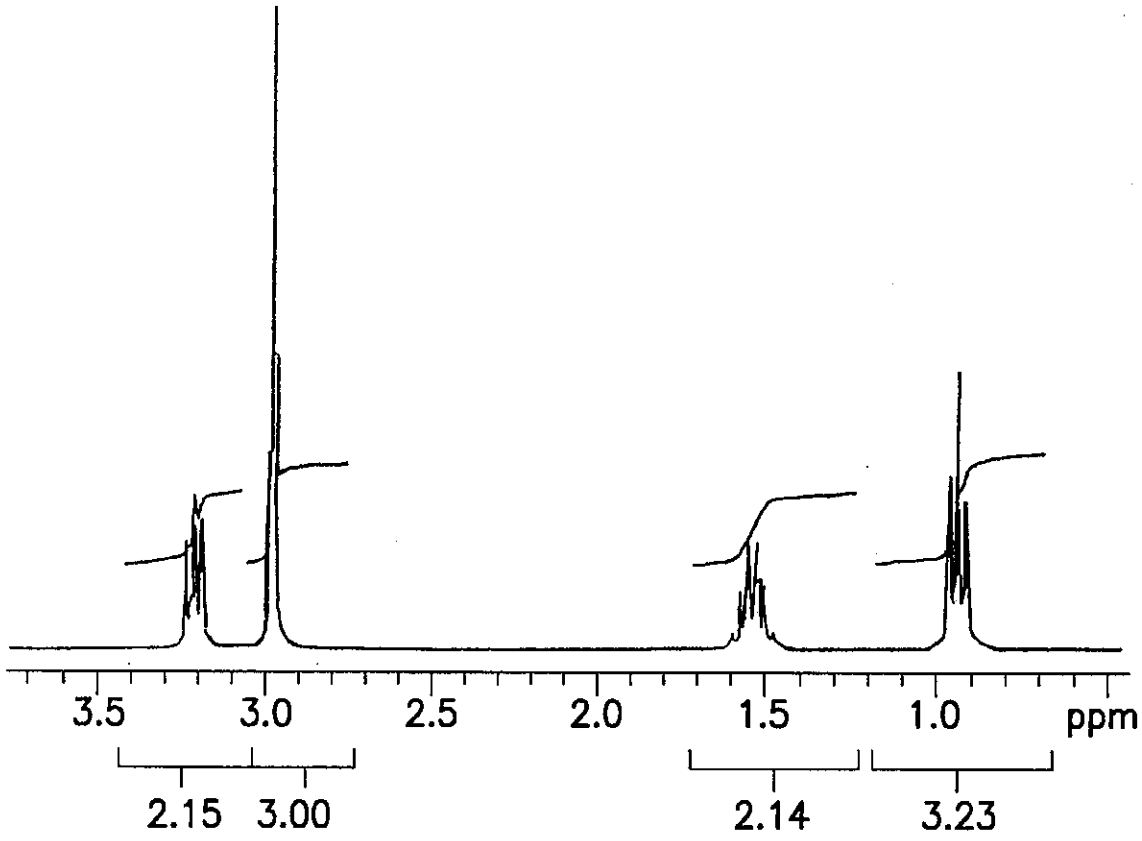

FIG.3

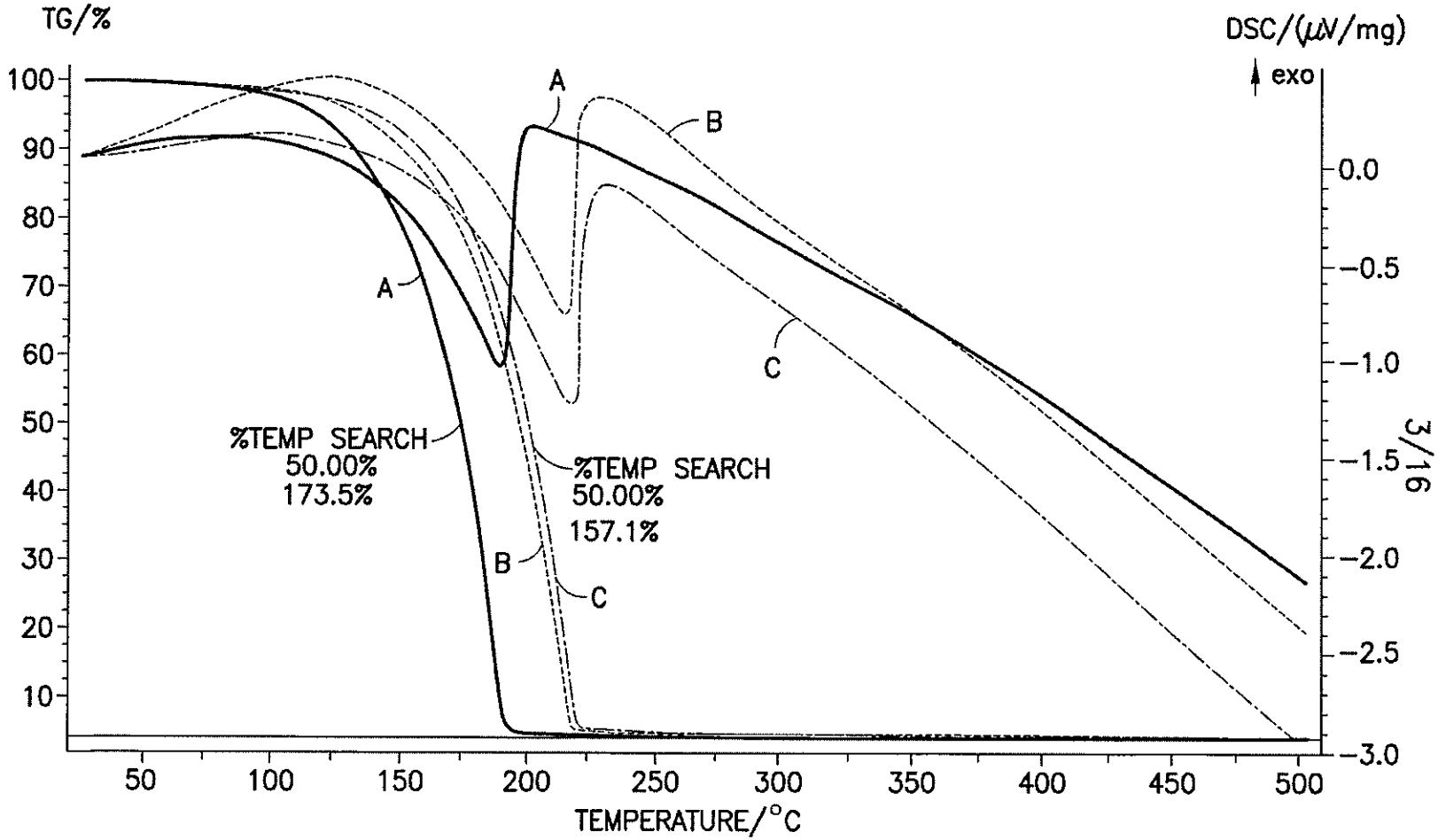
TG/%
DSC/(μV/mg)
exo
100
90
80
70
60
50
40
30
20
10
0.0
−0.5
−1.0
−1.5
−2.0
−2.5
−3.0
A
B
C
%TEMP SEARCH
50.00%
173.5%
%TEMP SEARCH
50.00%
157.1%
50
100
150
200
250
300
350
400
450
500
TEMPERATURE/°C

FIG.4

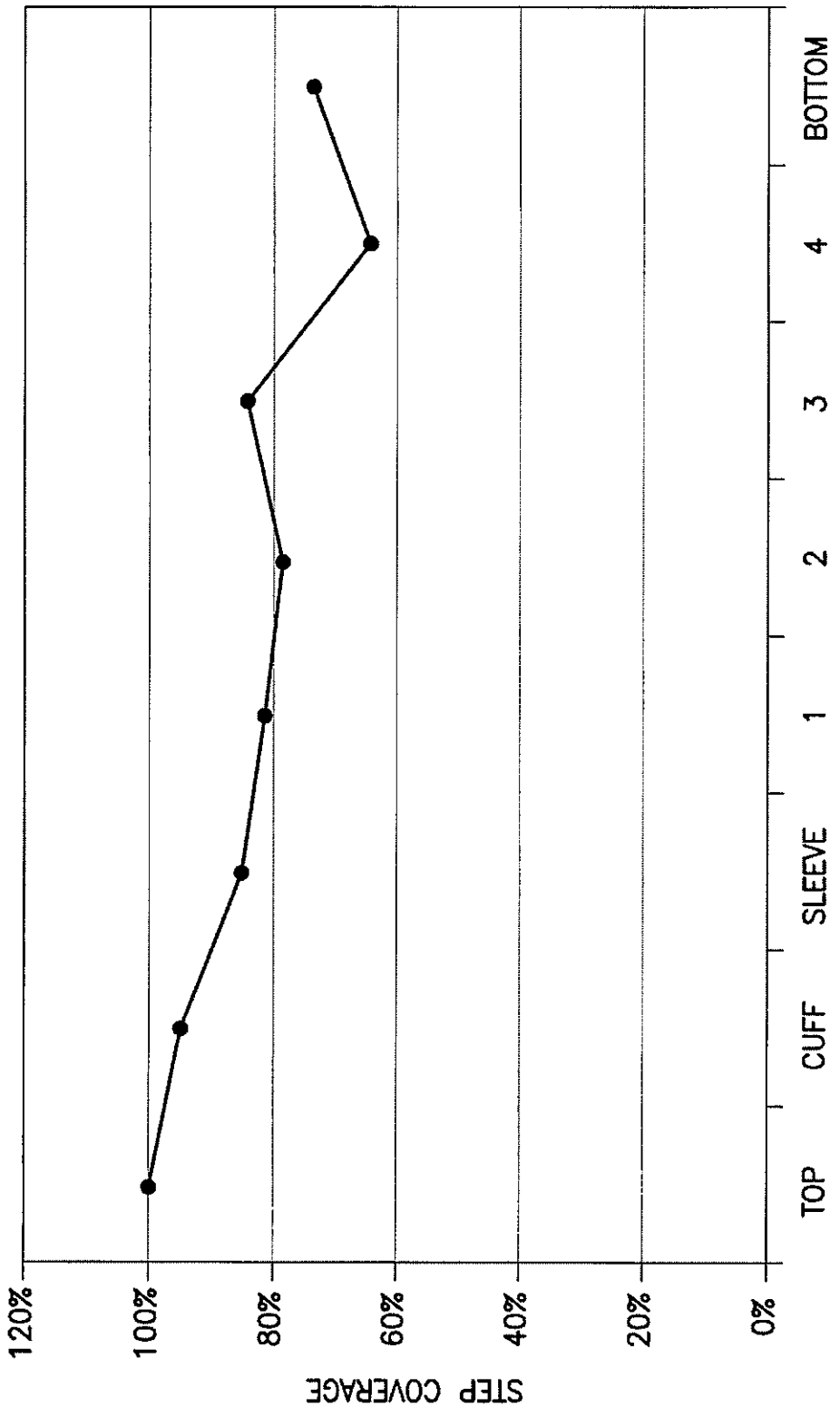
120%
100%
80%
60%
40%
20%
0%
STEP COVERAGE
TOP
CUFF
SLEEVE
1
2
3
4
BOTTOM
POSITION

FIG.5

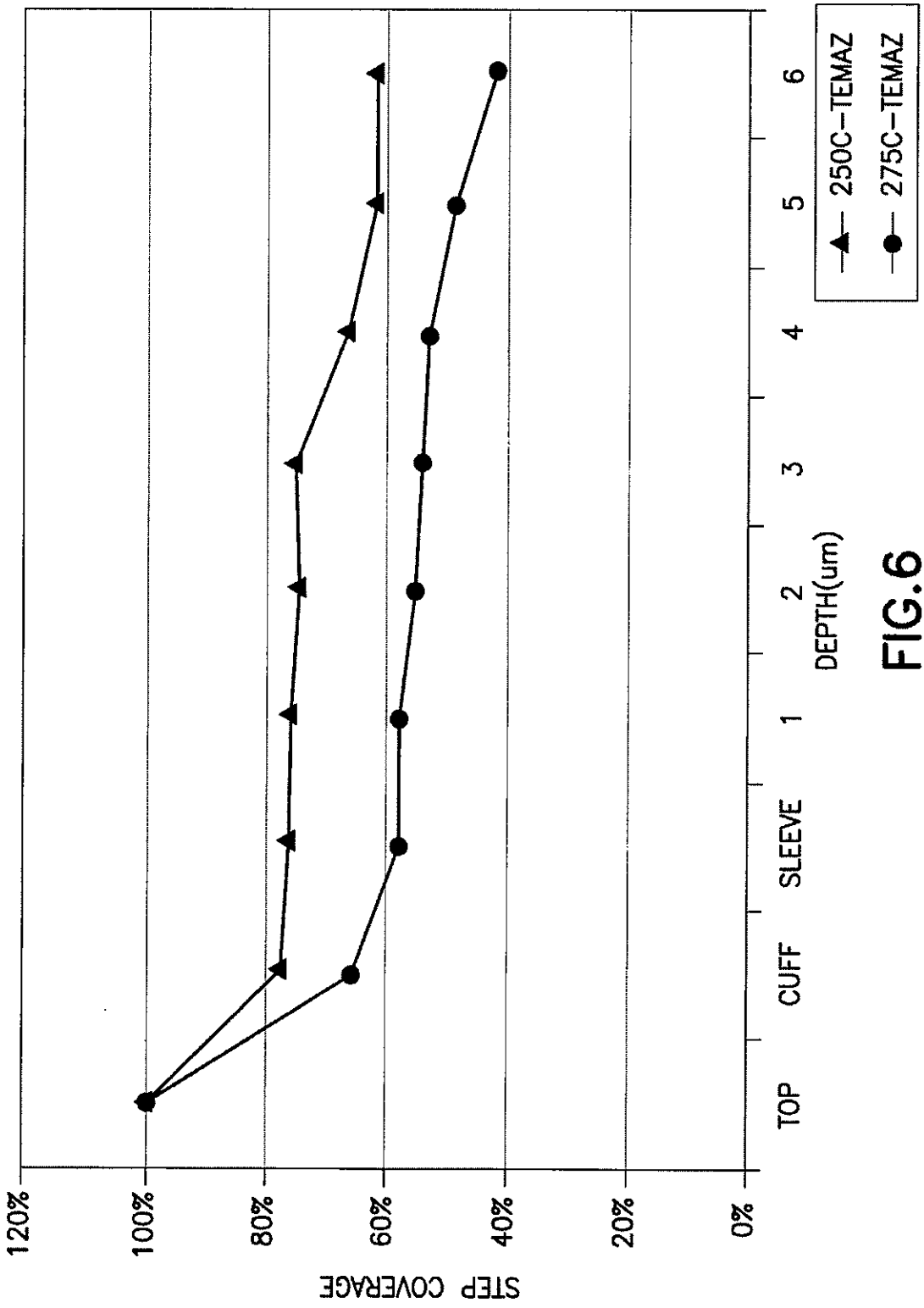
120%
100%
80%
60%
40%
20%
0%
STEP COVERAGE
TOP
CUFF
SLEEVE
1
2
3
4
5
6
DEPTH(um)
250C-TEMAZ
275C-TEMAZ

FIG.6

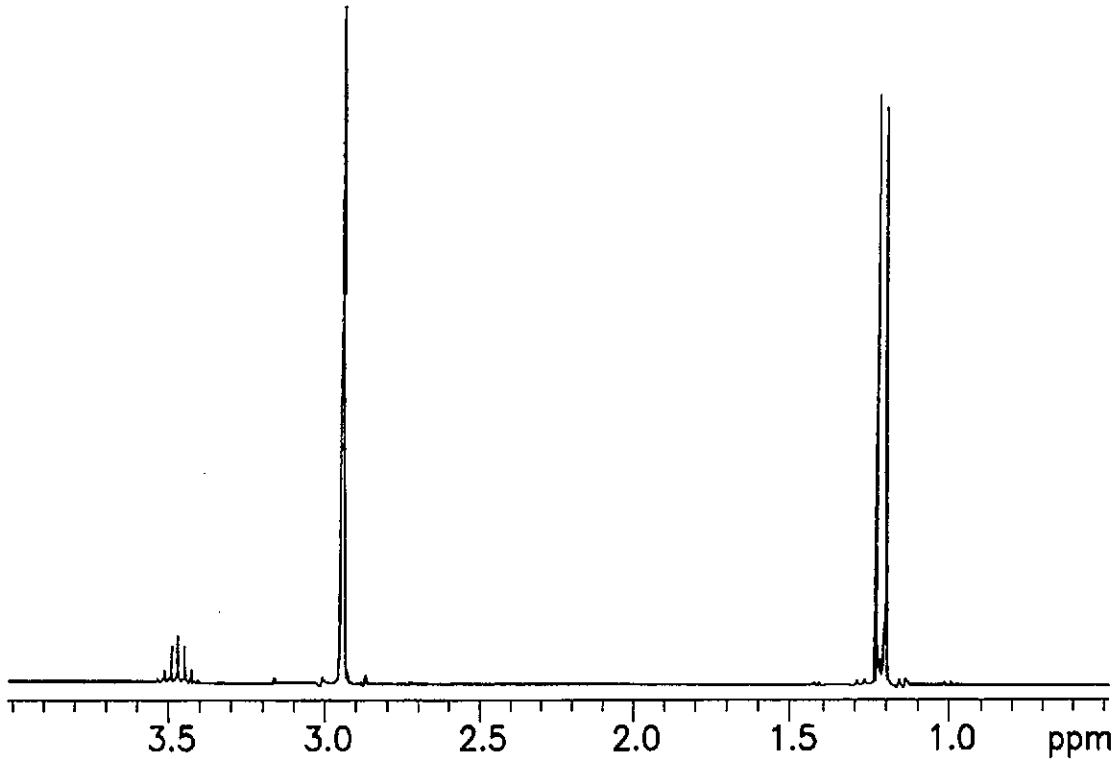

FIG.7

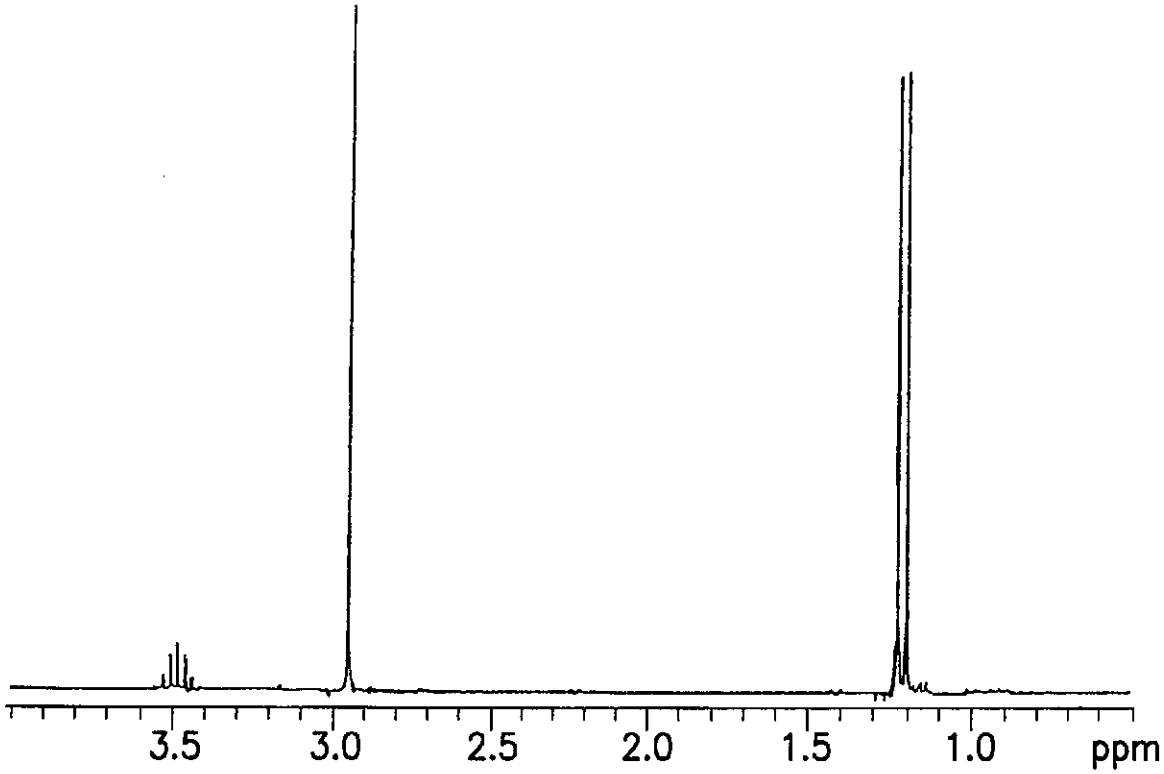

FIG.8

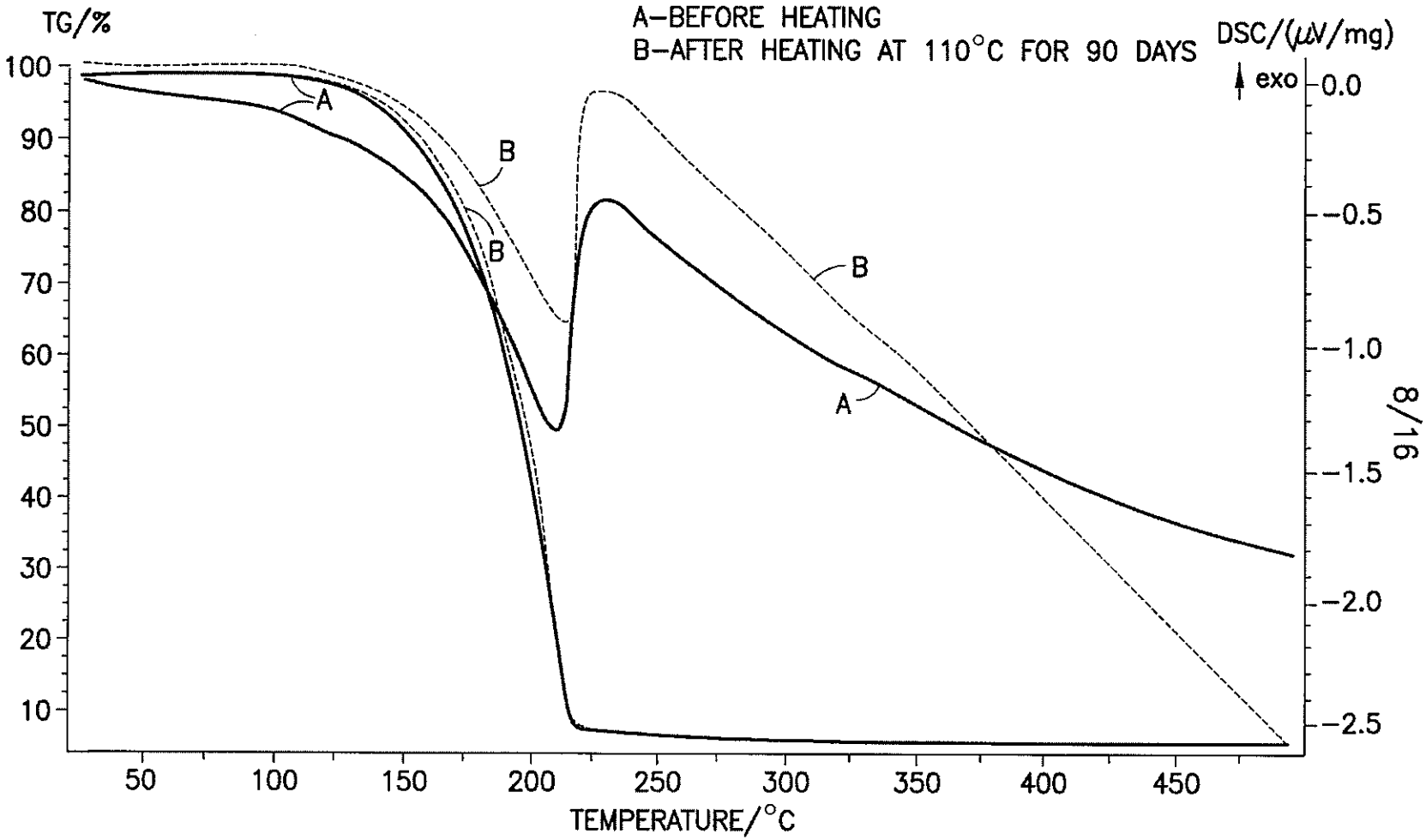
TG/%
A–BEFORE HEATING
B–AFTER HEATING AT 110°C FOR 90 DAYS
DSC/(μV/mg)
exo
100
90
80
70
60
50
40
30
20
10
0.0
−0.5
−1.0
−1.5
−2.0
−2.5
A
B
B
B
A
50
100
150
200
250
300
350
400
450
TEMPERATURE/°C

FIG.9

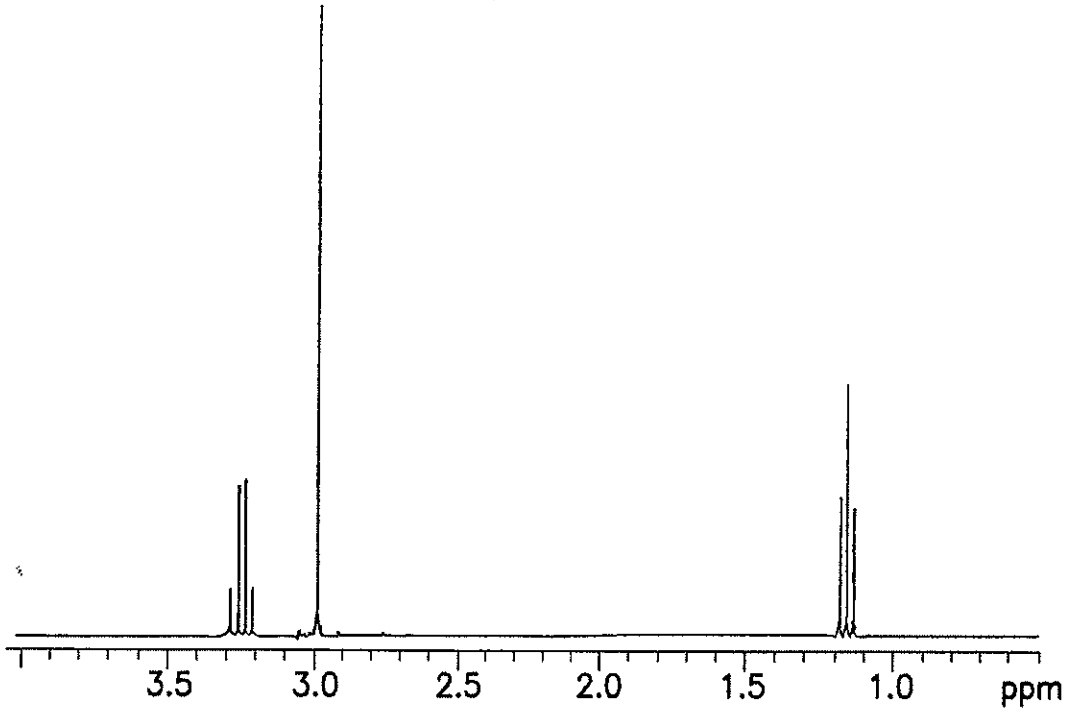

FIG.10

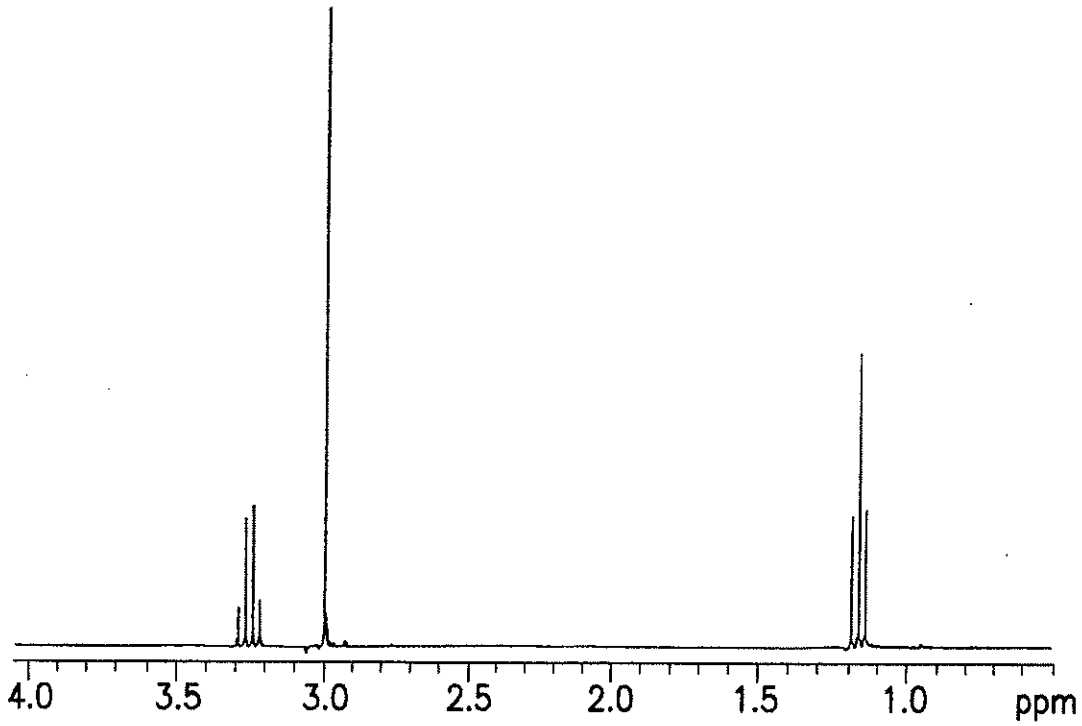

FIG.11

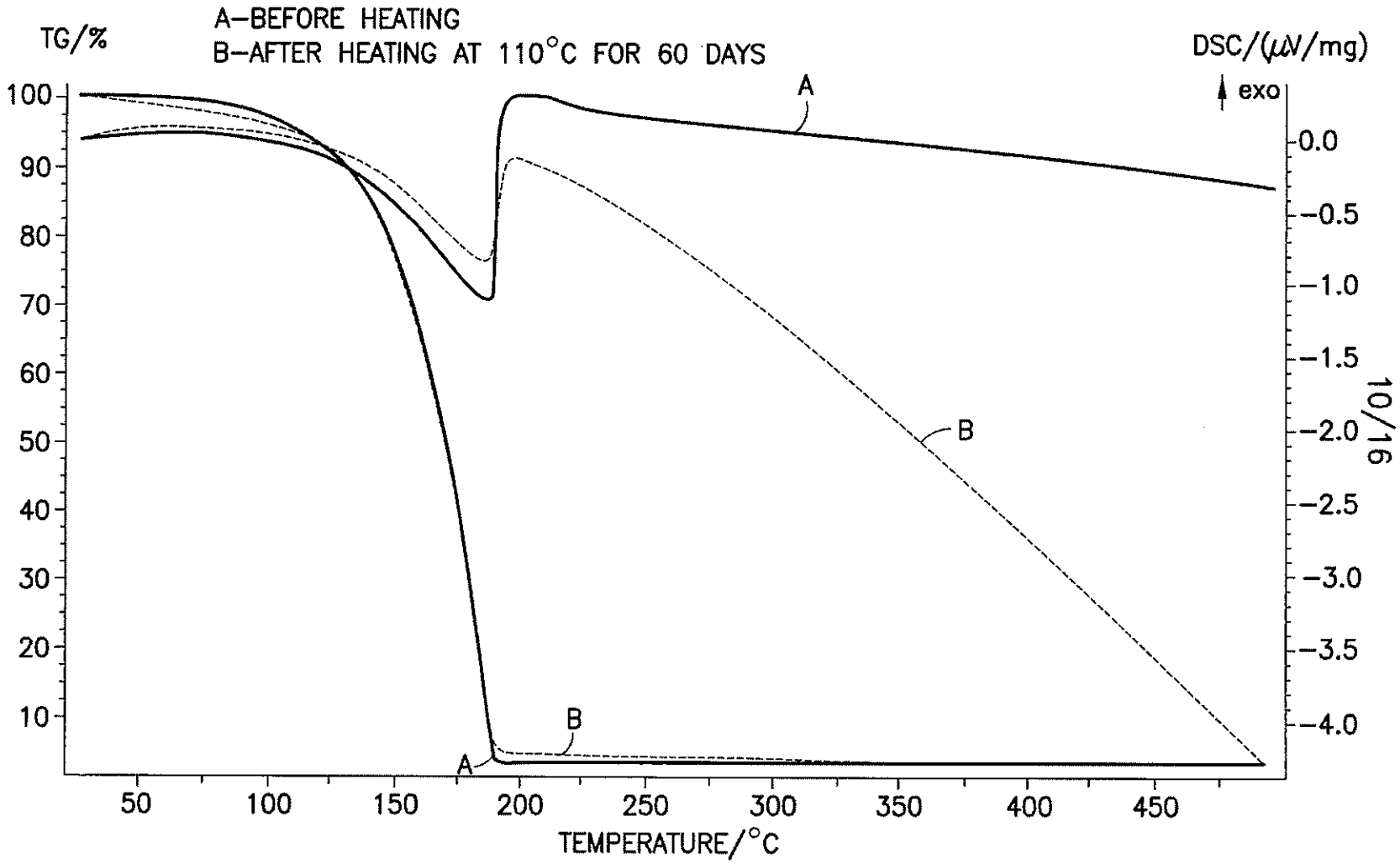
TG/%
A–BEFORE HEATING
B–AFTER HEATING AT 110°C FOR 60 DAYS
DSC/(μV/mg)
exo
100
90
80
70
60
50
40
30
20
10
0.0
−0.5
−1.0
−1.5
−2.0
−2.5
−3.0
−3.5
−4.0
10/16
A
B
B
A
50
100
150
200
250
300
350
400
450
TEMPERATURE/°C

FIG.12

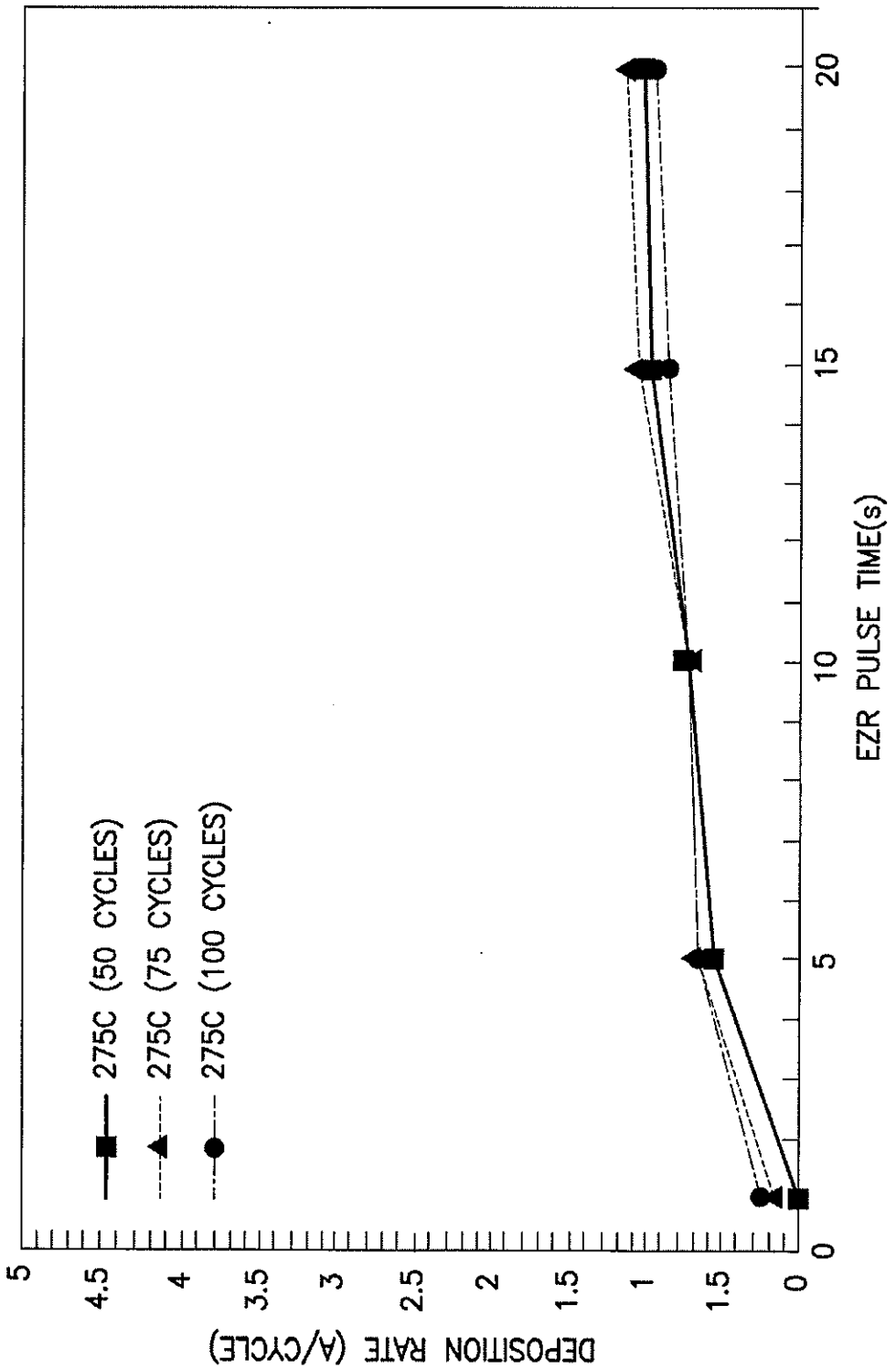
DEPOSITION RATE (A/CYCLE)
EZR PULSE TIME(s)
275C (50 CYCLES)
275C (75 CYCLES)
275C (100 CYCLES)
0
1.5
1
2
2.5
3
3.5
4
4.5
5
0
5
10
15
20

FIG.13

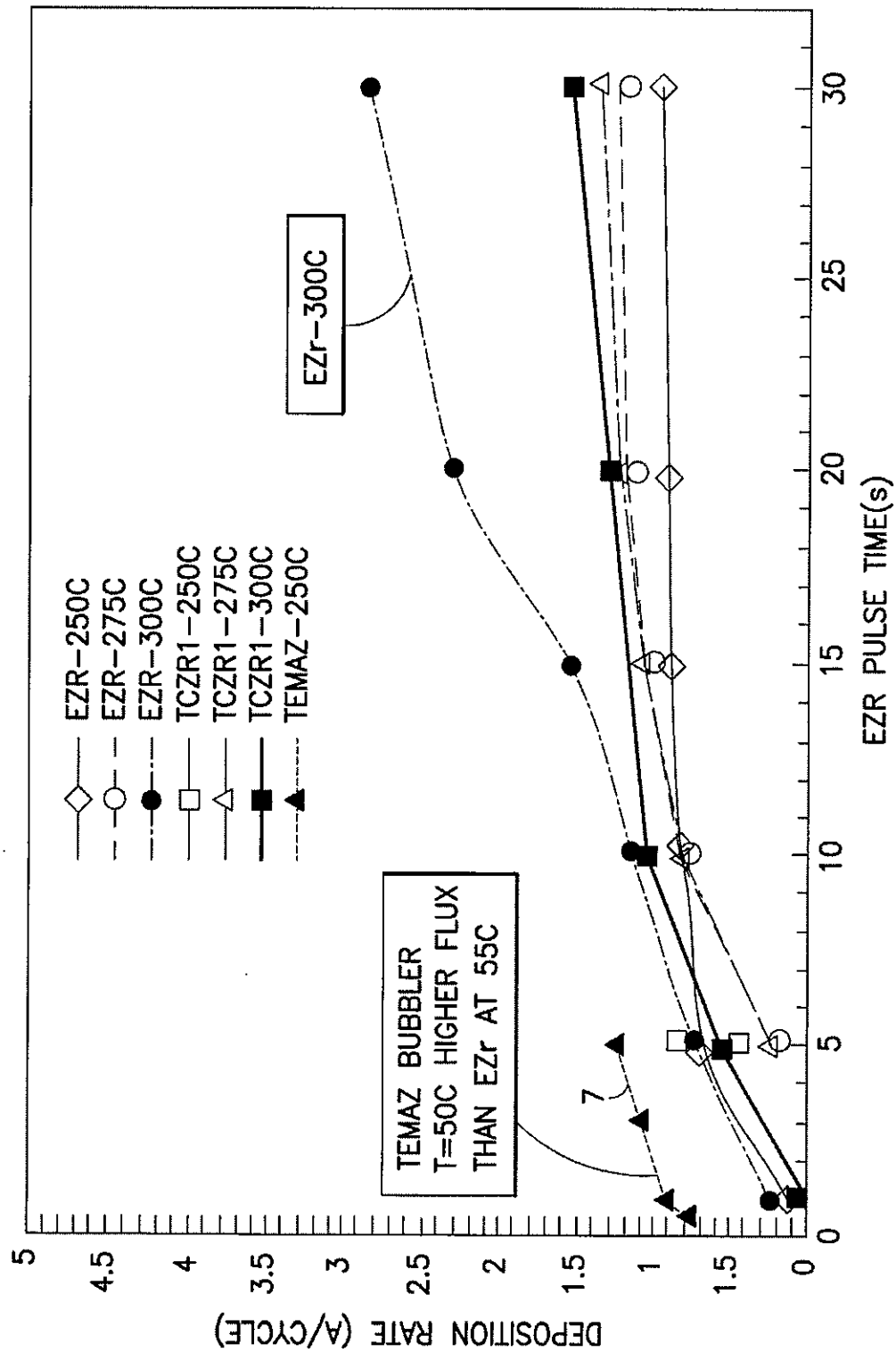
DEPOSITION RATE (A/CYCLE)
EZR PULSE TIME(s)
EZR-250C
EZR-275C
EZR-300C
TCZR1-250C
TCZR1-275C
TCZR1-300C
TEMAZ-250C
EZr-300C
TEMAZ BUBBLER
T=50C HIGHER FLUX
THAN EZr AT 55C
7

FIG.14

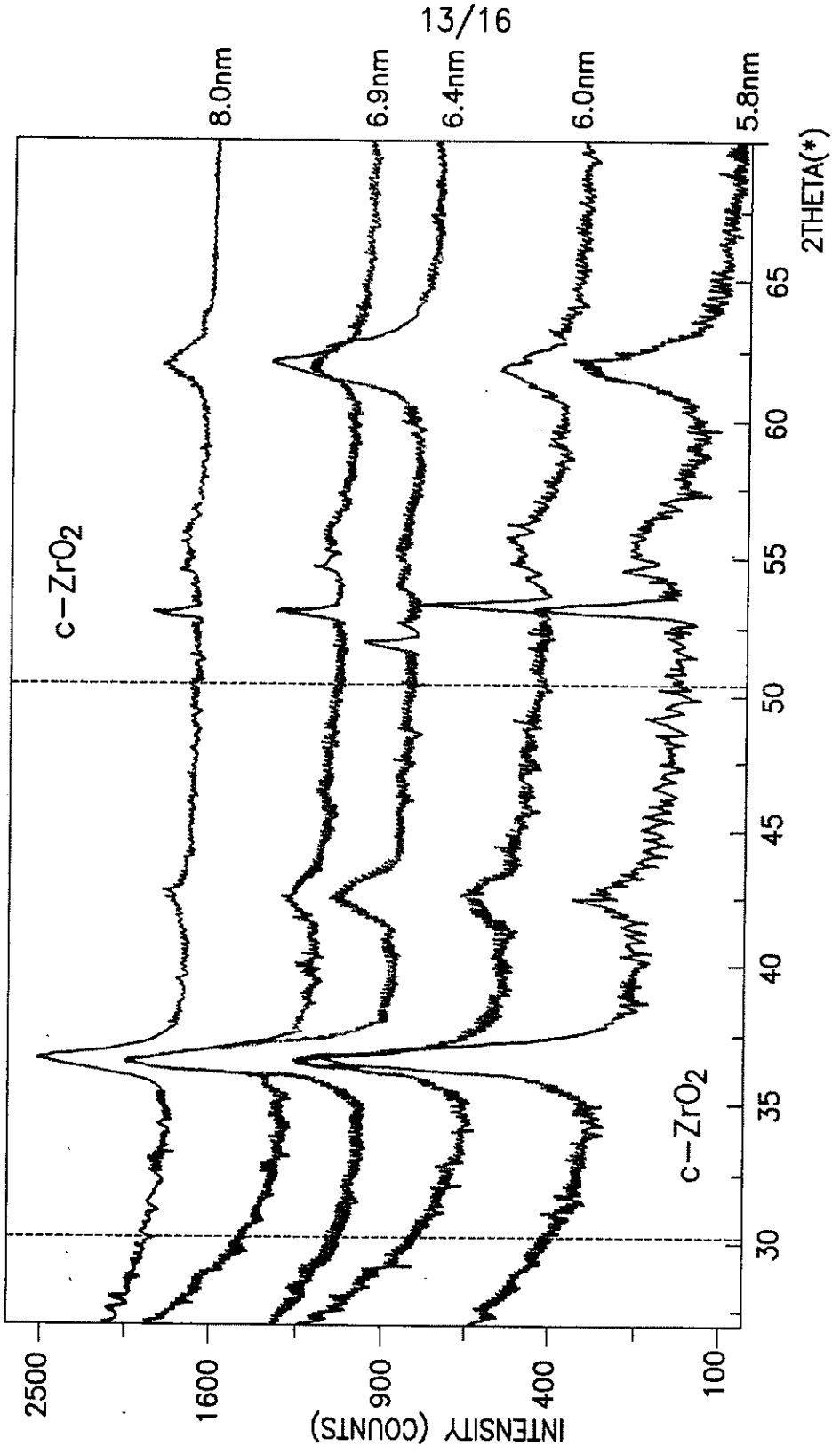
8.0nm
6.9nm
6.4nm
6.0nm
5.8nm
c−ZrO2
c−ZrO2
2500
1600
900
400
100
INTENSITY (COUNTS)
30
35
40
45
50
55
60
65
2THETA(*)

FIG.15

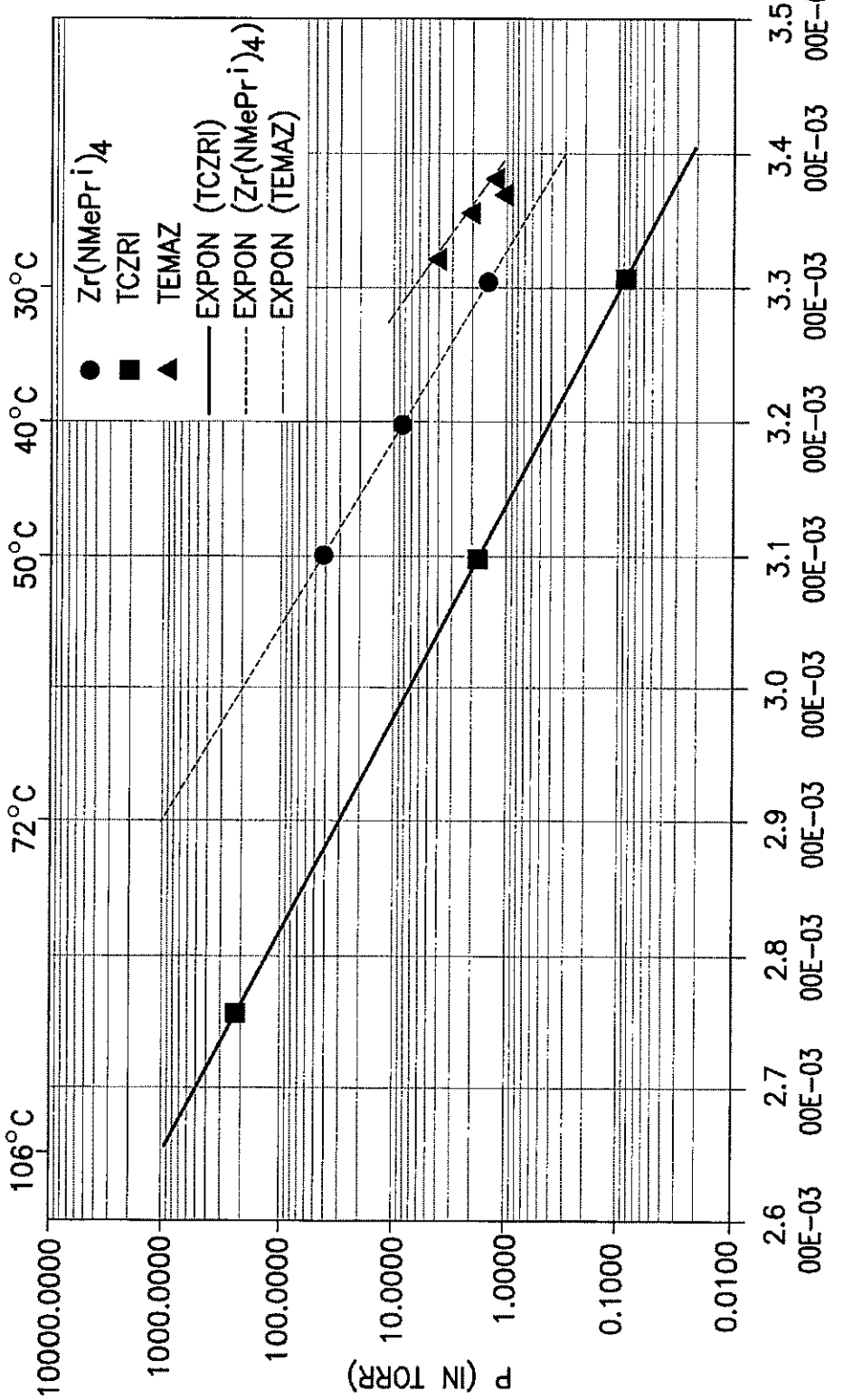
Zr(NMePr i)4
TCZRI
TEMAZ
EXPON (TCZRI)
EXPON (Zr(NMePr i)4)
EXPON (TEMAZ)
P (IN TORR)
10000.0000
1000.0000
100.0000
10.0000
1.0000
0.1000
0.0100
106°C
72°C
50°C
40°C
30°C
2.6 00E-03
2.7 00E-03
2.8 00E-03
2.9 00E-03
3.0 00E-03
3.1 00E-03
3.2 00E-03
3.3 00E-03
3.4 00E-03
3.5 00E-03

FIG.16

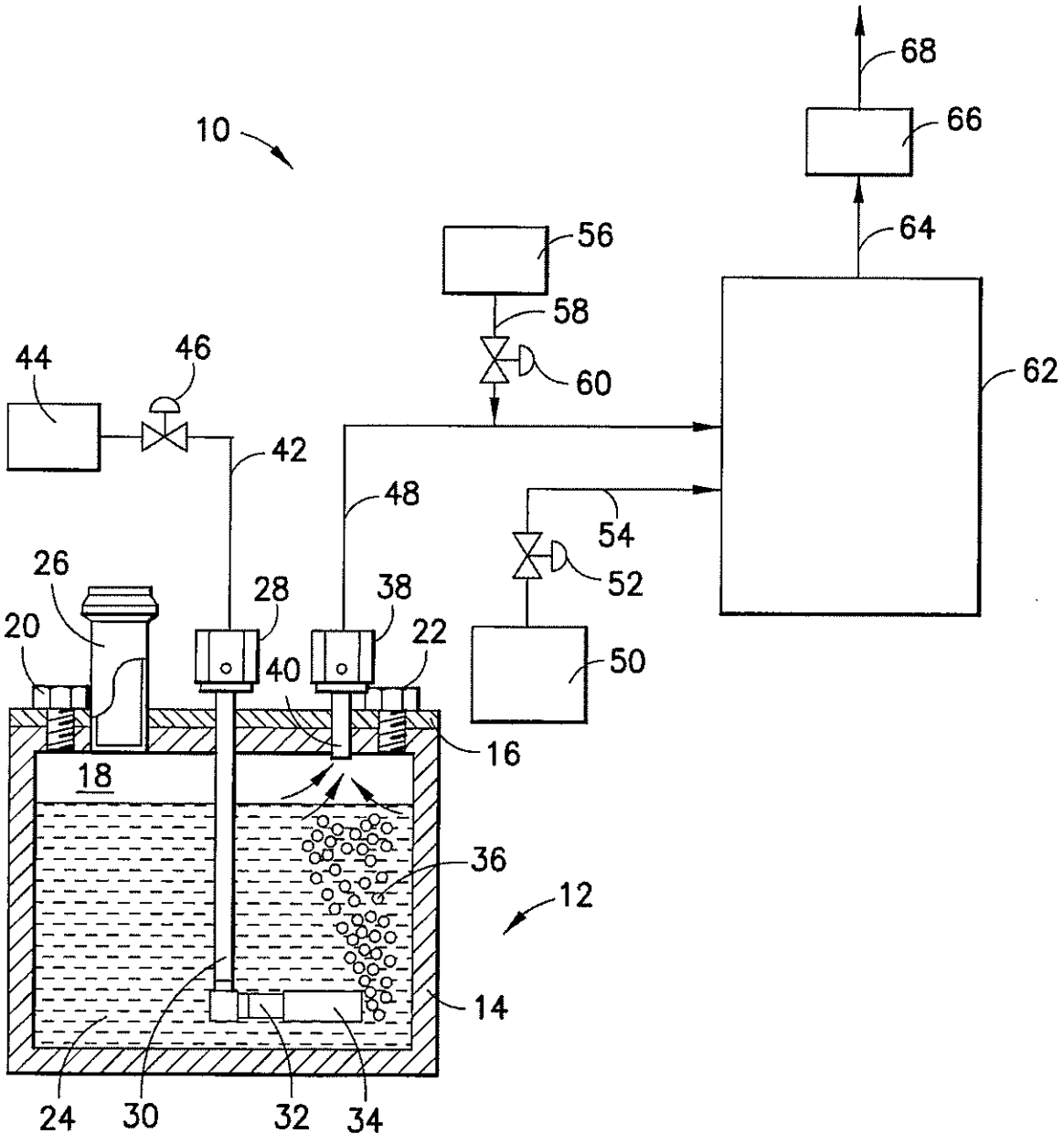
10
68
66
64
56
58
60
62
44
46
42
48
54
52
26
28
38
22
20
40
50
16
18
36
12
14
24
30
32
34

FIG.17

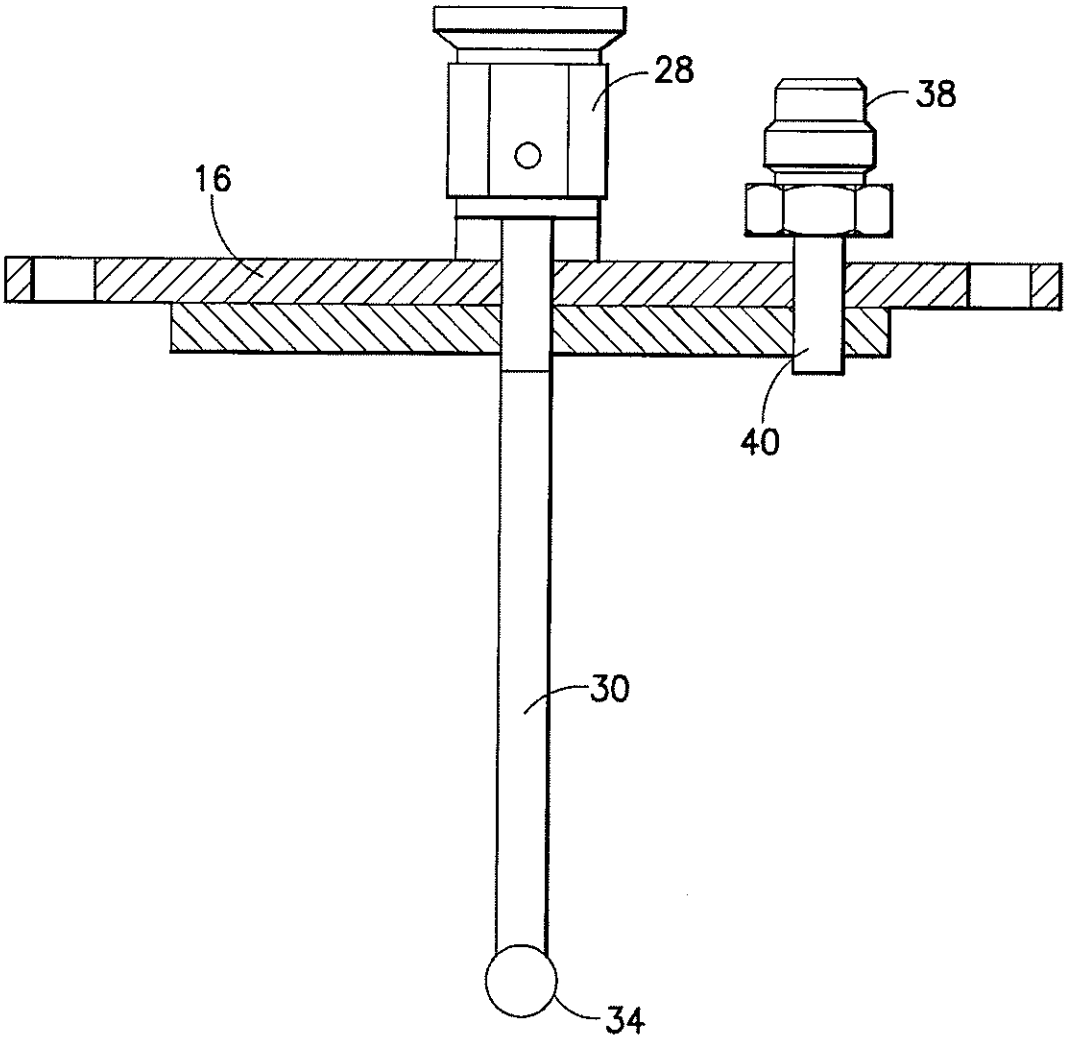

FIG.18