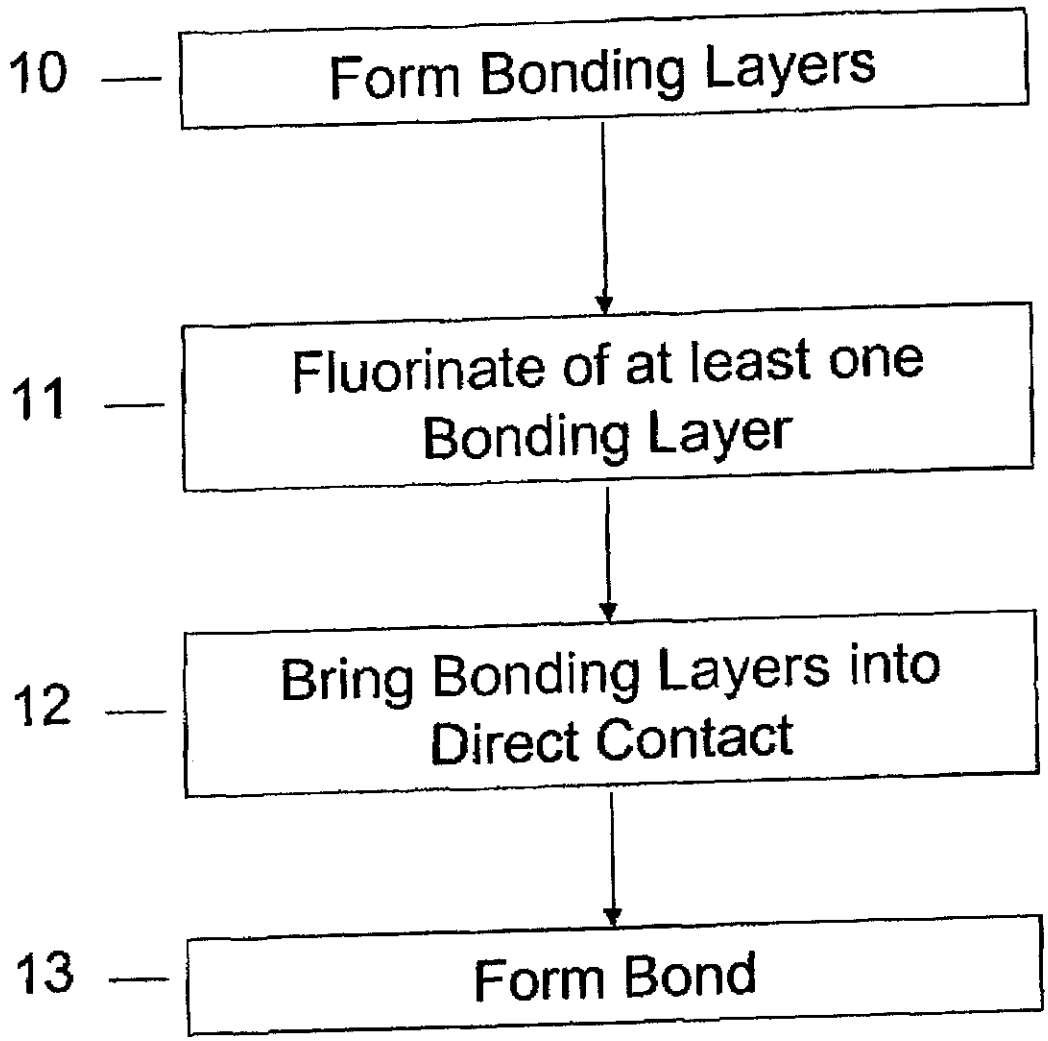

10
Form Bonding Layers
11
Fluorinate of at least one Bonding Layer
12
Bring Bonding Layers into Direct Contact
13
Form Bond

FIG. 1

FIG. 2A

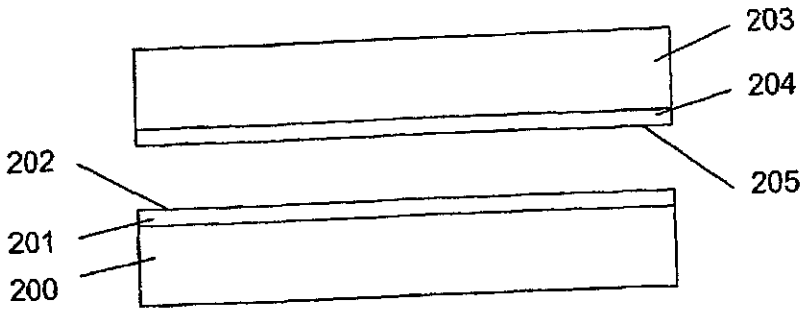


FIG. 2B

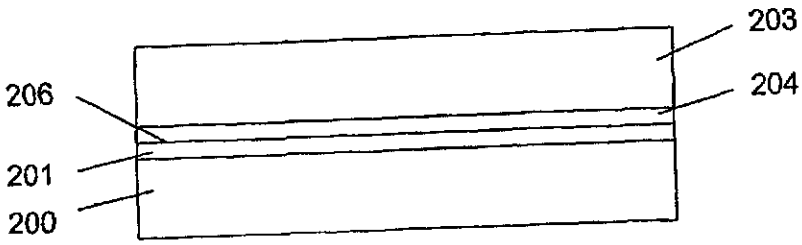


FIG. 2C

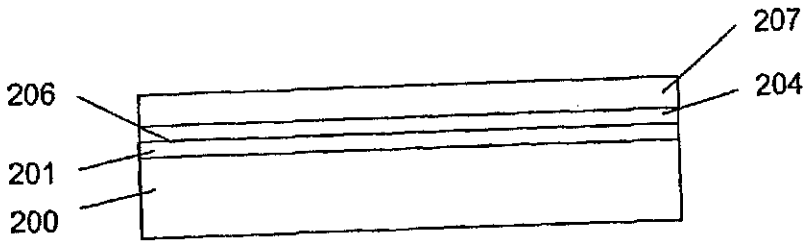
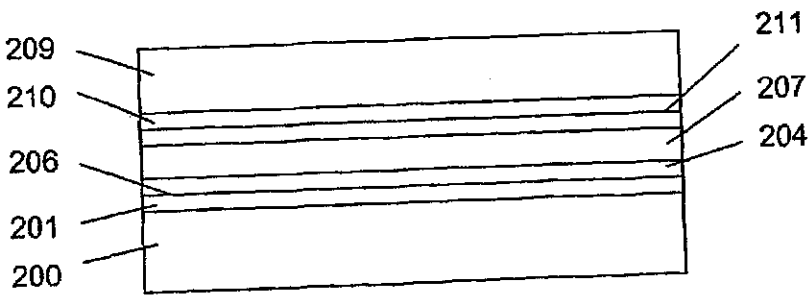


FIG. 2D



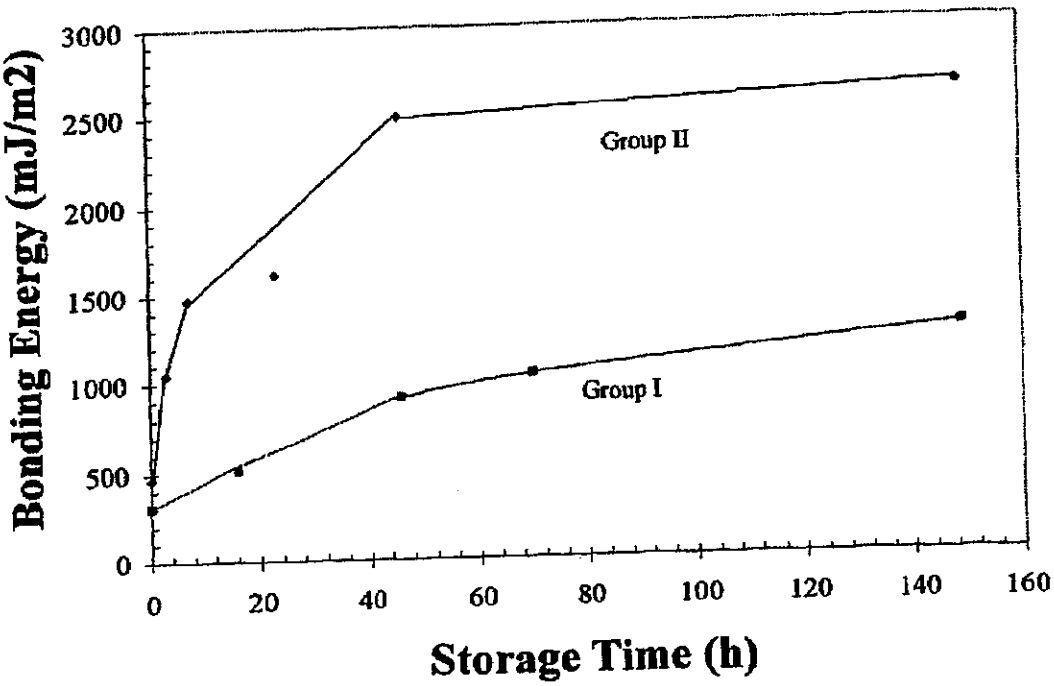

Bonding Energy (mJ/m2)
3000
2500
2000
1500
1000
500
0
0
20
40
60
80
100
120
140
160
Storage Time (h)
Group II
Group I

FIG. 3

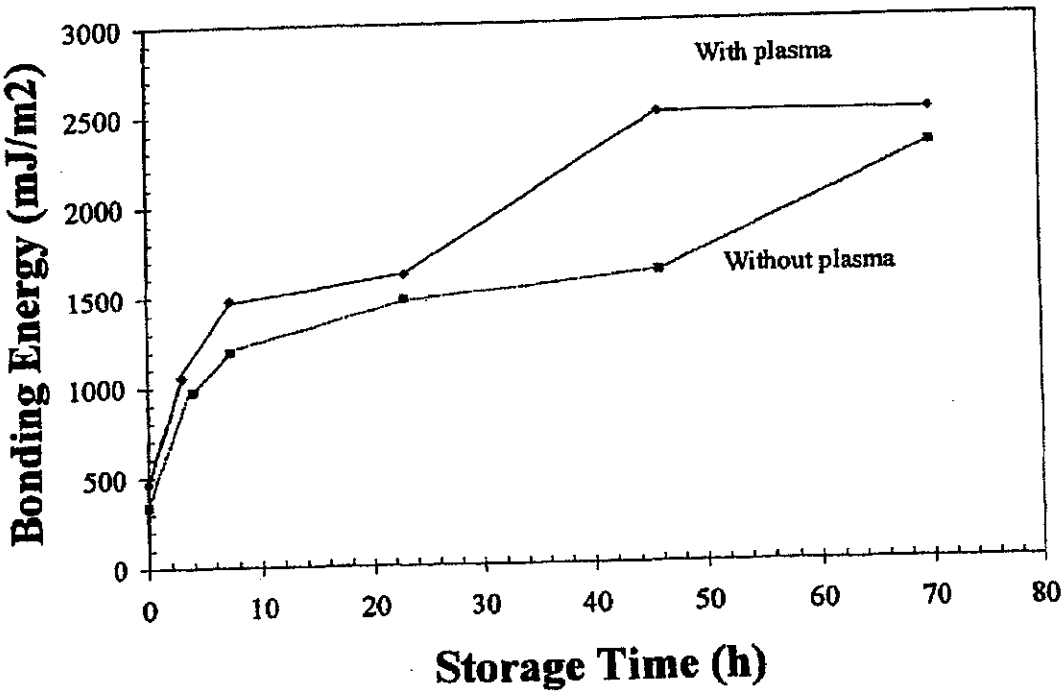

Bonding Energy (mJ/m2)
3000
2500
2000
1500
1000
500
0
0
10
20
30
40
50
60
70
80
Storage Time (h)
With plasma
Without plasma

FIG. 4

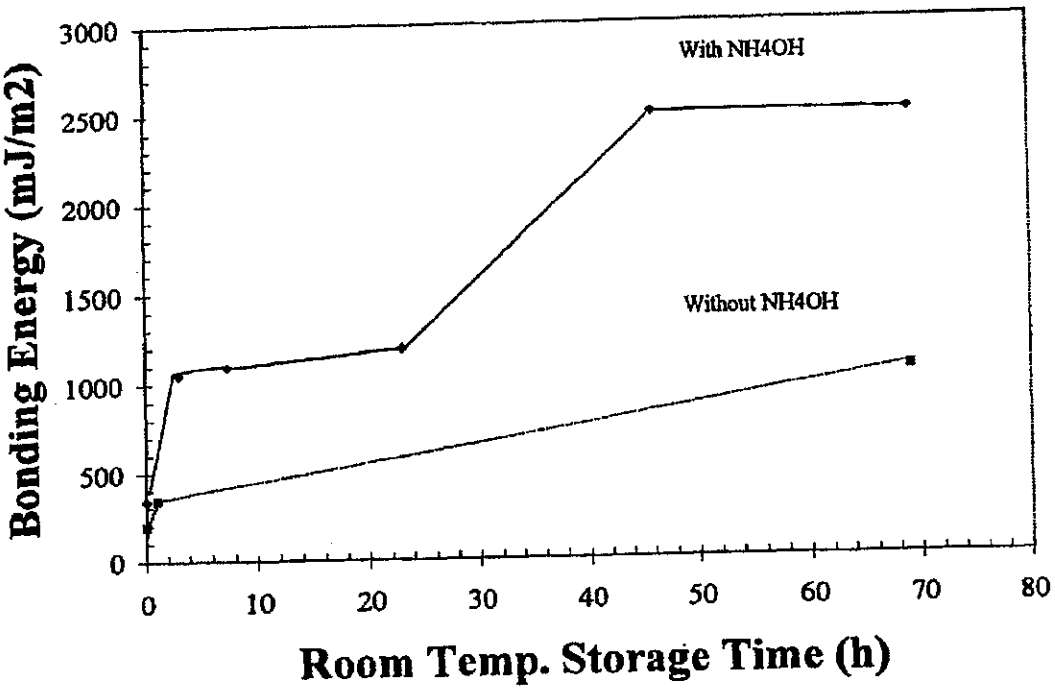

Bonding Energy (mJ/m2)
3000
2500
2000
1500
1000
500
0
With NH4OH
Without NH4OH
0
10
20
30
40
50
60
70
80
Room Temp. Storage Time (h)

FIG. 5

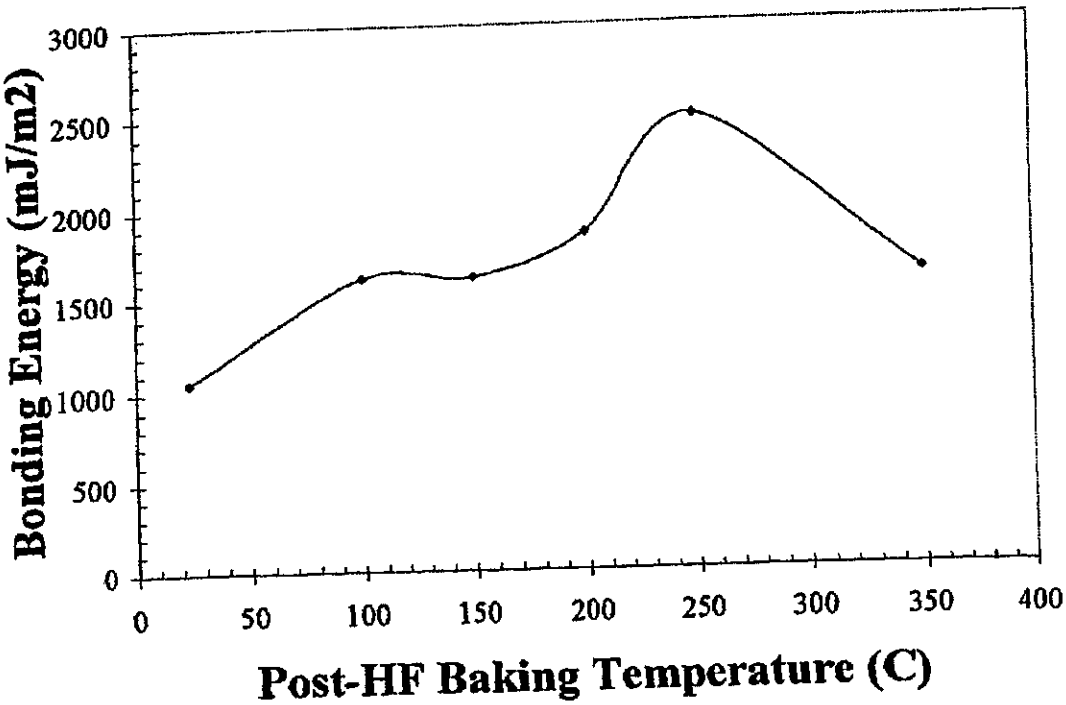

Bonding Energy (mJ/m2)
3000
2500
2000
1500
1000
500
0
0
50
100
150
200
250
300
350
400
Post-HF Baking Temperature (C)

FIG. 6

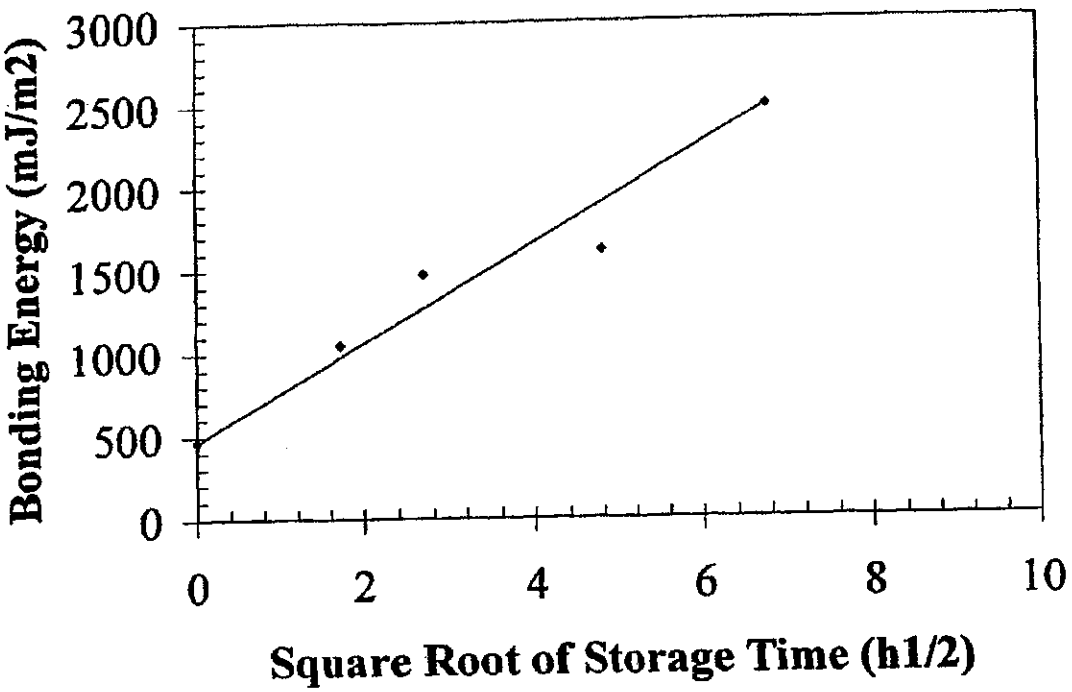

Bonding Energy (mJ/m2)
3000
2500
2000
1500
1000
500
0
0
2
4
6
8
10
Square Root of Storage Time (h1/2)

FIG. 7

FIG. 8A



FIG. 8B

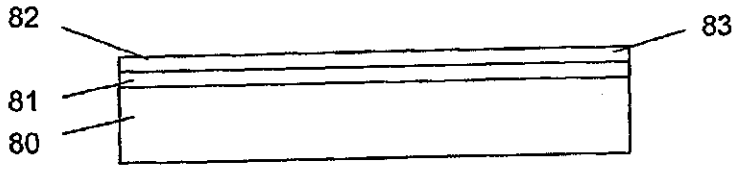
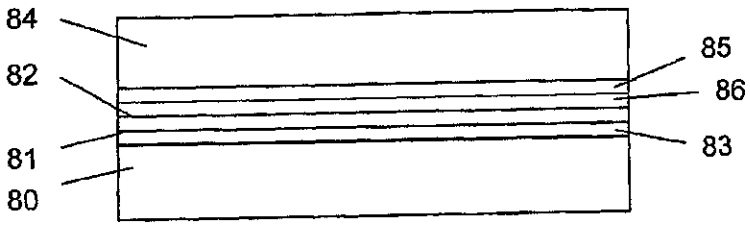


FIG. 8C



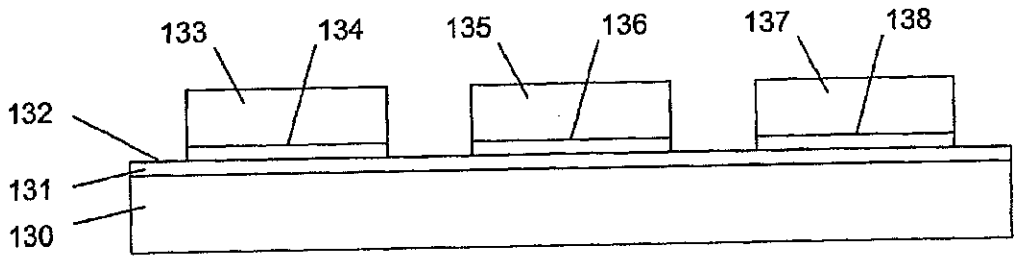


FIG. 13

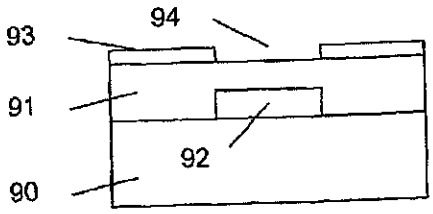


FIG. 9A

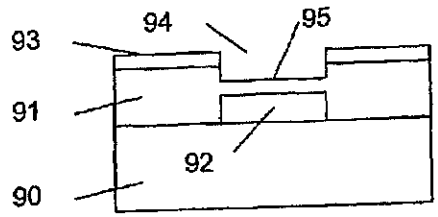


FIG. 9B

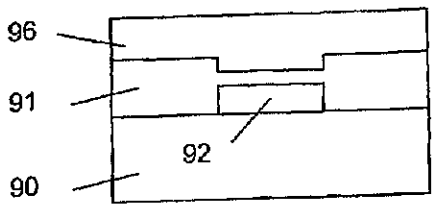


FIG. 9C

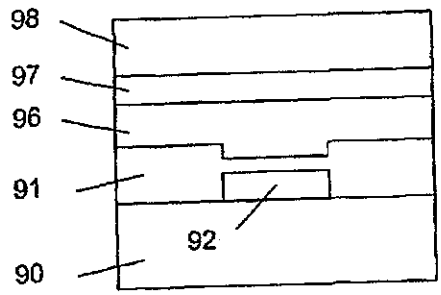


FIG. 9D

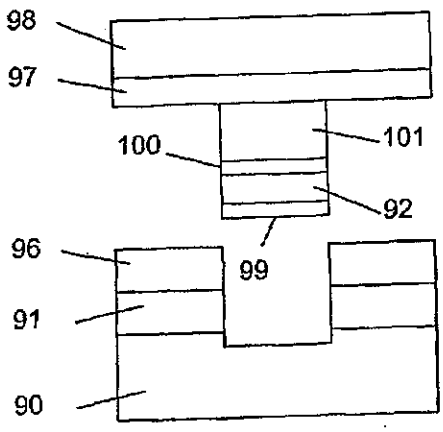


FIG. 9E



FIG. 10

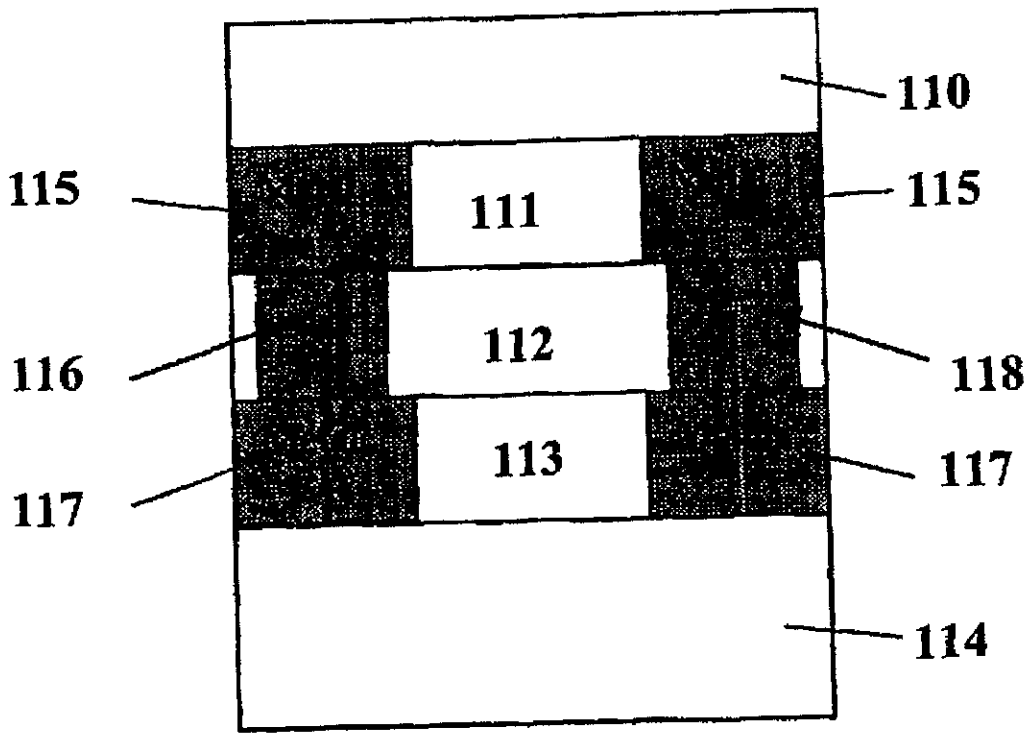


FIG. 11

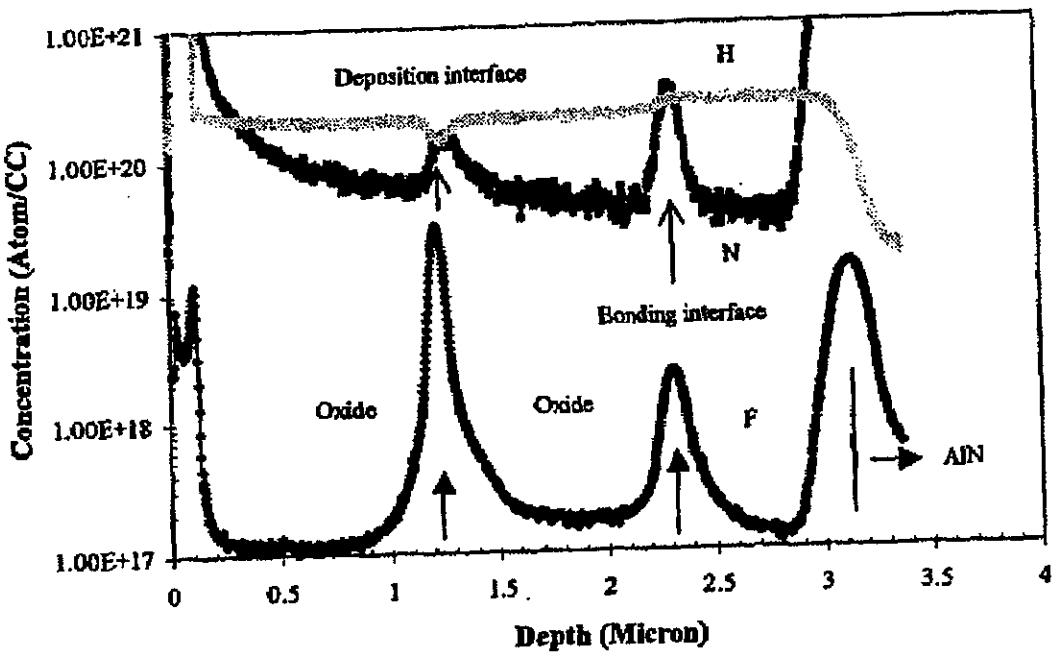

1.00E+21
1.00E+20
1.00E+19
1.00E+18
1.00E+17
Concentration (Atom/CC)
Deposition interface
H
N
Bonding interface
Oxide
Oxide
F
AlN
0
0.5
1
1.5
2
2.5
3
3.5
4
Depth (Micron)

FIG. 12

FIG. 14A

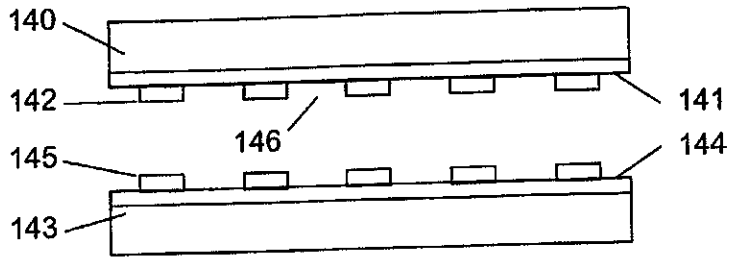


FIG. 14B

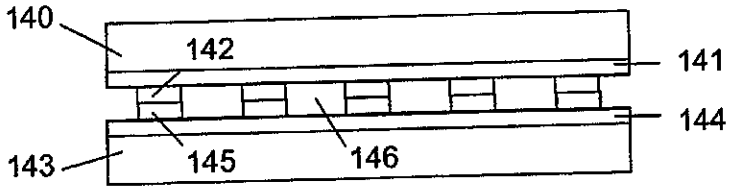


FIG. 14C

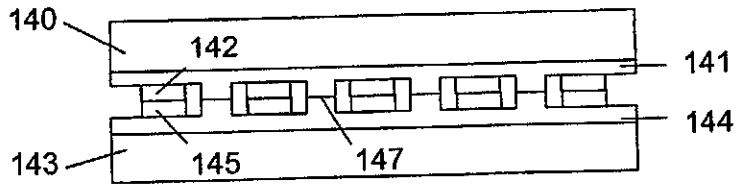
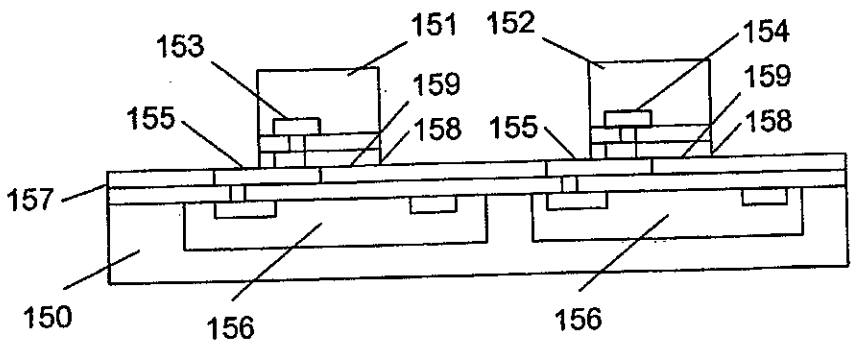


FIG. 15



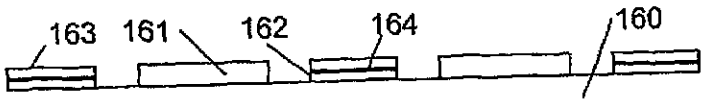


FIG. 16A

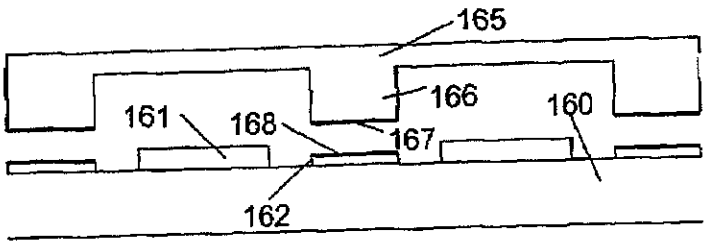


FIG. 16B

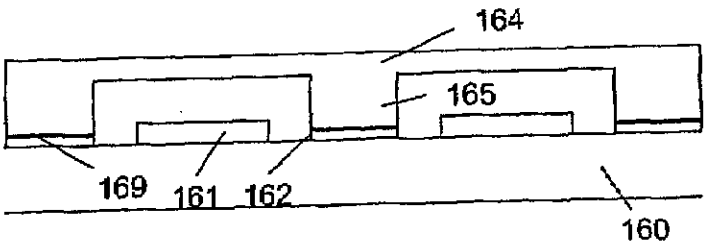


FIG. 16C

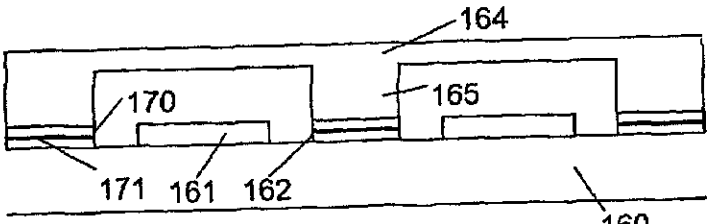


FIG. 16D

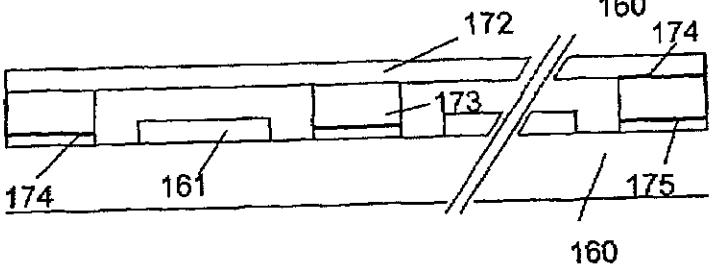


FIG. 16E