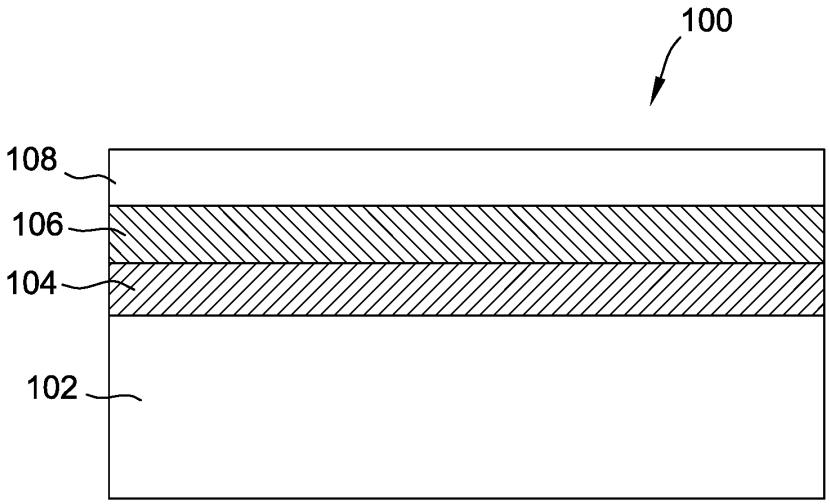


FIG. 1

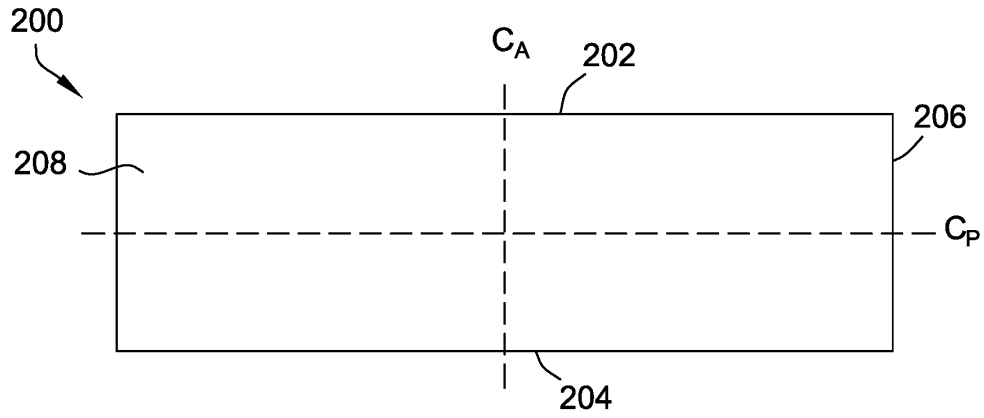


FIG. 2

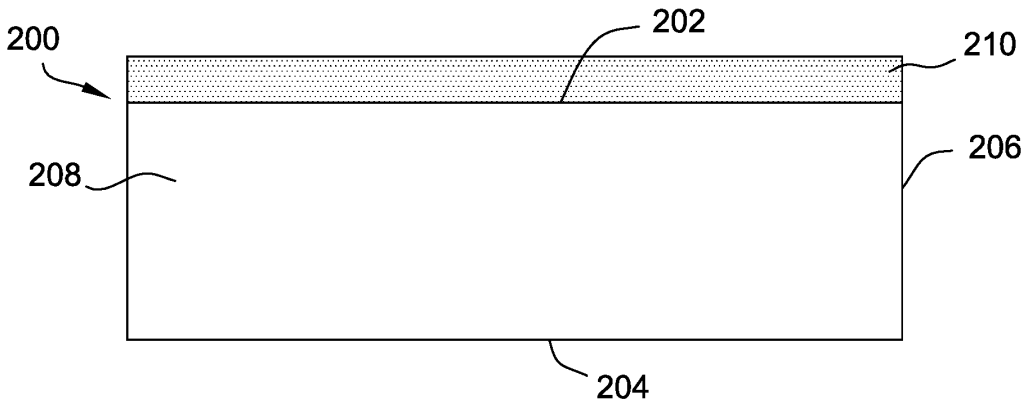


FIG. 3

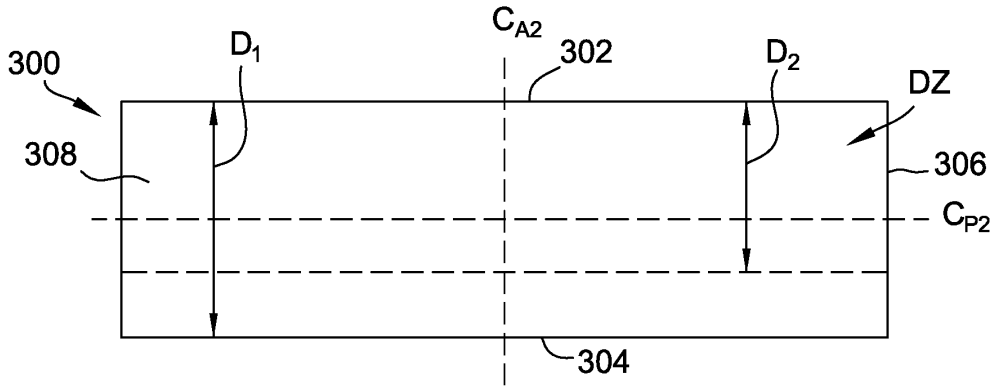

C_{A2}
D_1
302
D_2
300
DZ
308
306
C_{P2}
304

FIG. 4

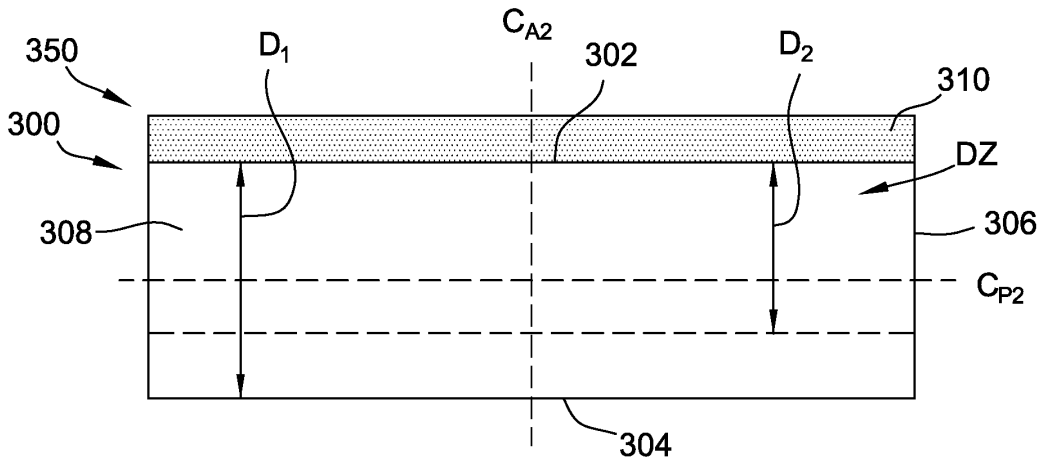

C_{A2}
D_1
302
D_2
350
310
300
DZ
308
306
C_{P2}
304

FIG. 5

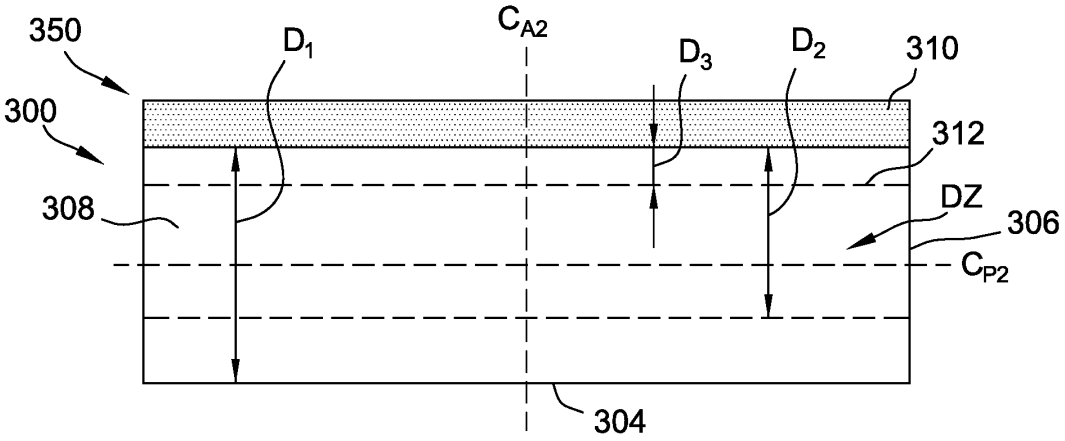


FIG. 6

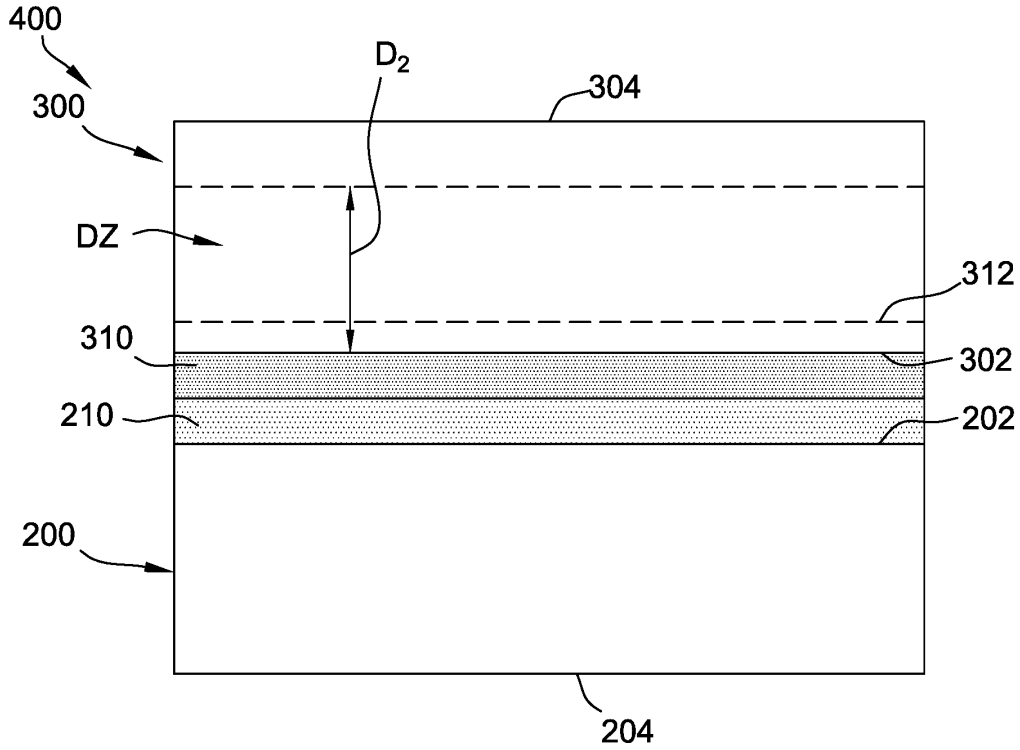

400
300
D_2
304
DZ
312
310
302
210
202
200
204

FIG. 7

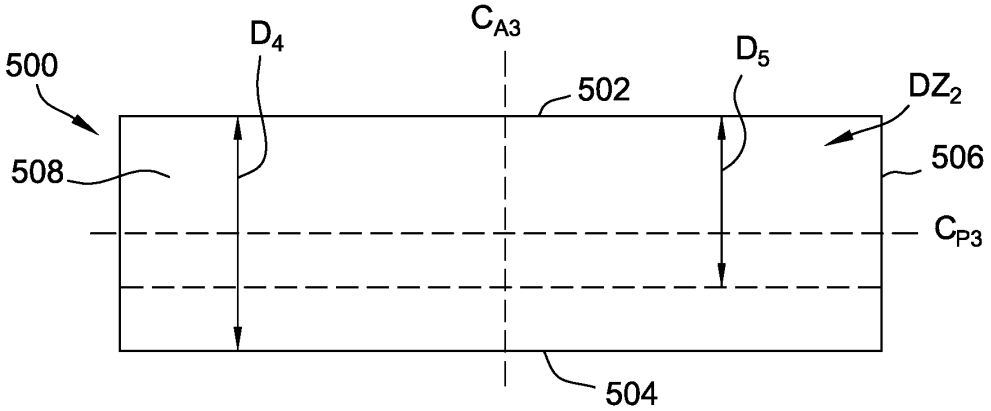

500
D_4
C_{A3}
D_5
502
DZ_2
508
506
C_{P3}
504

FIG. 8

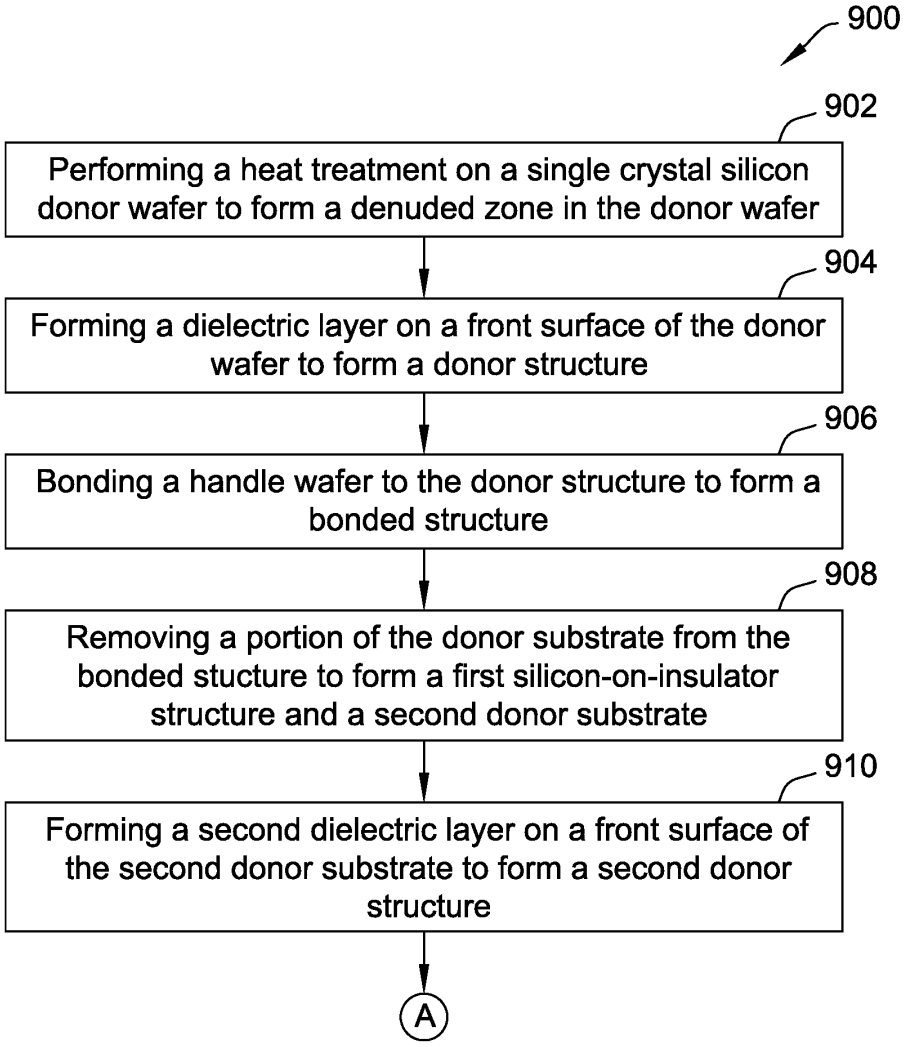

900
902
Performing a heat treatment on a single crystal silicon donor wafer to form a denuded zone in the donor wafer
904
Forming a dielectric layer on a front surface of the donor wafer to form a donor structure
906
Bonding a handle wafer to the donor structure to form a bonded structure
908
Removing a portion of the donor substrate from the bonded stucture to form a first silicon-on-insulator structure and a second donor substrate
910
Forming a second dielectric layer on a front surface of the second donor substrate to form a second donor structure
A

FIG. 9A

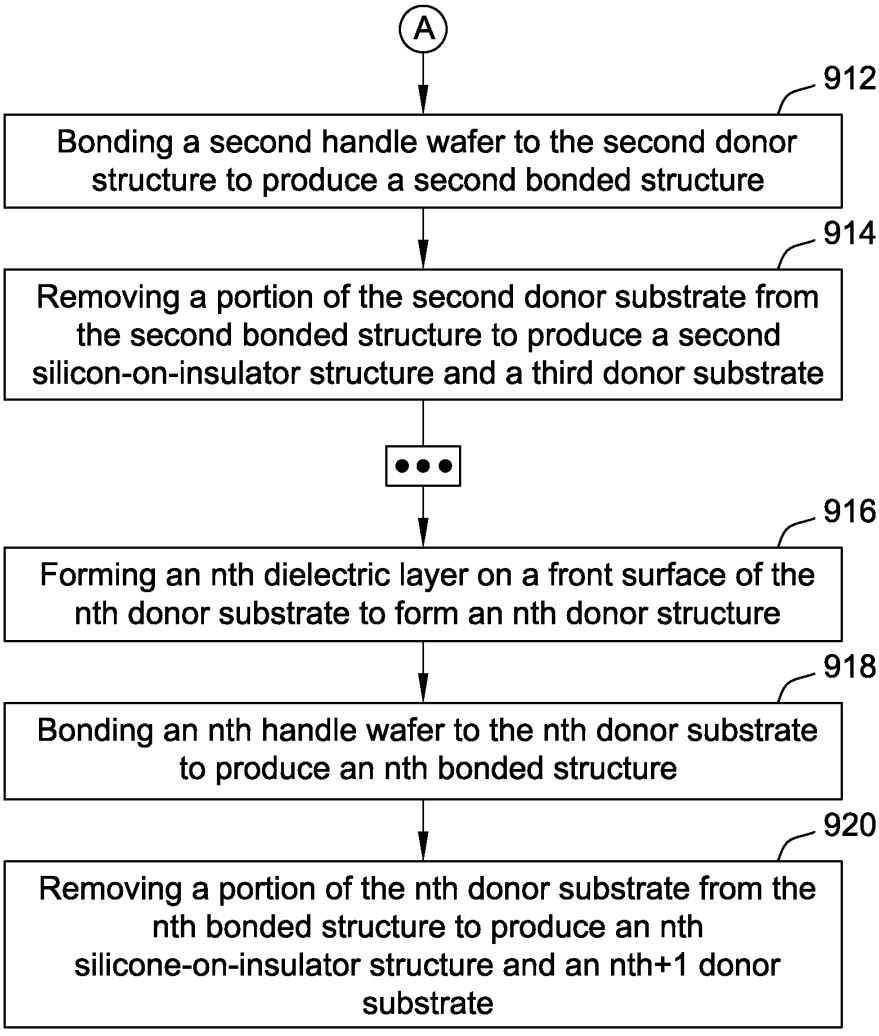

A
912
Bonding a second handle wafer to the second donor structure to produce a second bonded structure
914
Removing a portion of the second donor substrate from the second bonded structure to produce a second silicon-on-insulator structure and a third donor substrate
916
Forming an nth dielectric layer on a front surface of the nth donor substrate to form an nth donor structure
918
Bonding an nth handle wafer to the nth donor substrate to produce an nth bonded structure
920
Removing a portion of the nth donor substrate from the nth bonded structure to produce an nth silicone-on-insulator structure and an nth+1 donor substrate

FIG. 9B

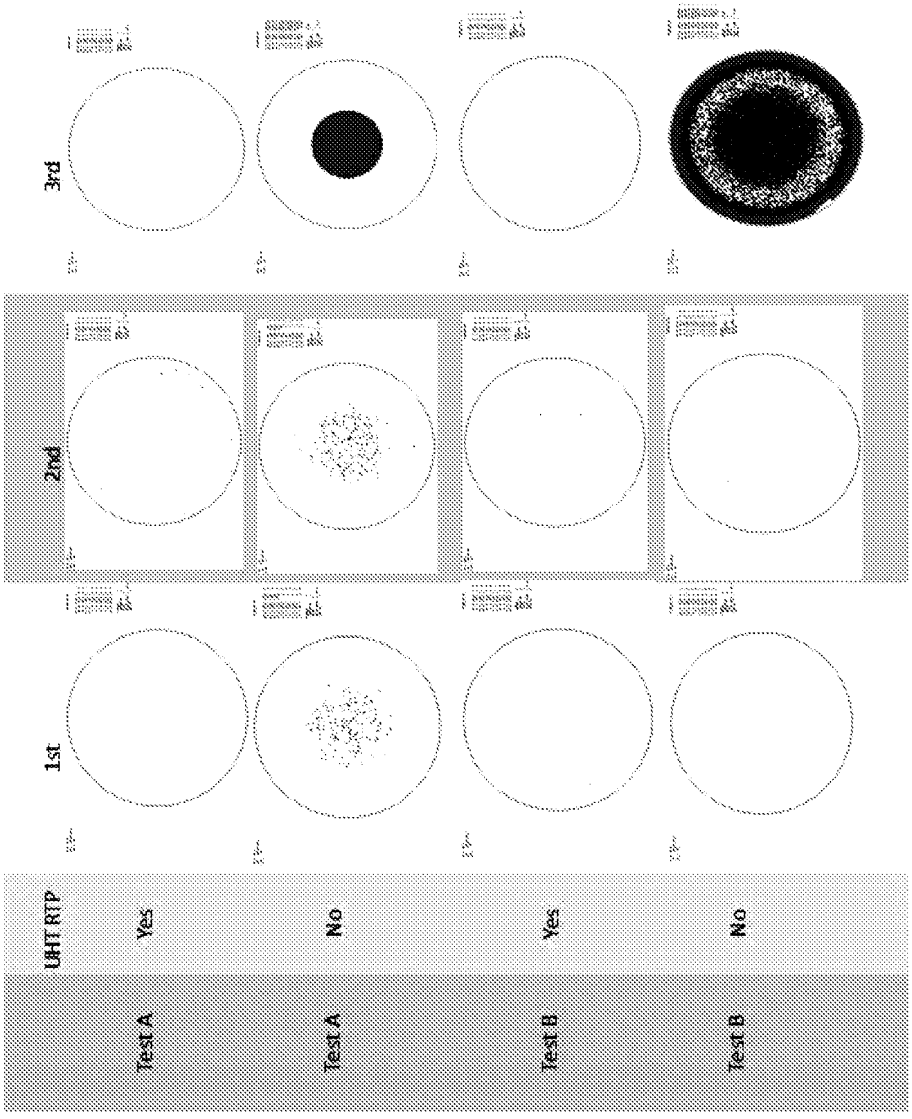


FIG. 10

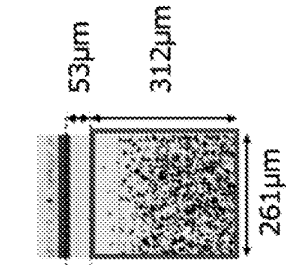


FIG. 11B

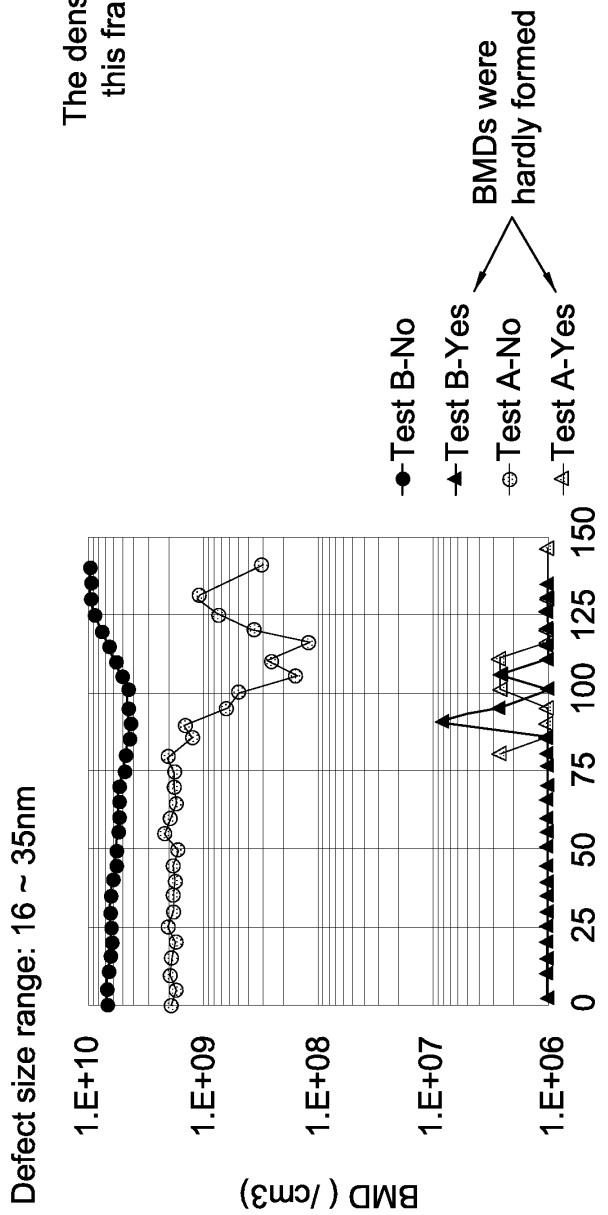


FIG. 11A

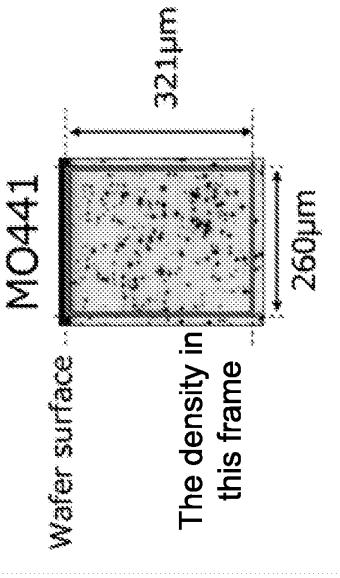


FIG. 12B

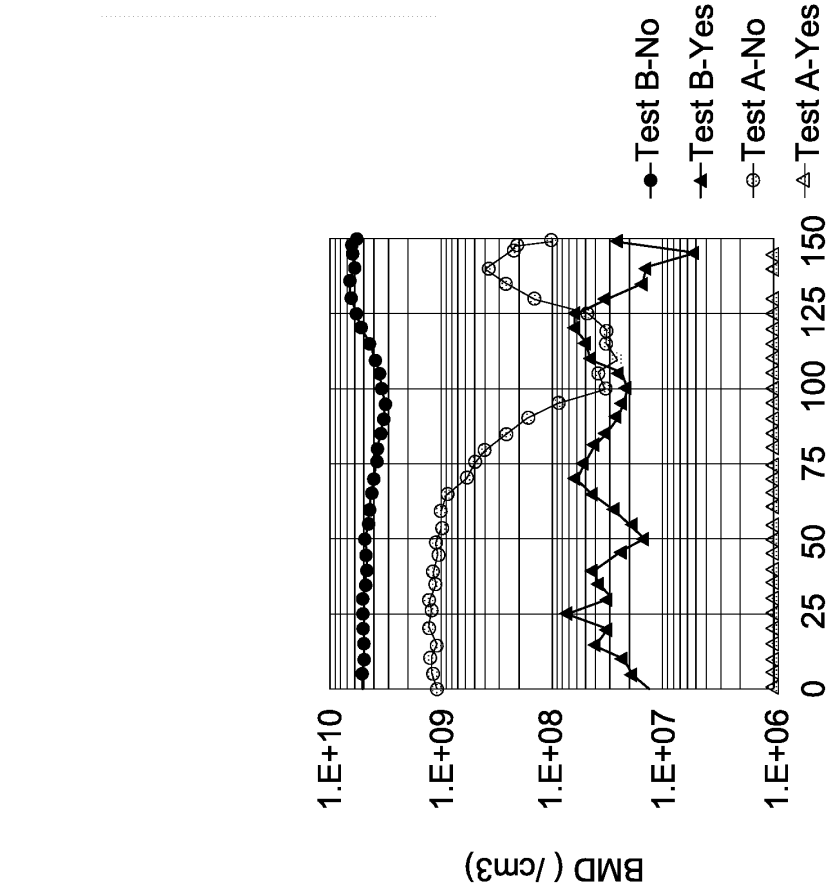


FIG. 12A

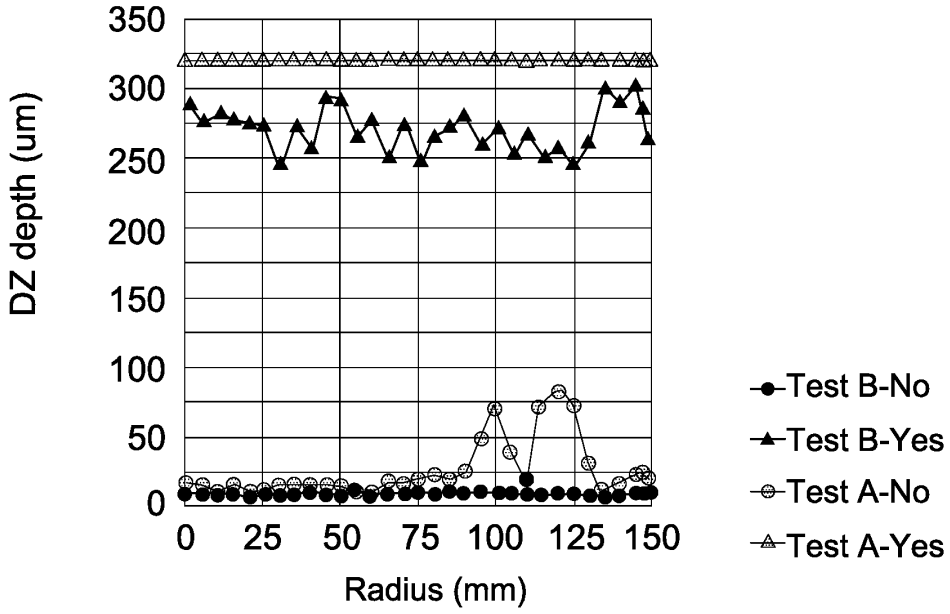

DZ depth (um)
350
300
250
200
150
100
50
0
0
25
50
75
100
125
150
Radius (mm)
Test B-No
Test B-Yes
Test A-No
Test A-Yes

FIG. 12C

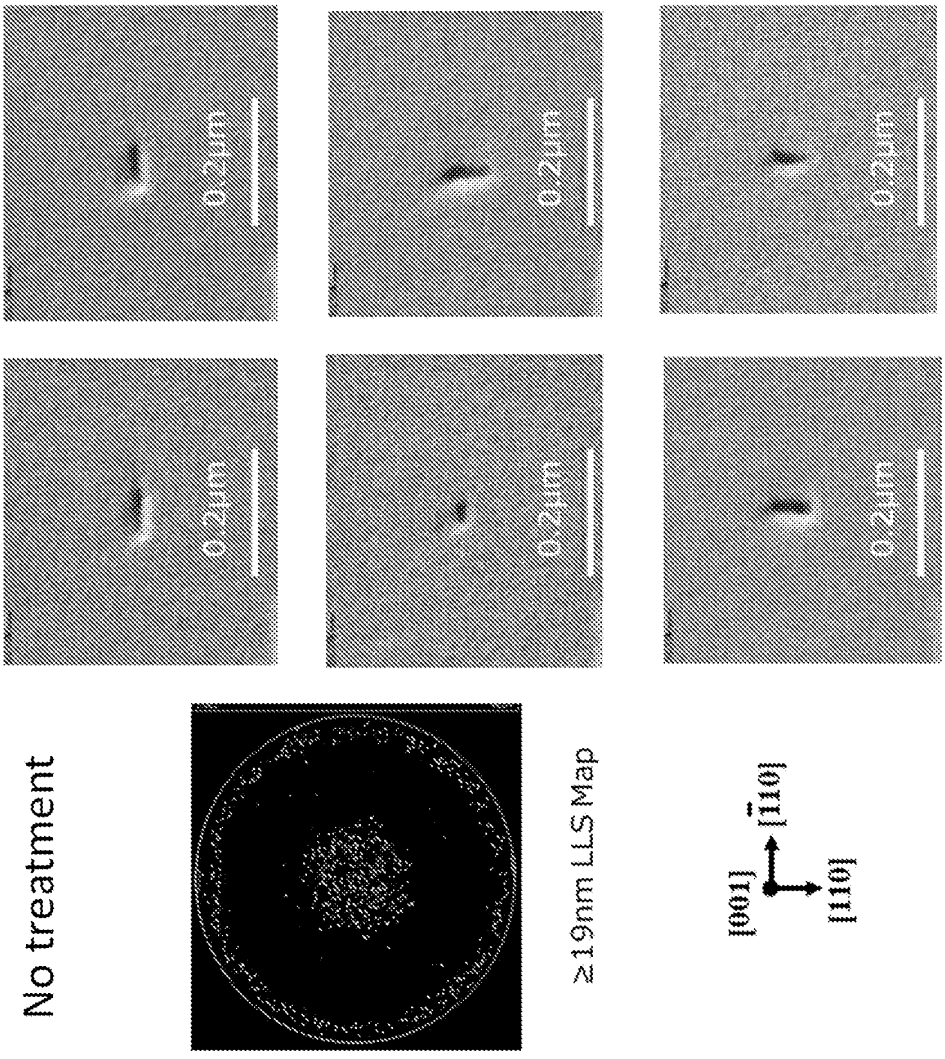

0.2μm
0.2μm
0.2μm
0.2μm
0.2μm
0.2μm
No treatment
≥19nm LLS Map
[001]
[$\bar{1}$10]
[110]

FIG. 13

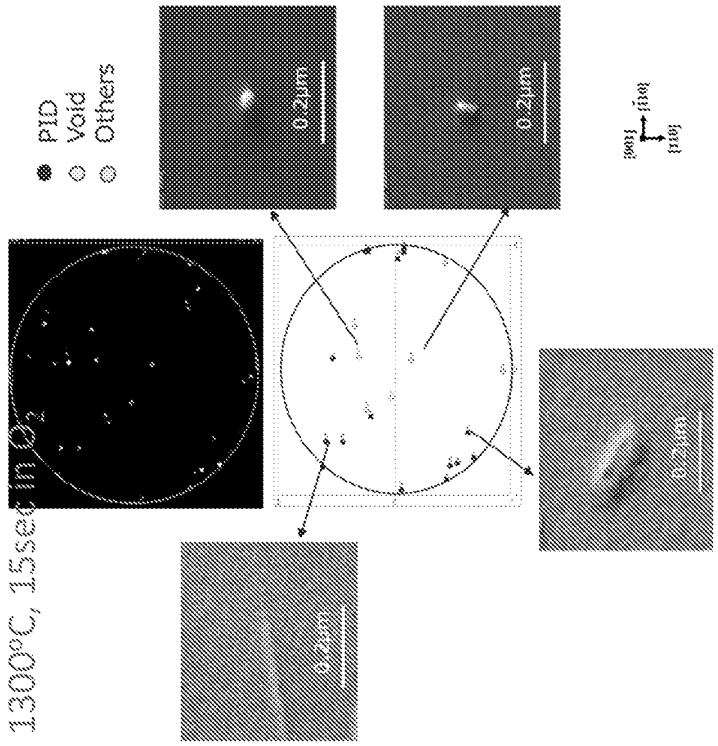

PID
Void
Others
1300°C, 15sec in O_2
0.2μm
0.2μm
0.2μm
0.2μm
[001]
[010]
[100]

FIG. 15

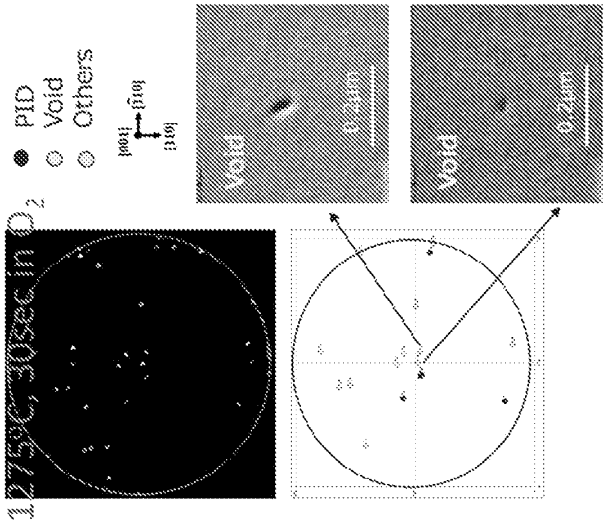

PID
Void
Others
1275°C, 30sec in O_2
Void
Void
0.2μm
0.2μm
[001]
[010]
[100]

FIG. 14

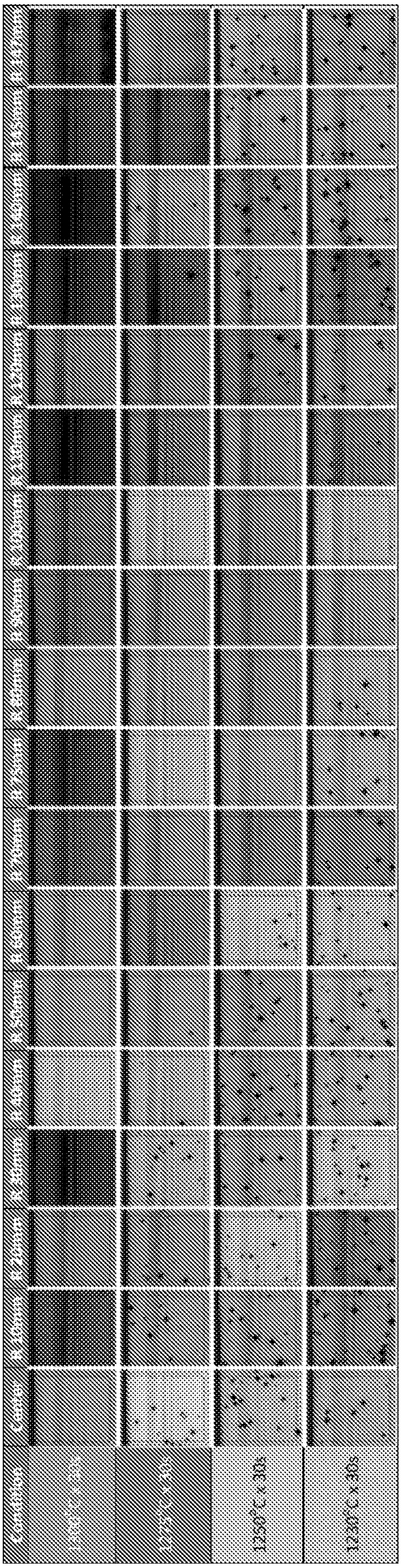


FIG. 16

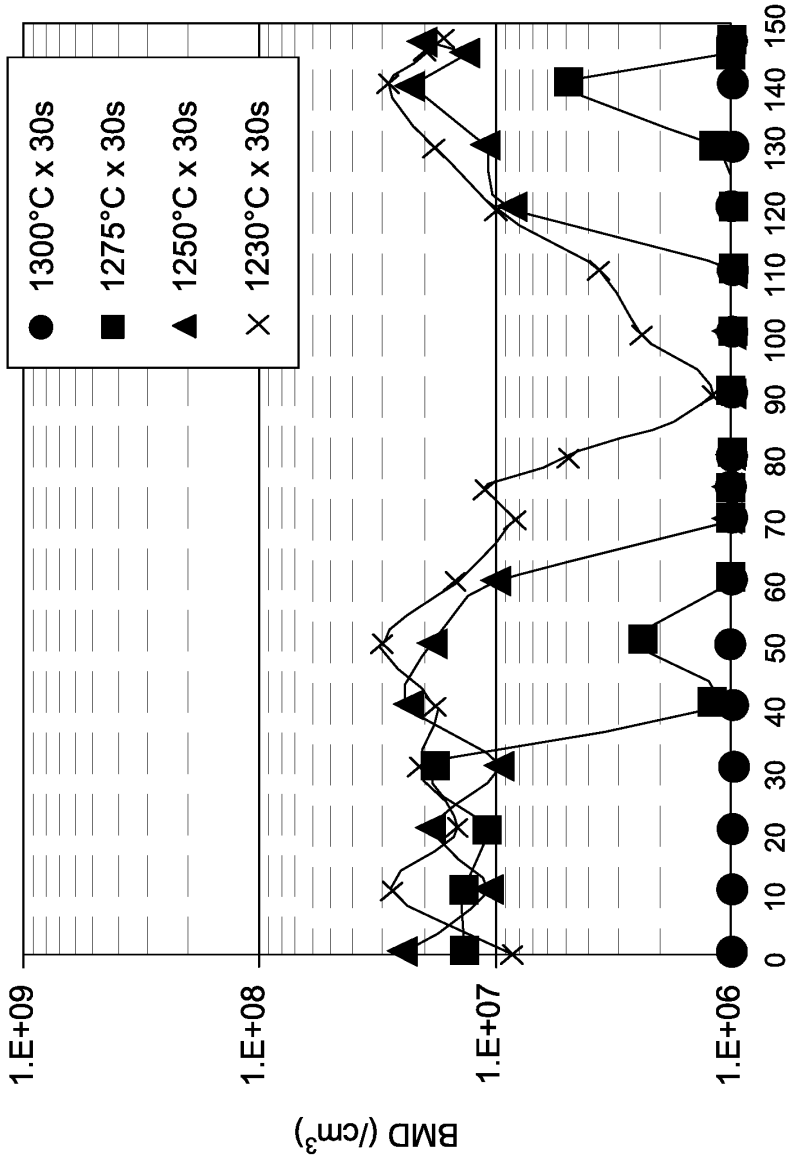

1300°C x 30s
1275°C x 30s
1250°C x 30s
1230°C x 30s
BMD (/cm³)
1.E+09
1.E+08
1.E+07
1.E+06
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150

FIG. 17