Fig. 1

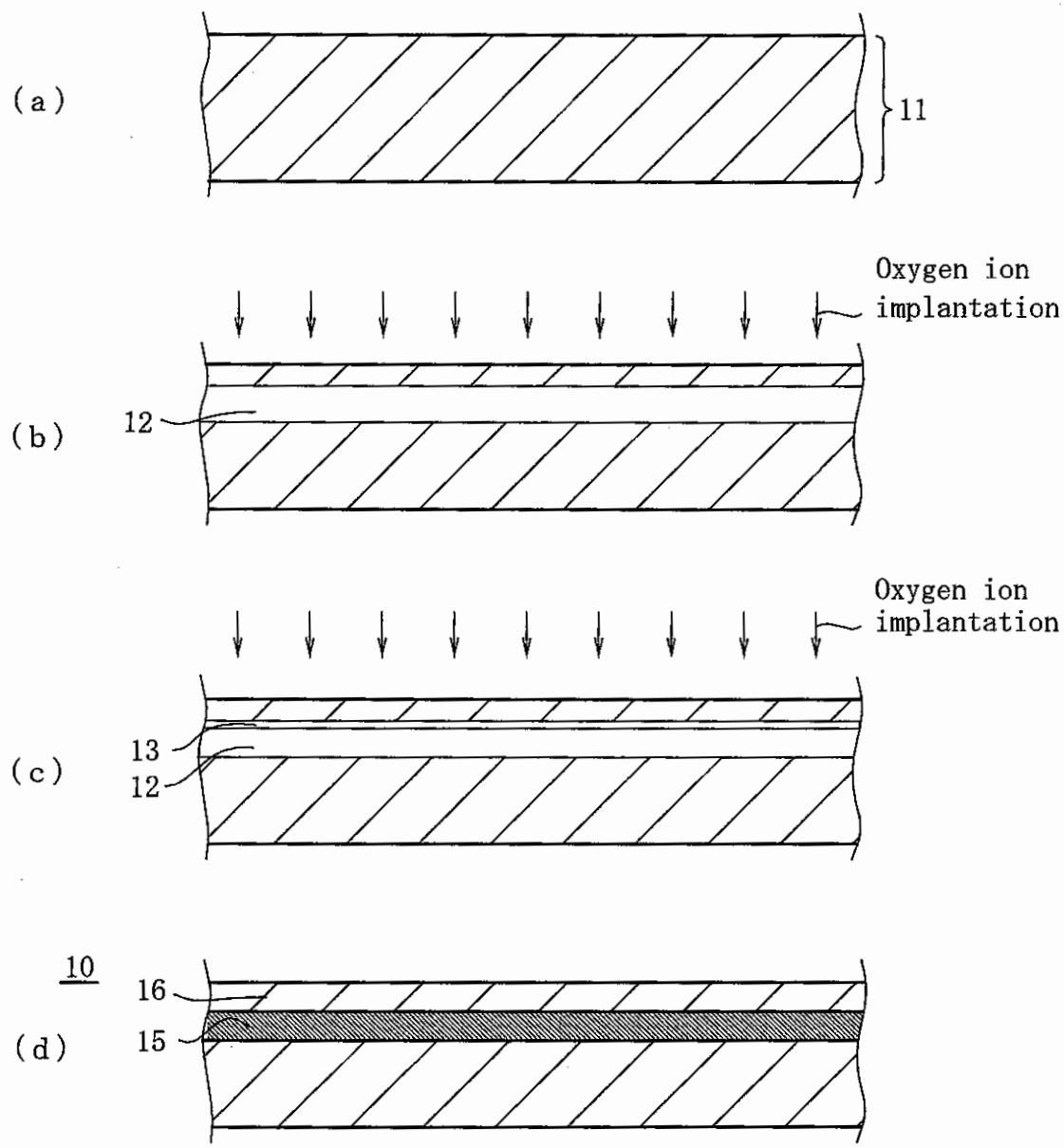

(a)
11
Oxygen ion implantation
(b)
12
Oxygen ion implantation
(c)
13
12
10
(d)
16
15

Fig. 2

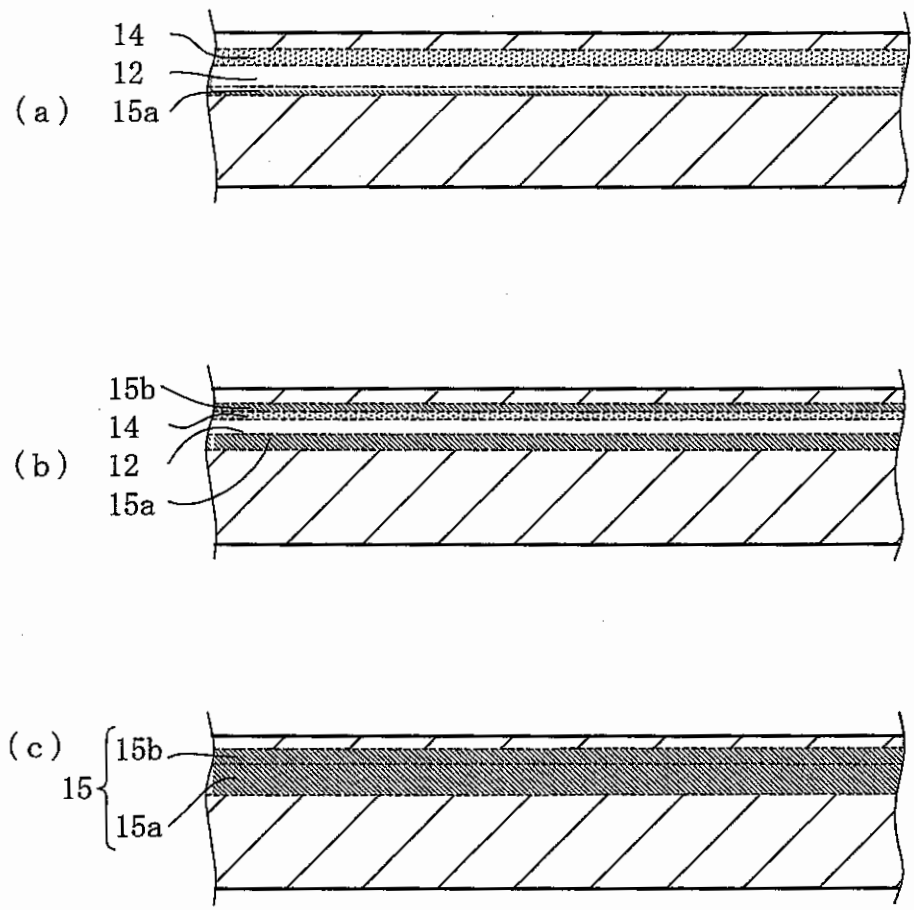
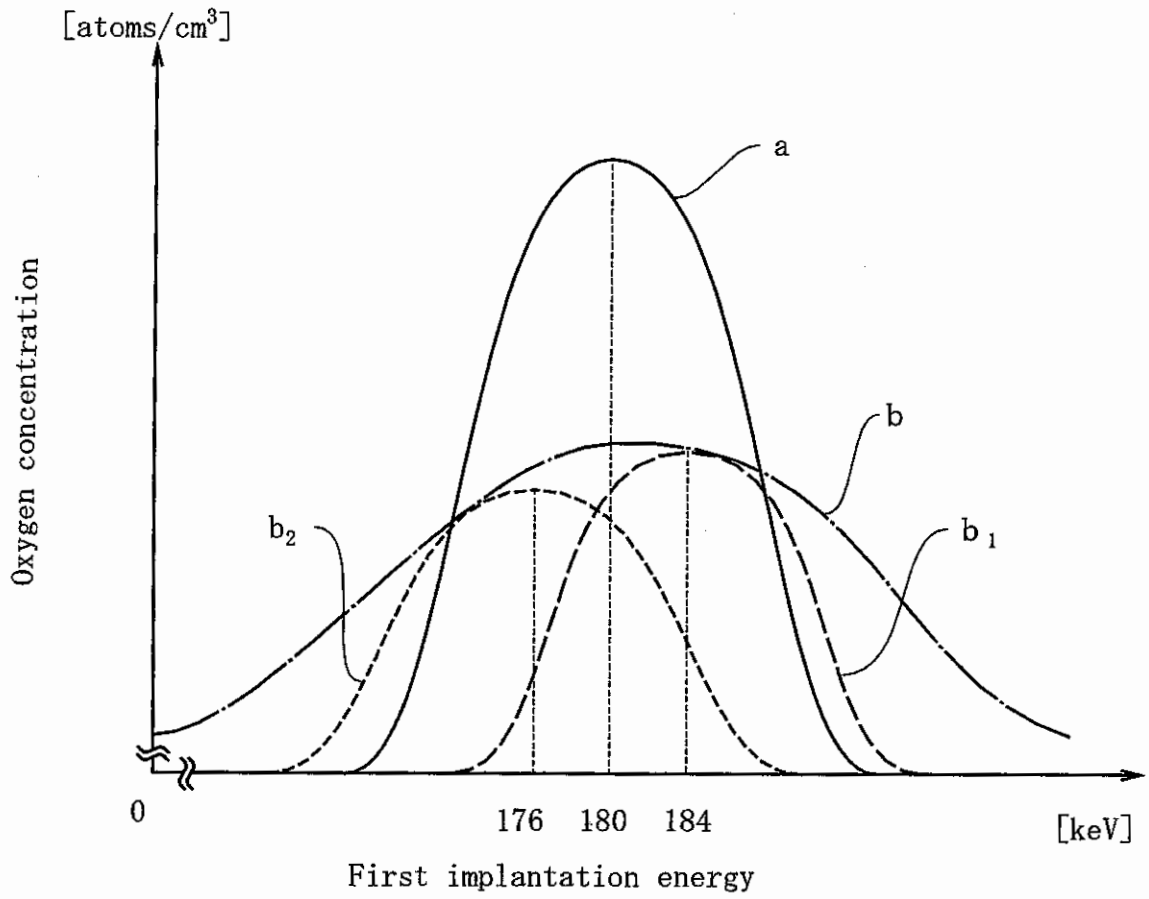


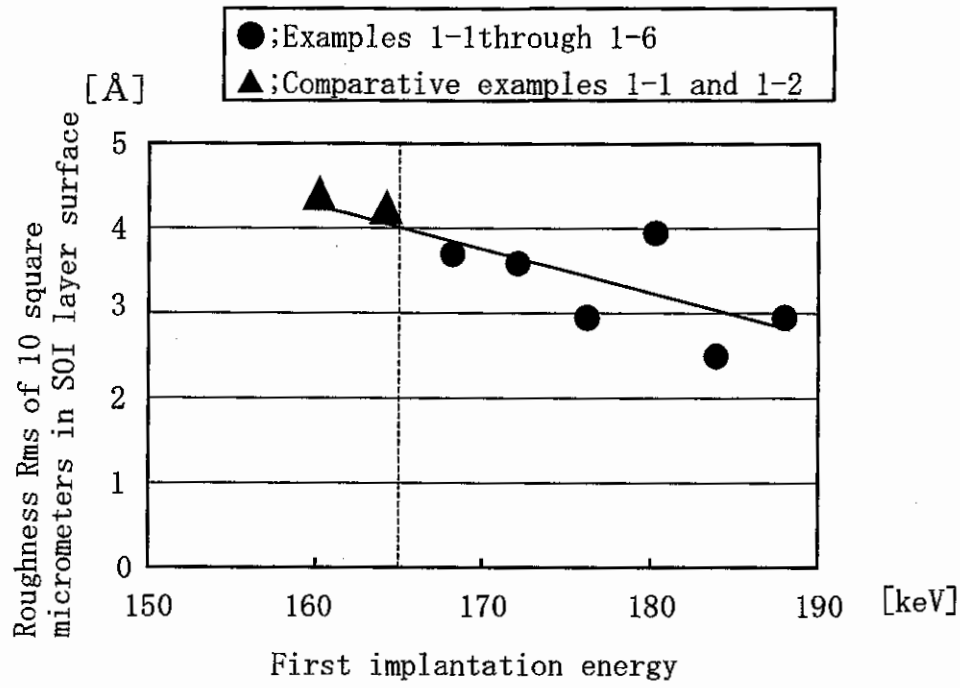
Fig. 3



a : Ion implantation by single implatation step
b_1 : First ion implantation by double implantation steps
b_2 : Second ion implantation by double implantation steps
b : Ion implantation by double implantation steps

Fig. 4

(a)


●;Examples 1-1through 1-6
▲;Comparative examples 1-1 and 1-2
[Å]
Roughness Rms of 10 square micrometers in SOI layer surface
5
4
3
2
1
0
150
160
170
180
190
[keV]
First implantation energy

(b)

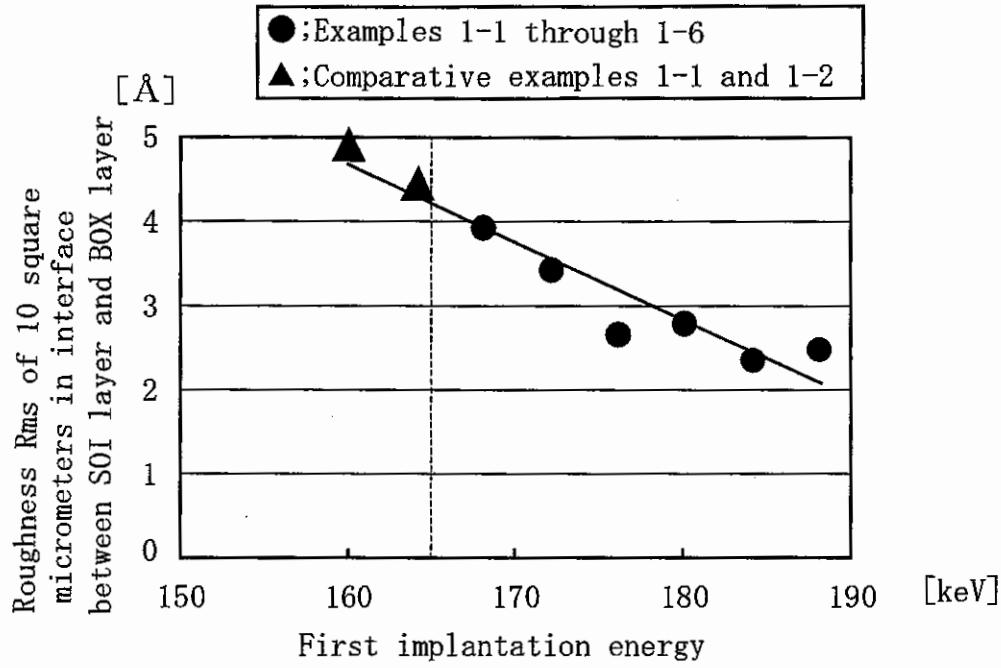
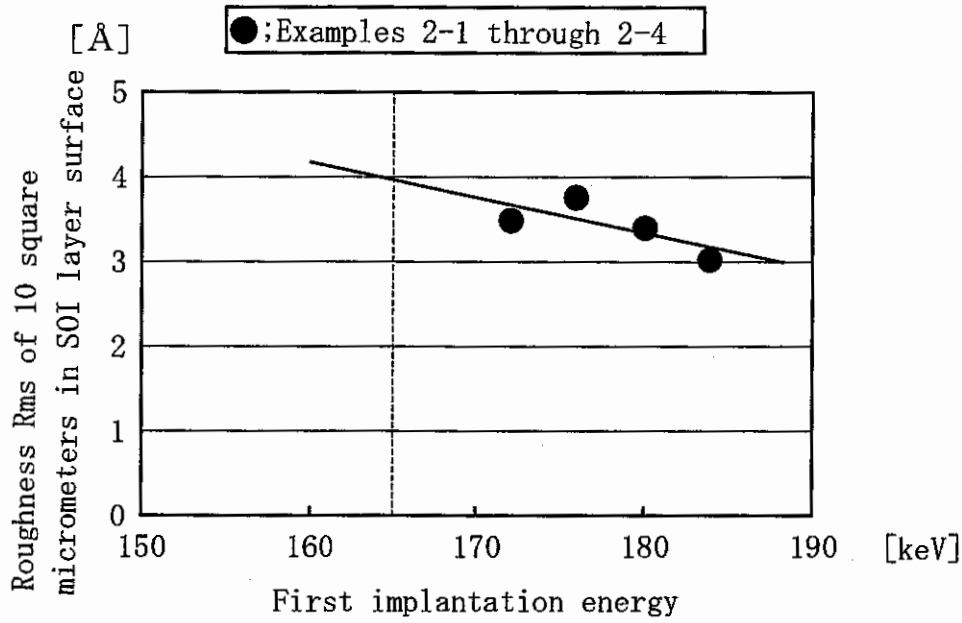

●;Examples 1-1 through 1-6
▲;Comparative examples 1-1 and 1-2
[Å]
Roughness Rms of 10 square micrometers in interface between SOI layer and BOX layer
5
4
3
2
1
0
150
160
170
180
190
[keV]
First implantation energy

Fig. 5

(a)


[Å]
●;Examples 2-1 through 2-4
Roughness Rms of 10 square micrometers in SOI layer surface
5
4
3
2
1
0
150
160
170
180
190
[keV]
First implantation energy

(b)

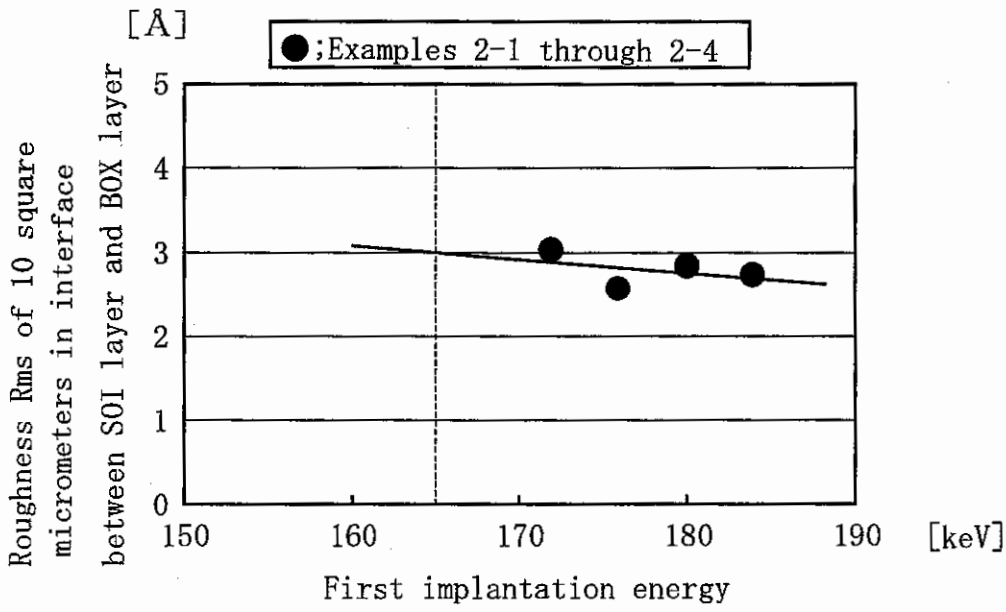
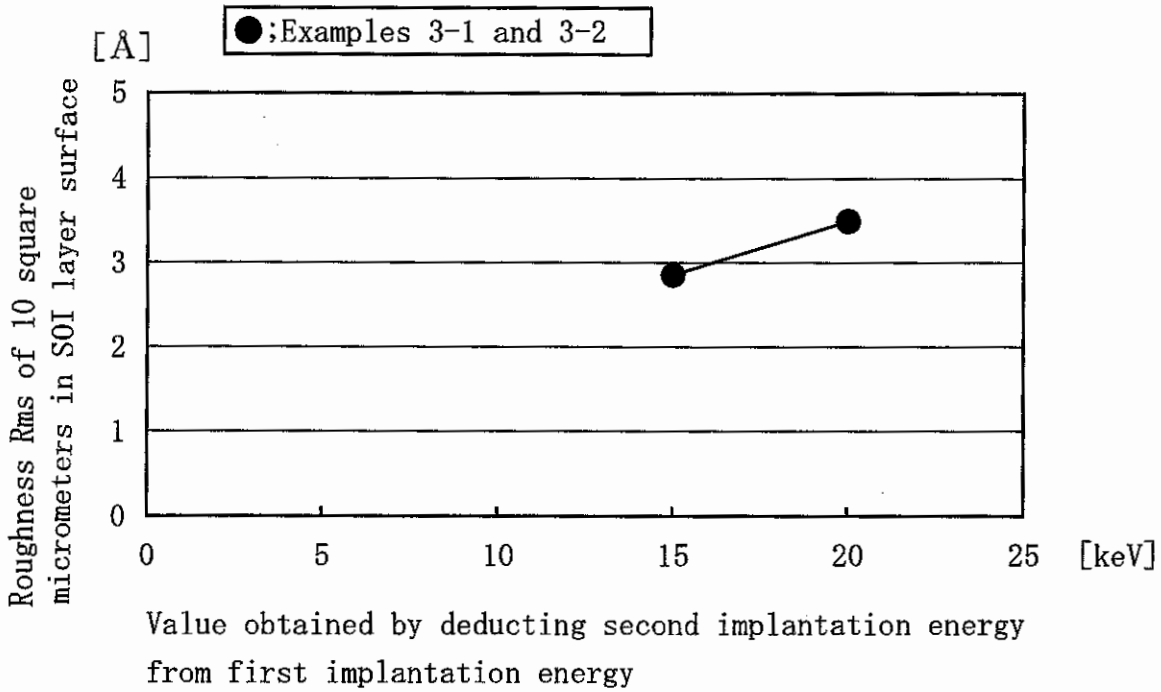

[Å]
●;Examples 2-1 through 2-4
Roughness Rms of 10 square micrometers in interface between SOI layer and BOX layer
5
4
3
2
1
0
150
160
170
180
190
[keV]
First implantation energy

Fig. 6

(a)


●;Examples 3-1 and 3-2
[Å]
Roughness Rms of 10 square micrometers in SOI layer surface
0
1
2
3
4
5
0
5
10
15
20
25
[keV]
Value obtained by deducting second implantation energy from first implantation energy

(b)

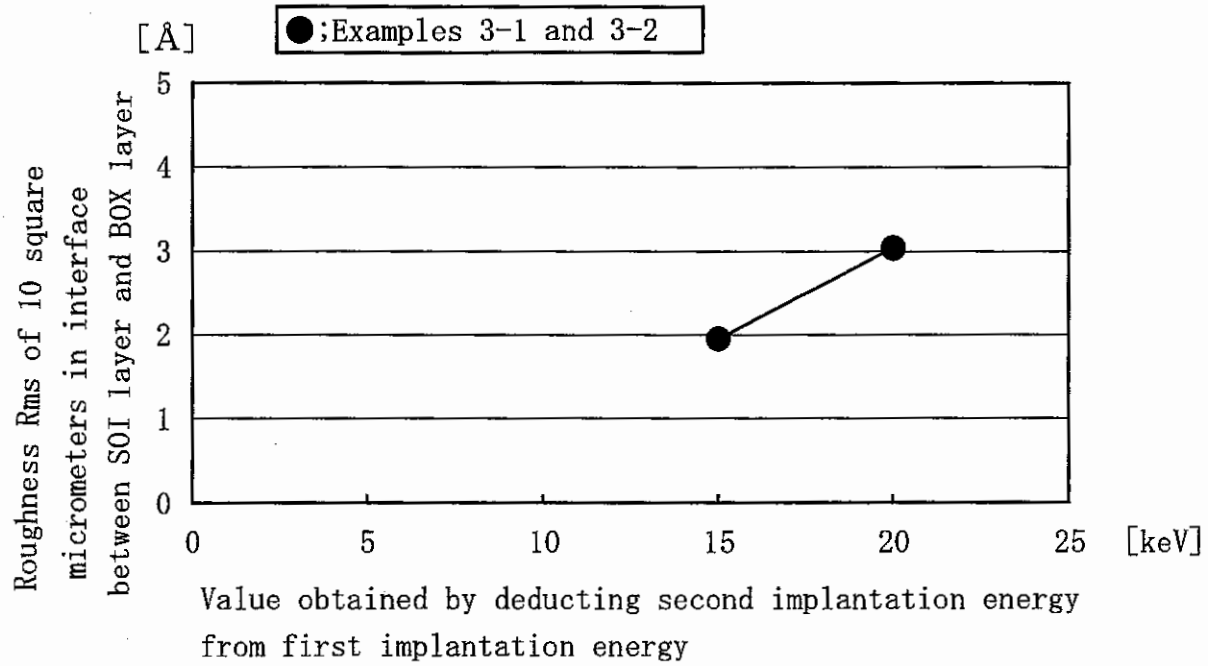
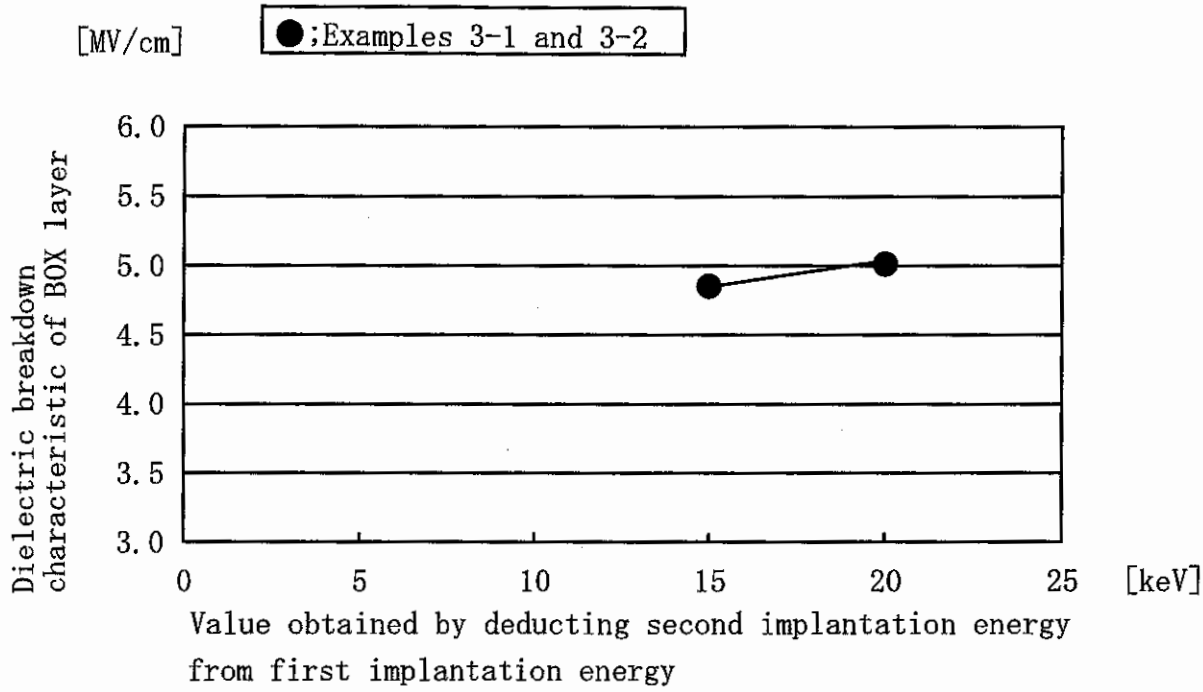

●;Examples 3-1 and 3-2
[Å]
Roughness Rms of 10 square micrometers in interface between SOI layer and BOX layer
0
1
2
3
4
5
0
5
10
15
20
25
[keV]
Value obtained by deducting second implantation energy from first implantation energy

Fig. 7


[MV/cm]
●;Examples 3-1 and 3-2
Dielectric breakdown characteristic of BOX layer
6.0
5.5
5.0
4.5
4.0
3.5
3.0
0
5
10
15
20
25
[keV]
Value obtained by deducting second implantation energy from first implantation energy