FIG. 1A

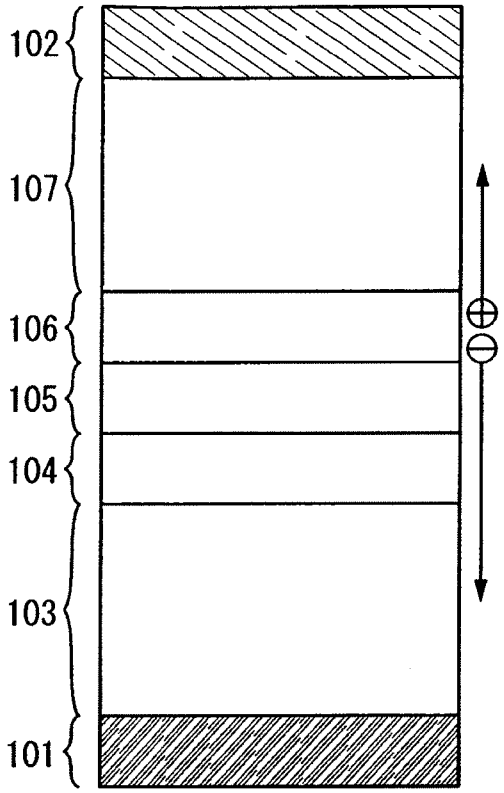

102
107
106
105
104
103
101

FIG. 1B

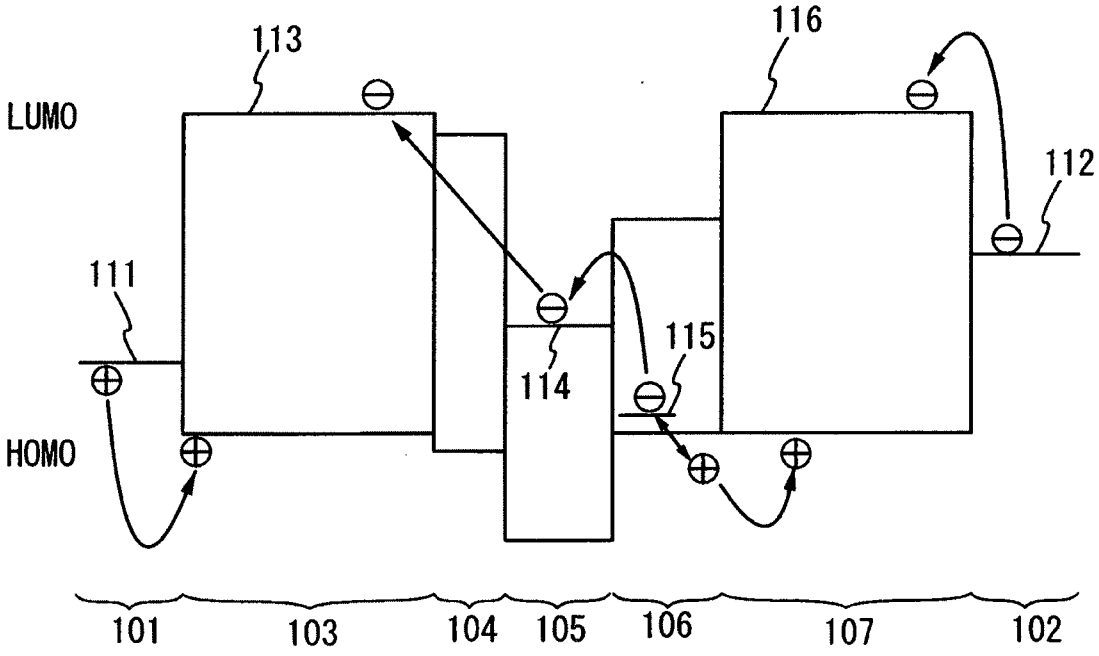

LUMO
HOMO
113
116
112
111
114
115
101
103
104
105
106
107
102

FIG. 2A

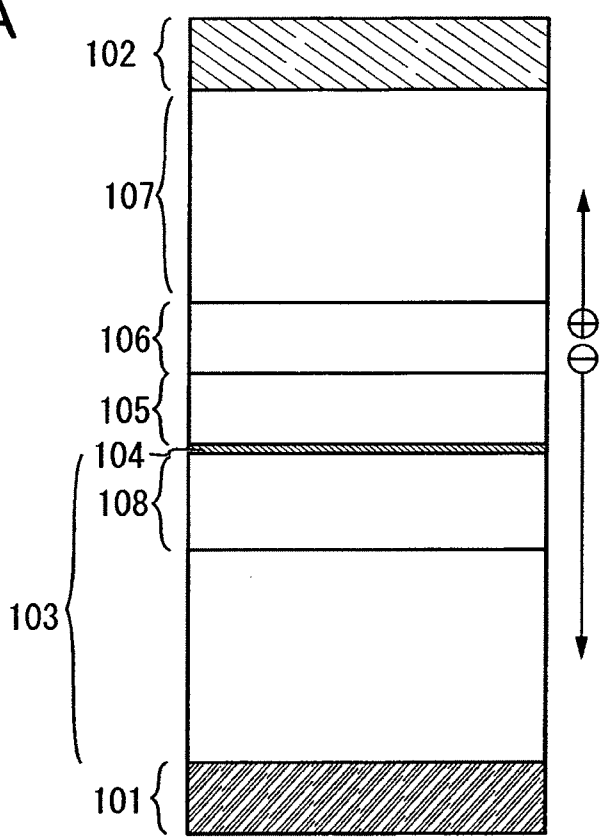

102
107
106
105
104
108
103
101

FIG. 2B

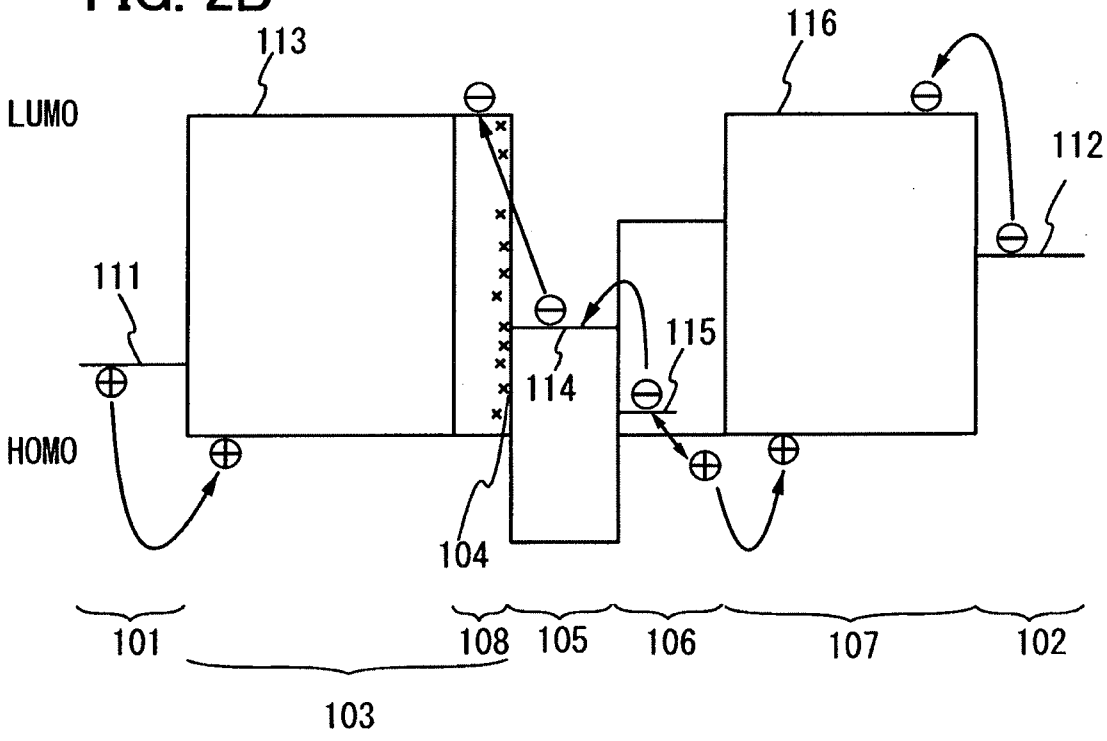

LUMO
HOMO
113
116
112
111
115
114
104
101
108
105
106
107
102
103

FIG. 3A

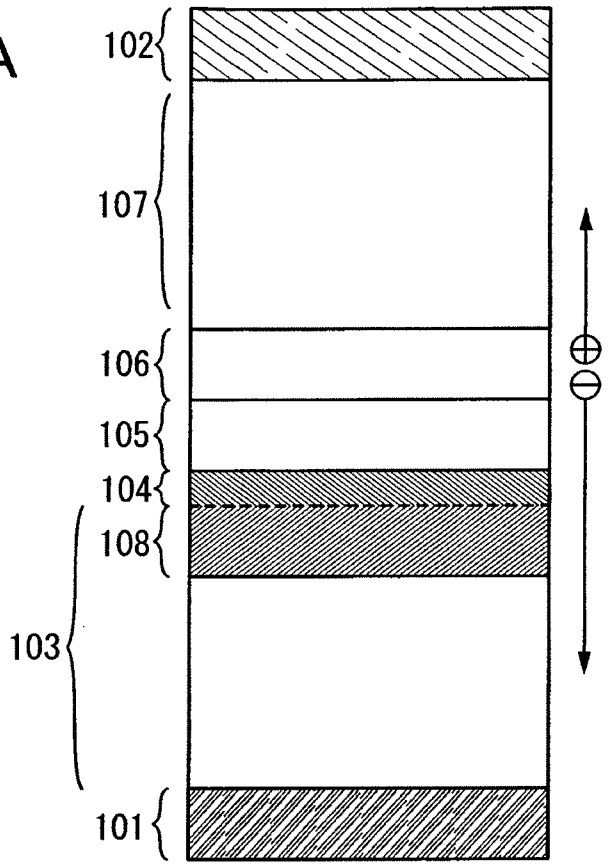

102
107
106
105
104
108
103
101

FIG. 3B

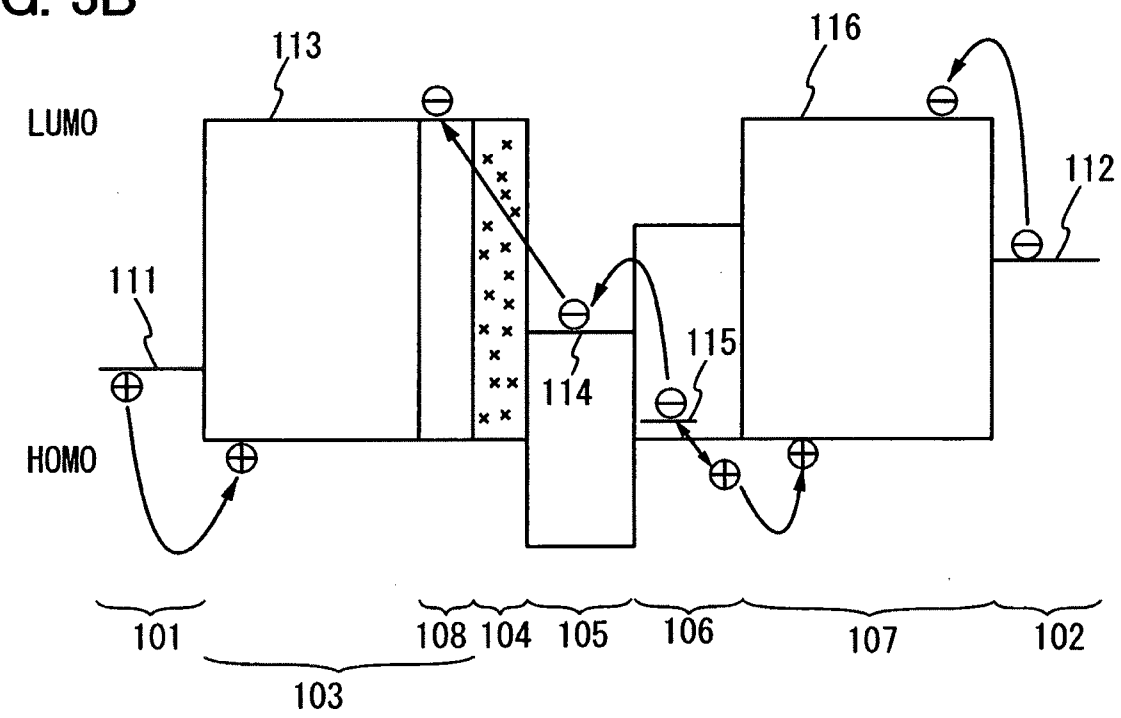

LUMO
HOMO
113
116
112
111
114
115
101
108
104
105
106
107
102
103

FIG. 4A

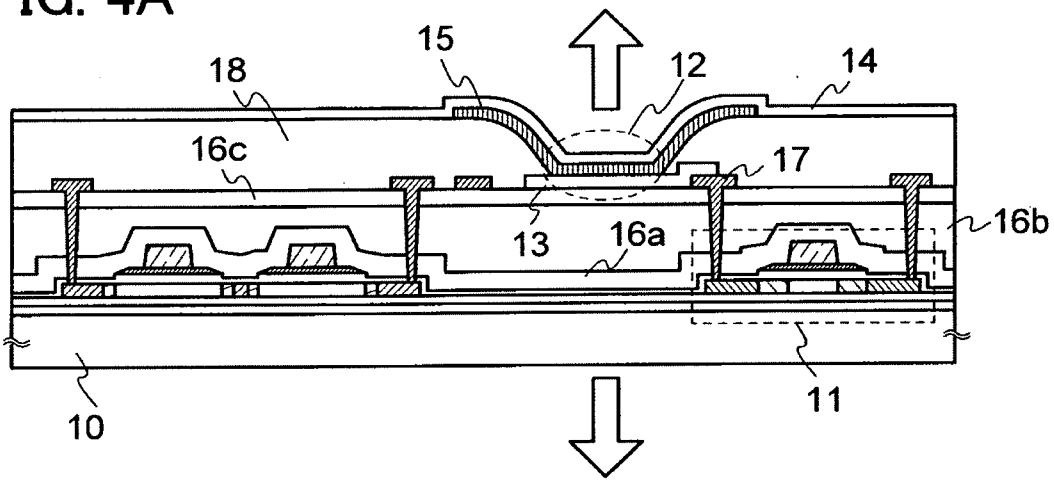


FIG. 4B

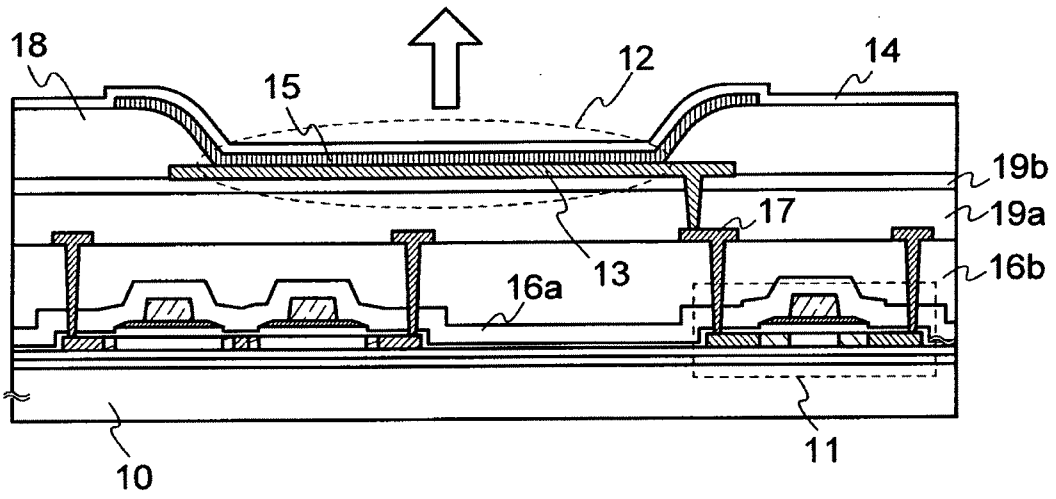


FIG. 4C

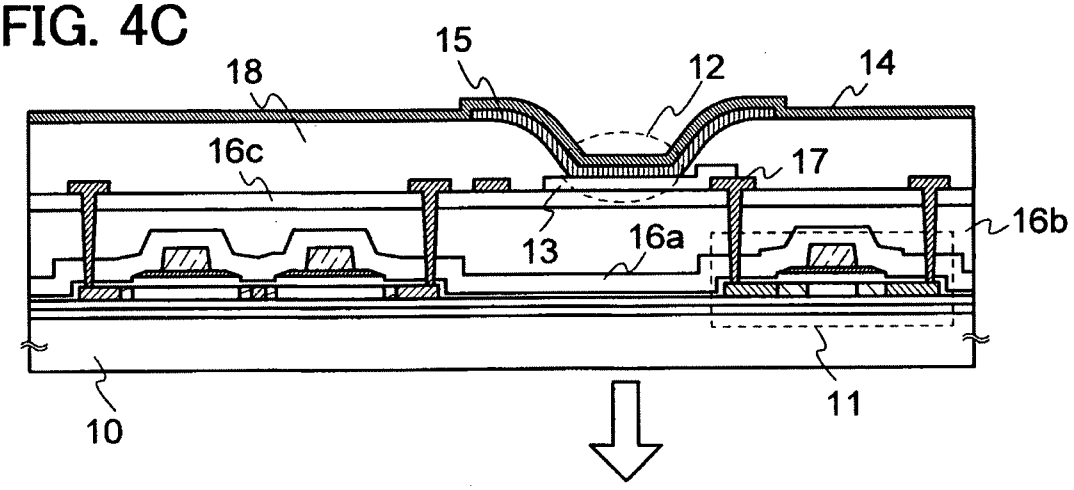


FIG. 5A

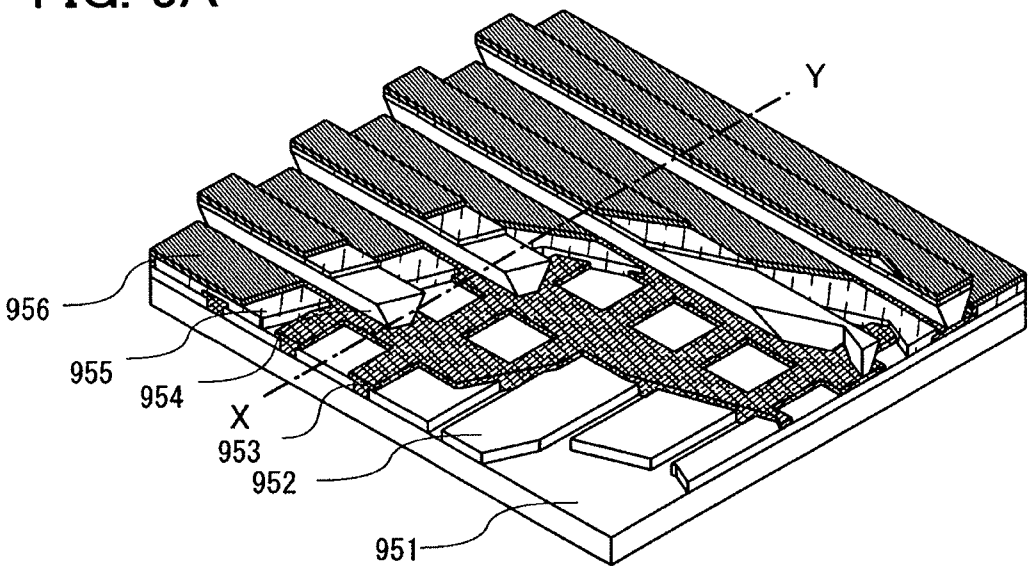

Y
956
955
954
X
953
952
951

FIG. 5B

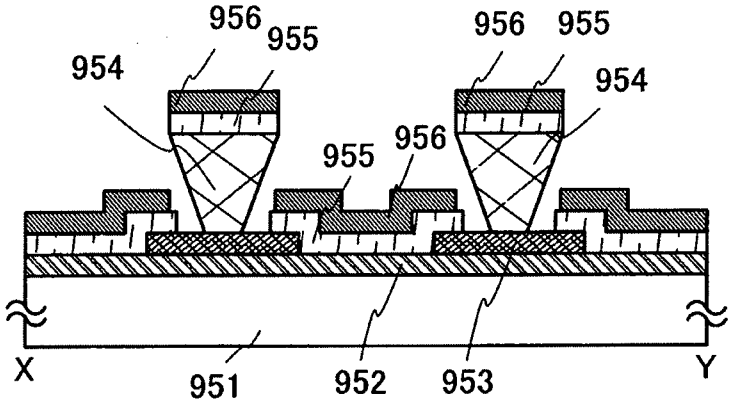

956
955
954
956
955
954
955
956
X
951
952
953
Y

FIG. 6A

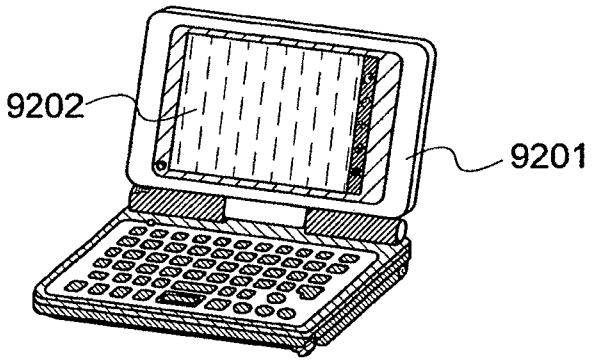


FIG. 6B

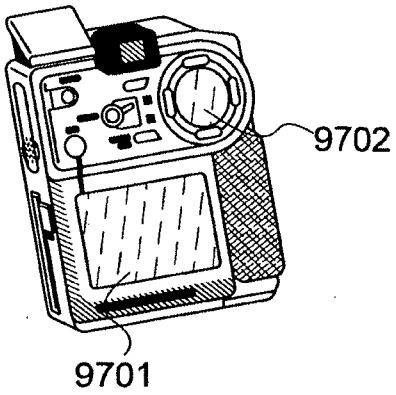


FIG. 6C

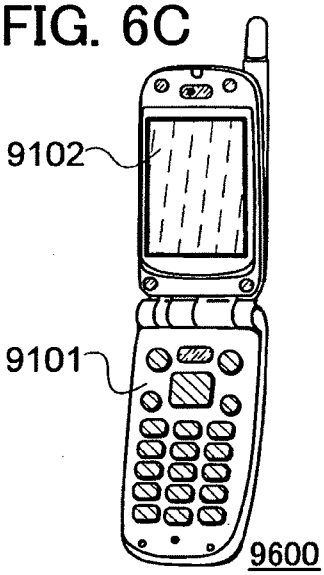


FIG. 6D

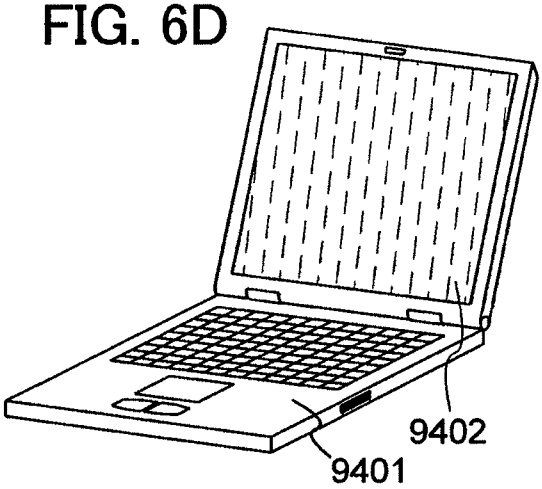


FIG. 6E

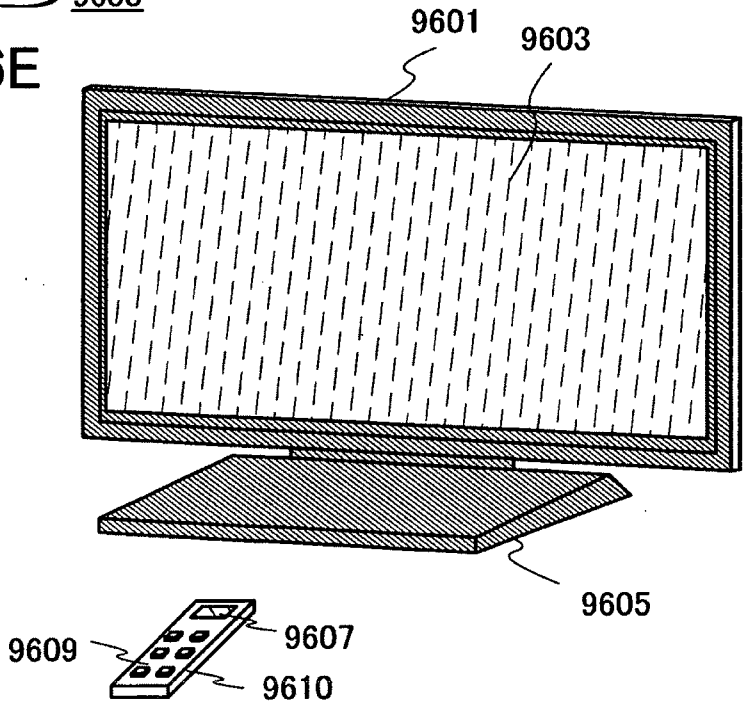


FIG. 7

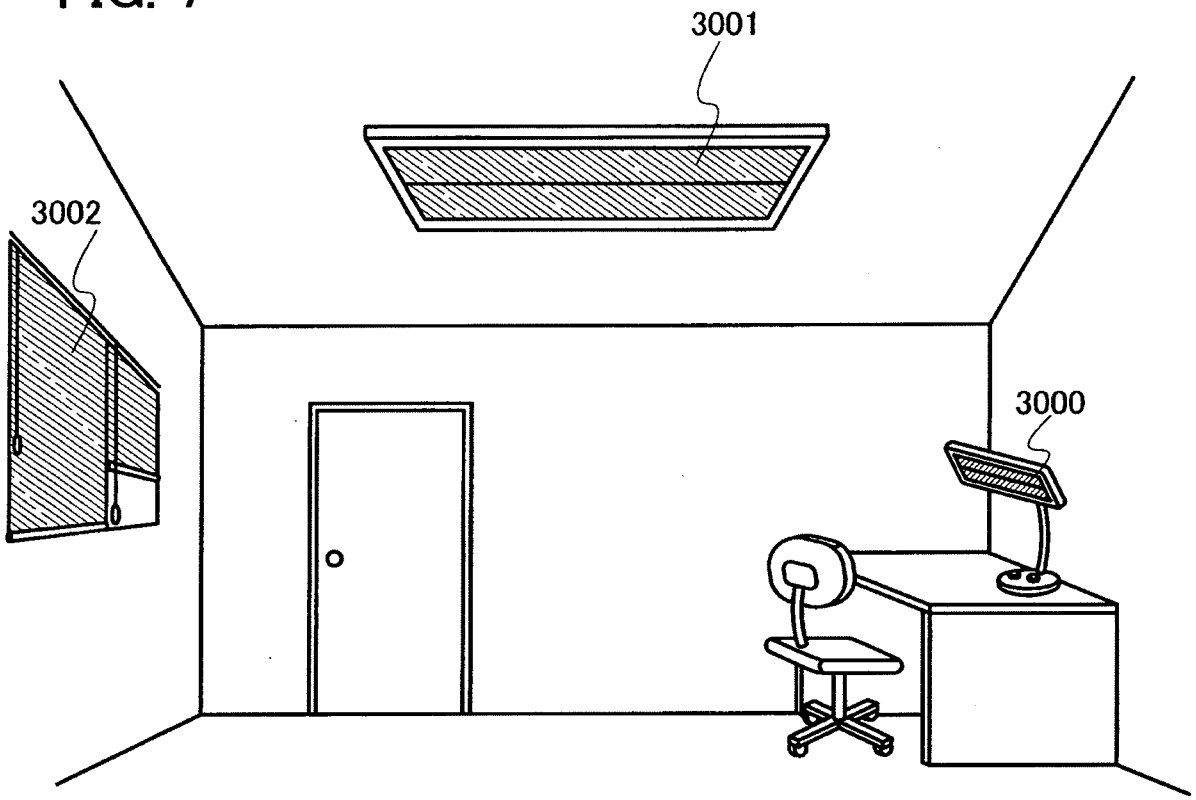


FIG. 8A

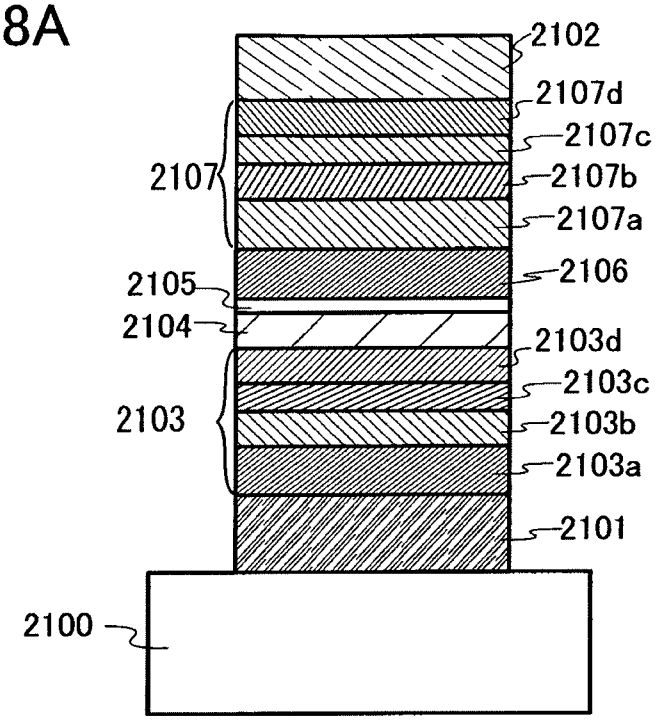

2102
2107d
2107c
2107
2107b
2107a
2106
2105
2104
2103d
2103c
2103
2103b
2103a
2101
2100

FIG. 8B

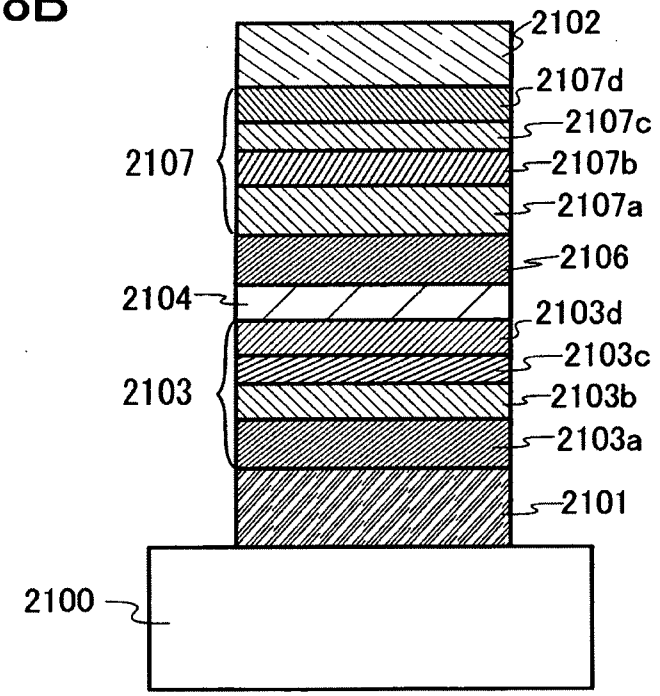

2102
2107d
2107c
2107
2107b
2107a
2106
2104
2103d
2103c
2103
2103b
2103a
2101
2100

FIG. 9

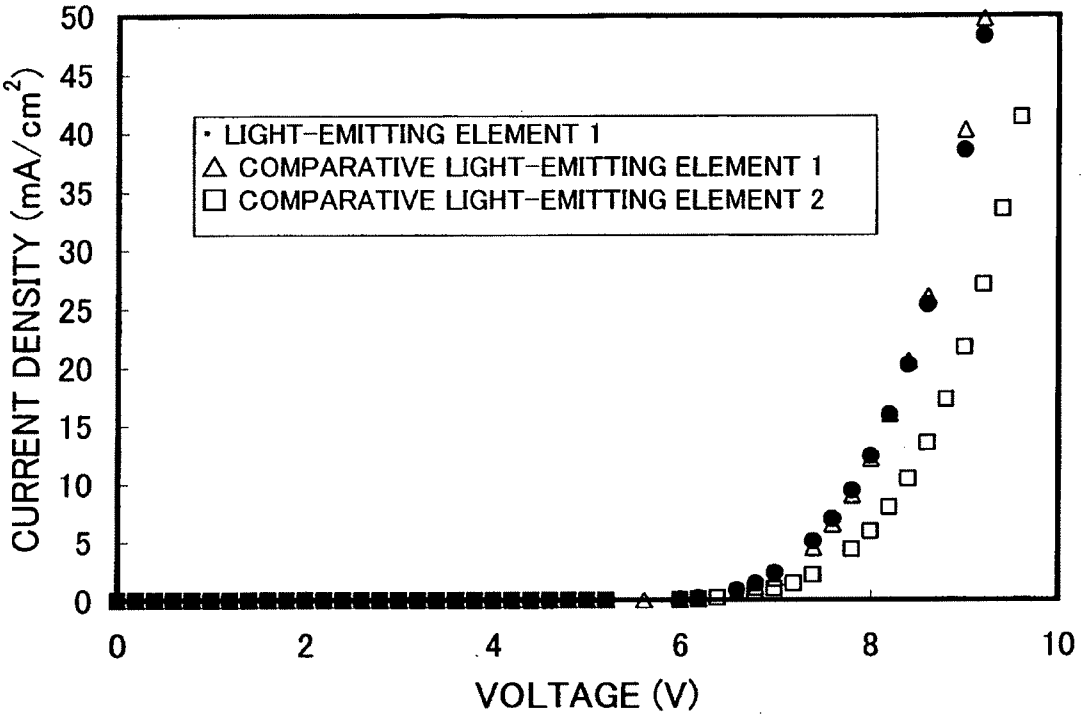

CURRENT DENSITY (mA/cm^2)
VOLTAGE (V)
· LIGHT-EMITTING ELEMENT 1
△ COMPARATIVE LIGHT-EMITTING ELEMENT 1
□ COMPARATIVE LIGHT-EMITTING ELEMENT 2
0
5
10
15
20
25
30
35
40
45
50
0
2
4
6
8
10

FIG. 10

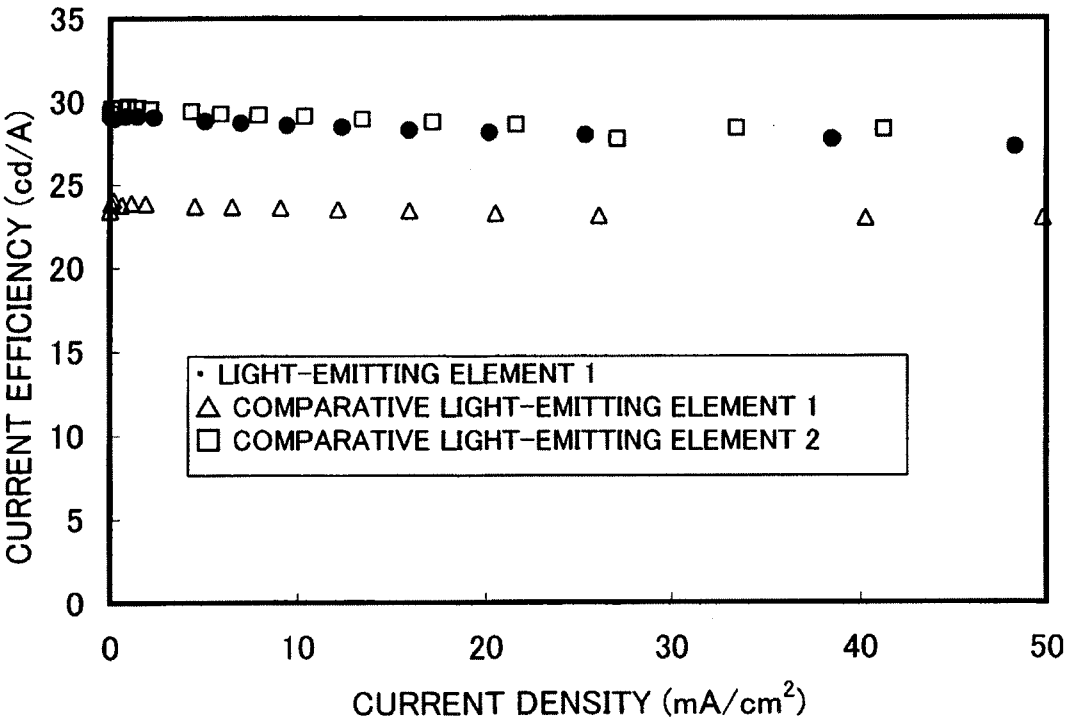

CURRENT EFFICIENCY (cd/A)
CURRENT DENSITY (mA/cm^2)
· LIGHT-EMITTING ELEMENT 1
△ COMPARATIVE LIGHT-EMITTING ELEMENT 1
□ COMPARATIVE LIGHT-EMITTING ELEMENT 2
0
5
10
15
20
25
30
35
0
10
20
30
40
50

FIG. 11

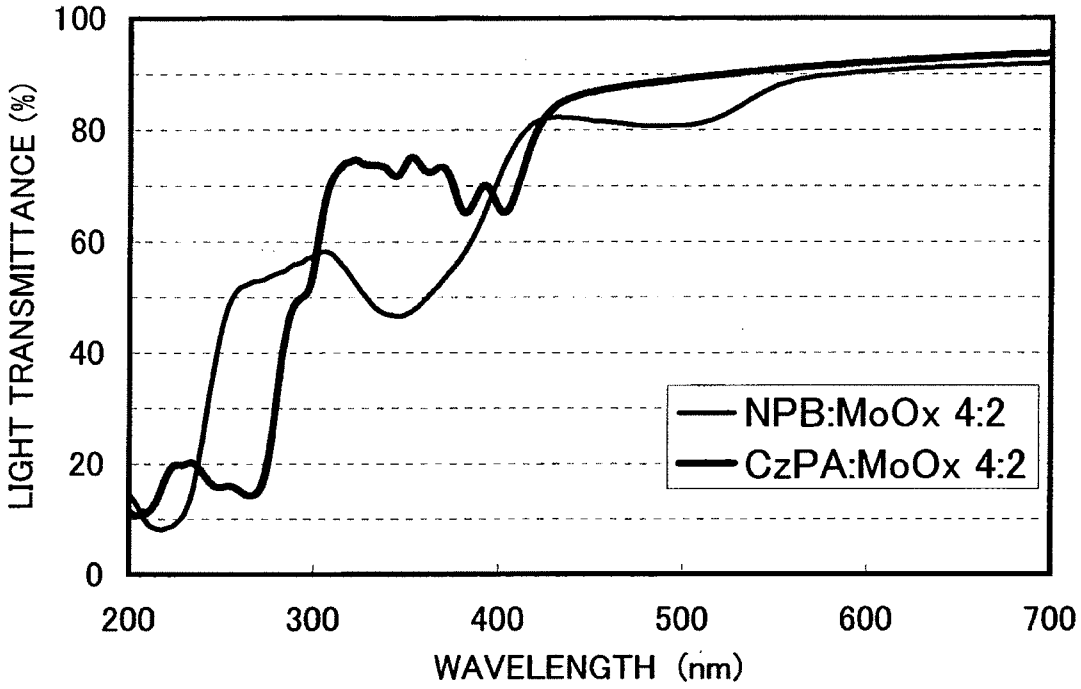

100
80
60
40
20
0
LIGHT TRANSMITTANCE (%)
200
300
400
500
600
700
WAVELENGTH (nm)
NPB:MoOx 4:2
CzPA:MoOx 4:2

FIG. 12A

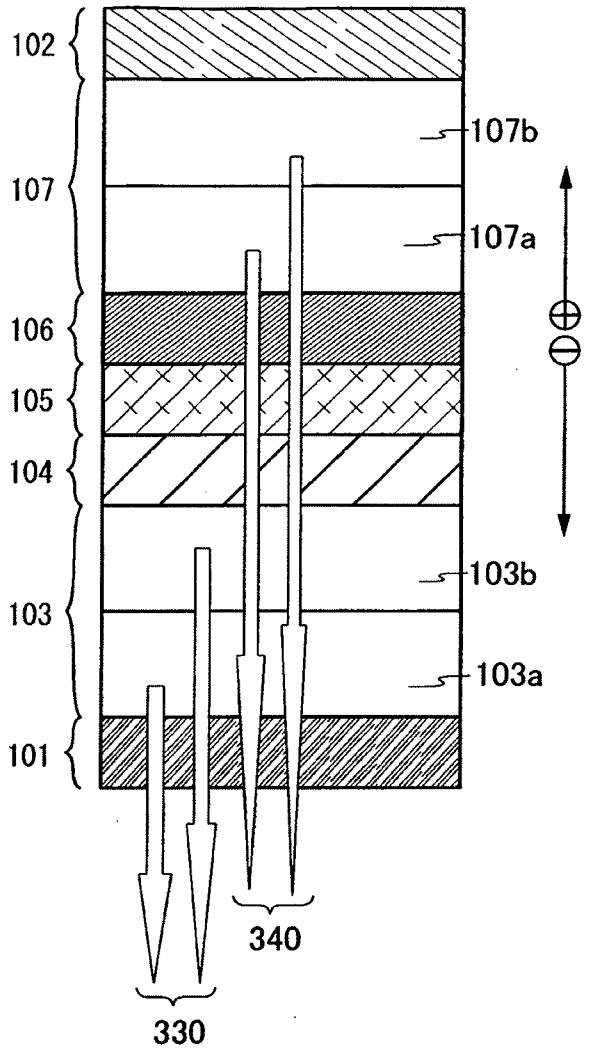


FIG. 12B

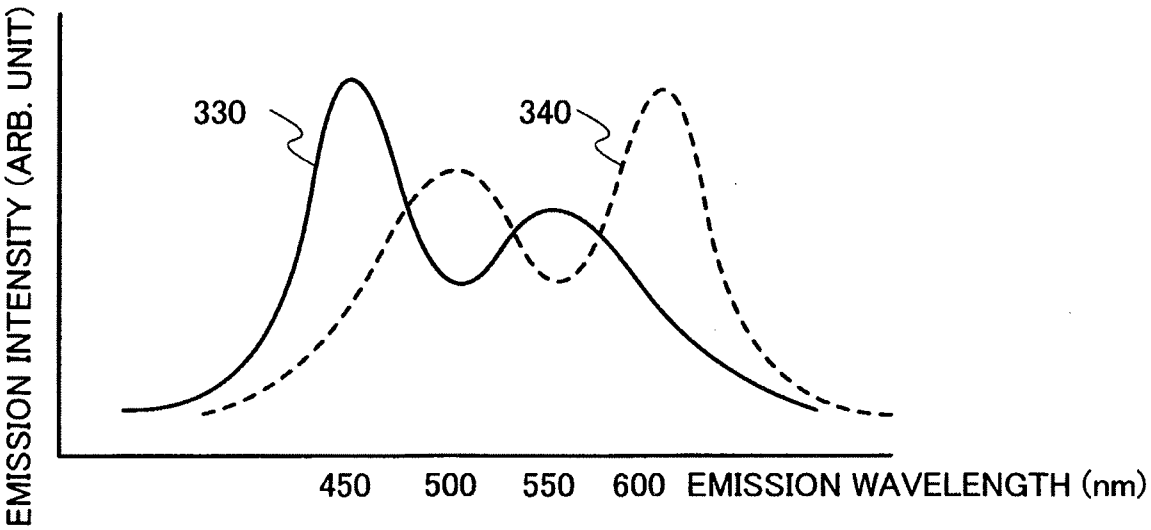


FIG. 13

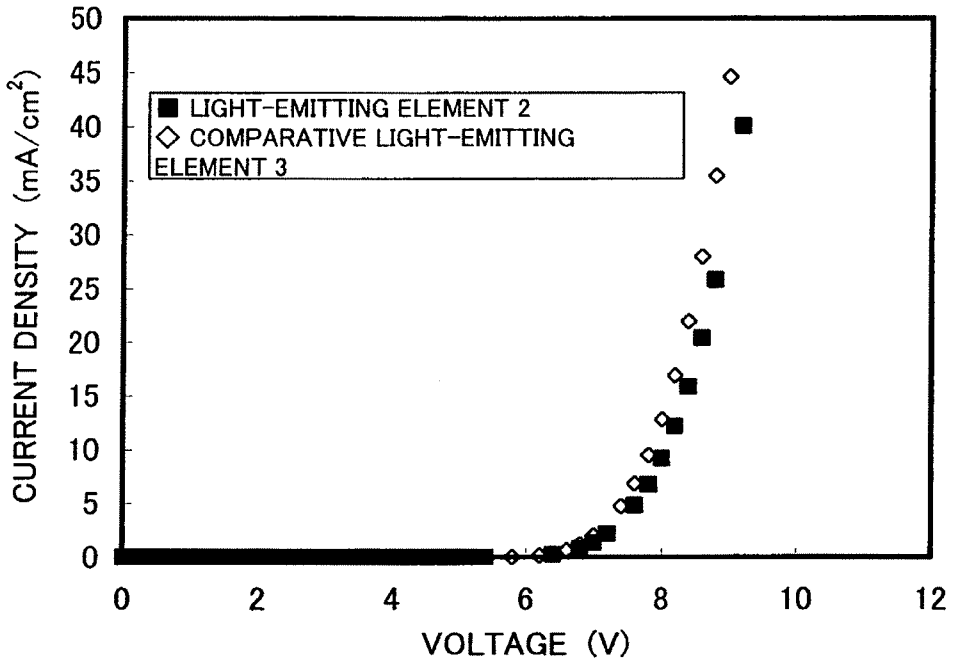

50
45
40
35
30
25
20
15
10
5
0
CURRENT DENSITY (mA/cm2)
LIGHT-EMITTING ELEMENT 2
COMPARATIVE LIGHT-EMITTING ELEMENT 3
0
2
4
6
8
10
12
VOLTAGE (V)

FIG. 14

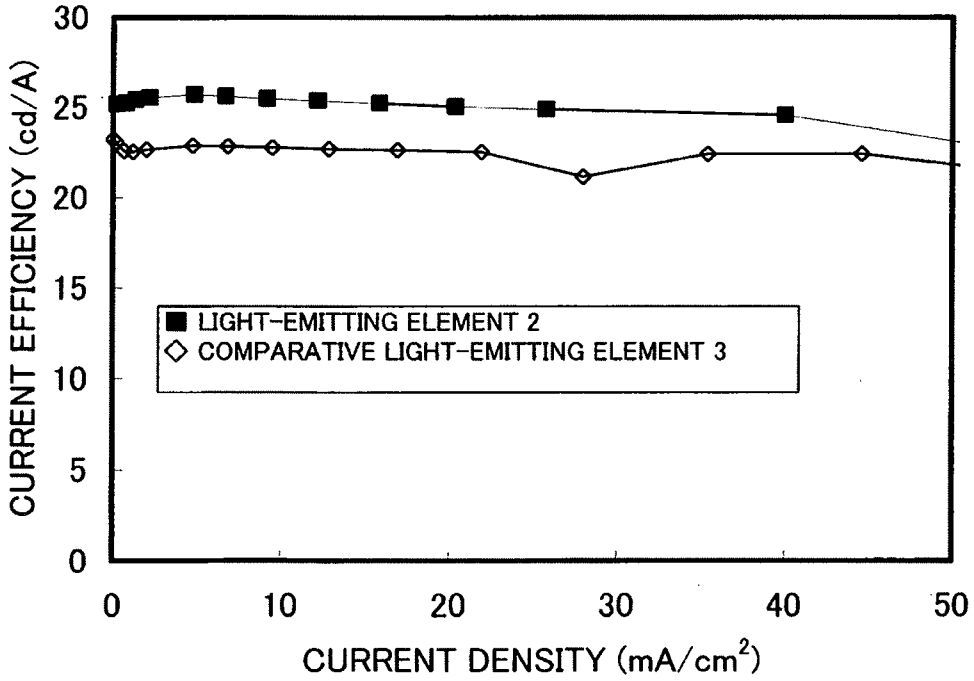

30
25
20
15
10
5
0
CURRENT EFFICIENCY (cd/A)
LIGHT-EMITTING ELEMENT 2
COMPARATIVE LIGHT-EMITTING ELEMENT 3
0
10
20
30
40
50
CURRENT DENSITY (mA/cm2)

FIG. 15

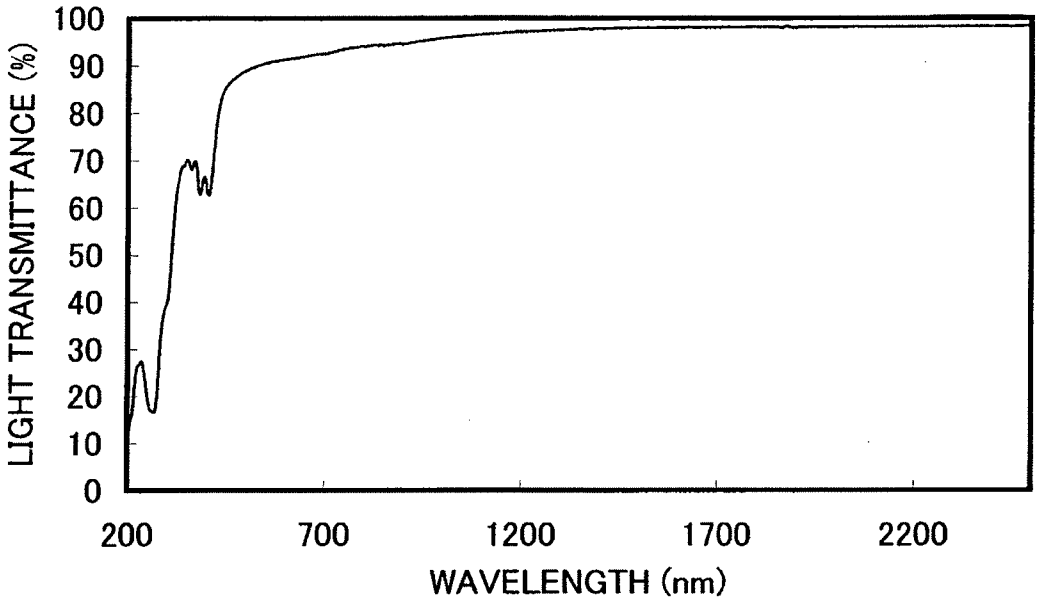

LIGHT TRANSMITTANCE (%)
100
90
80
70
60
50
40
30
20
10
0
200
700
1200
1700
2200
WAVELENGTH (nm)

FIG. 16

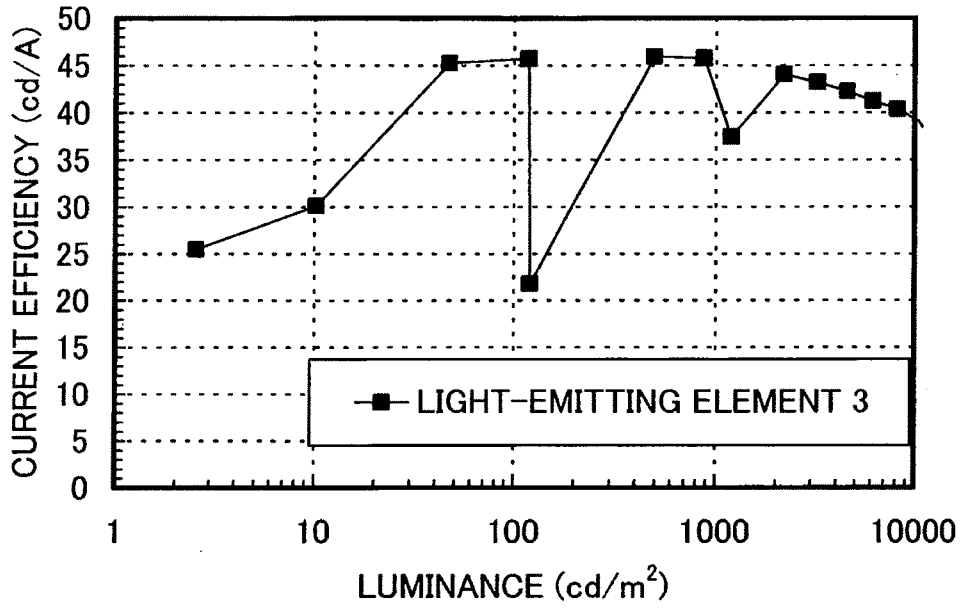

CURRENT EFFICIENCY (cd/A)
50
45
40
35
30
25
20
15
10
5
0
1
10
100
1000
10000
LUMINANCE (cd/m2)
LIGHT-EMITTING ELEMENT 3

FIG. 17

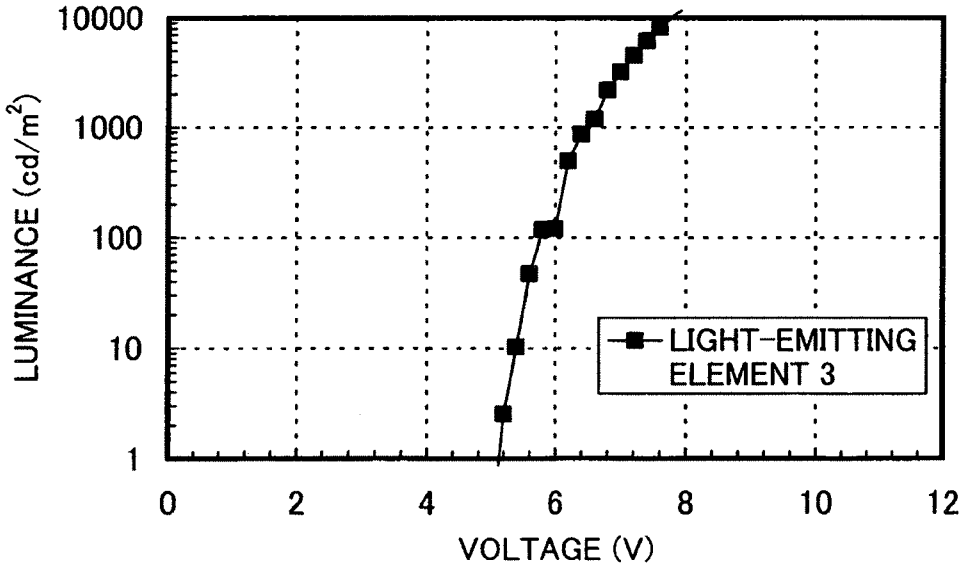

LUMINANCE (cd/m2)
10000
1000
100
10
1
0
2
4
6
8
10
12
VOLTAGE (V)
LIGHT-EMITTING ELEMENT 3

FIG. 18

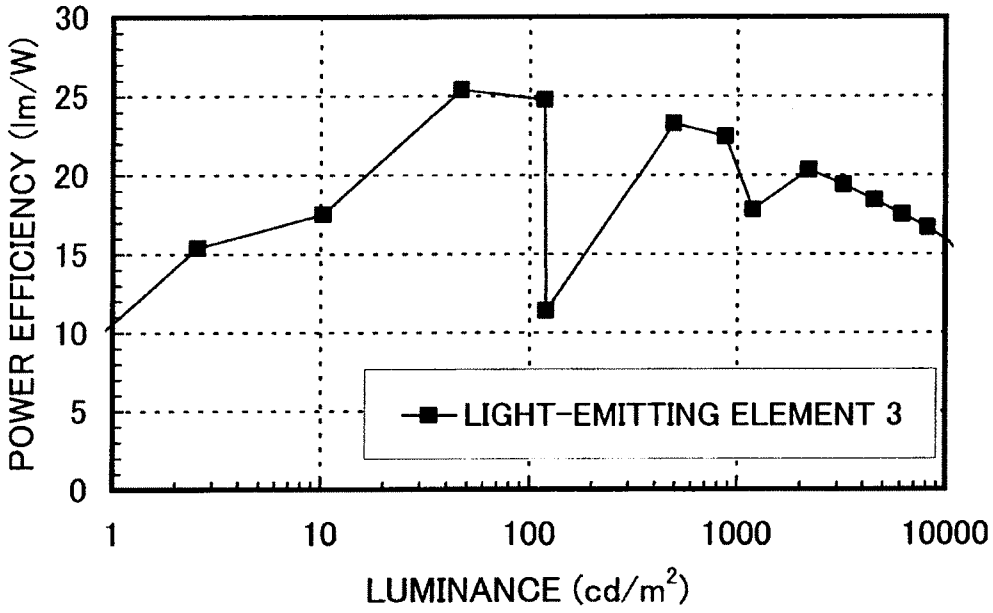
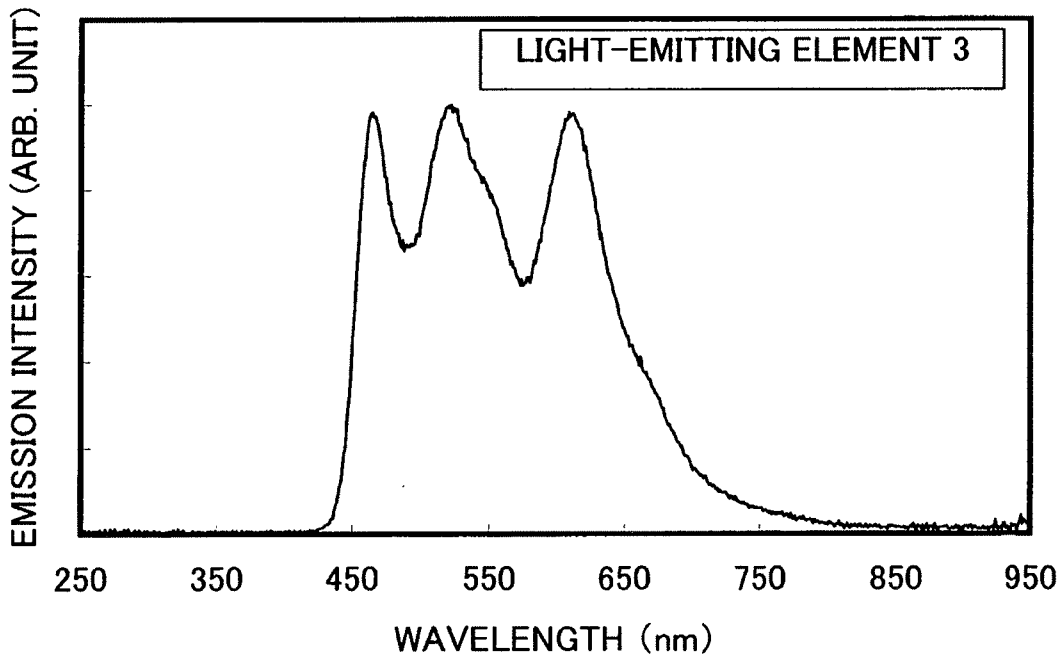

POWER EFFICIENCY (lm/W)
30
25
20
15
10
5
0
1
10
100
1000
10000
LUMINANCE (cd/m2)
LIGHT-EMITTING ELEMENT 3

FIG. 19


EMISSION INTENSITY (ARB. UNIT)
LIGHT-EMITTING ELEMENT 3
250
350
450
550
650
750
850
950
WAVELENGTH (nm)