FIG. 1

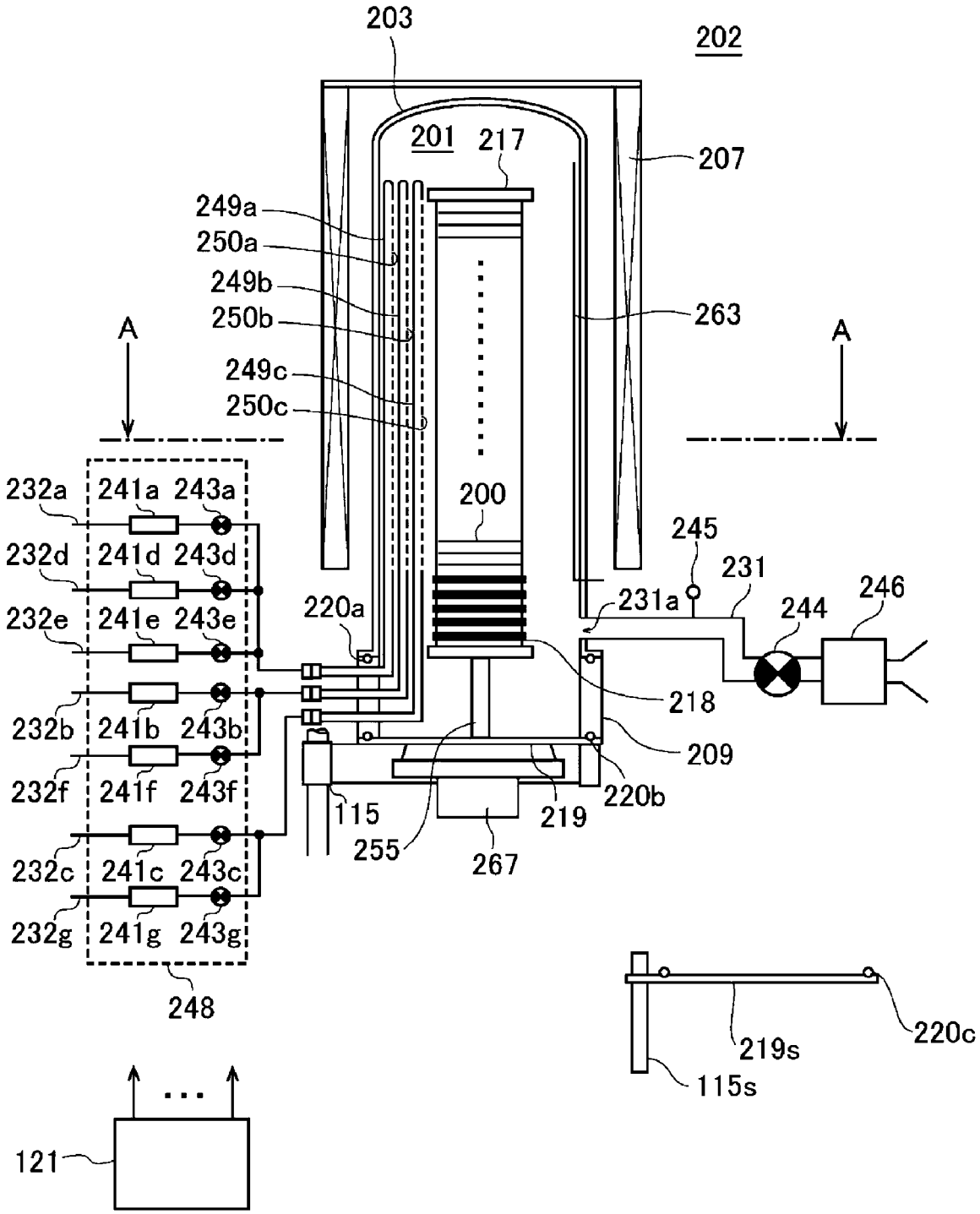

203
202
201
217
207
249a
250a
249b
250b
263
A
A
249c
250c
232a
241a
243a
200
245
232d
241d
243d
231
232e
241e
243e
220a
231a
244
246
218
232b
241b
243b
209
232f
241f
243f
220b
115
219
255
267
232c
241c
243c
232g
241g
243g
248
219s
220c
115s
121

FIG. 2

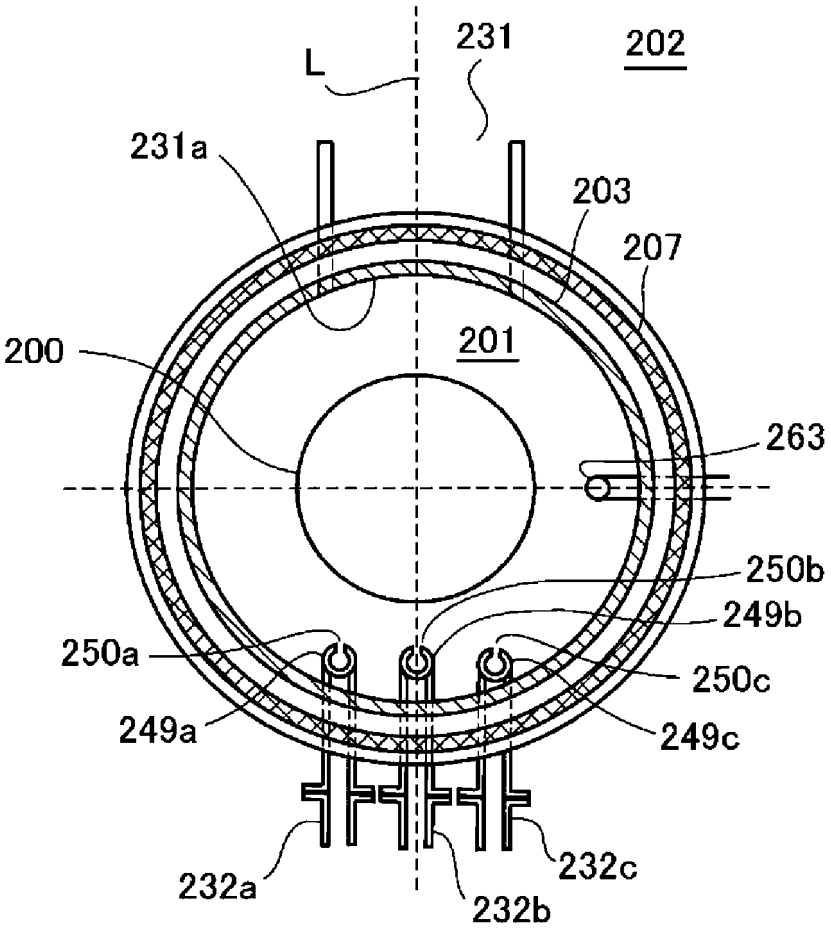

L
231
202
231a
203
207
200
201
263
250b
249b
250a
250c
249a
249c
232a
232b
232c

FIG. 3

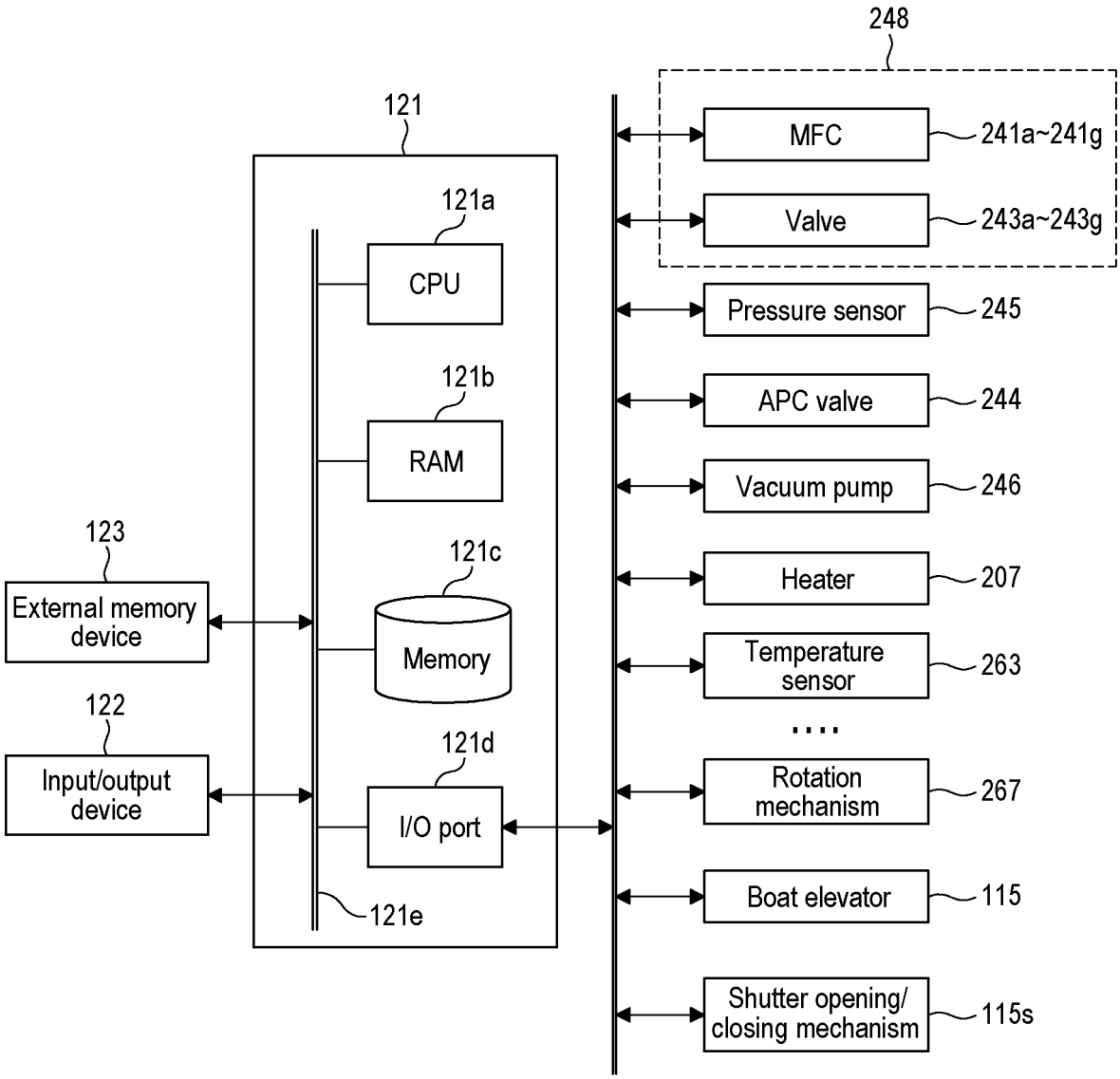

248
121
121a
CPU
121b
RAM
121c
Memory
121d
I/O port
121e
123
External memory device
122
Input/output device
MFC
241a~241g
Valve
243a~243g
Pressure sensor
245
APC valve
244
Vacuum pump
246
Heater
207
Temperature sensor
263
....
Rotation mechanism
267
Boat elevator
115
Shutter opening/ closing mechanism
115s

FIG. 4

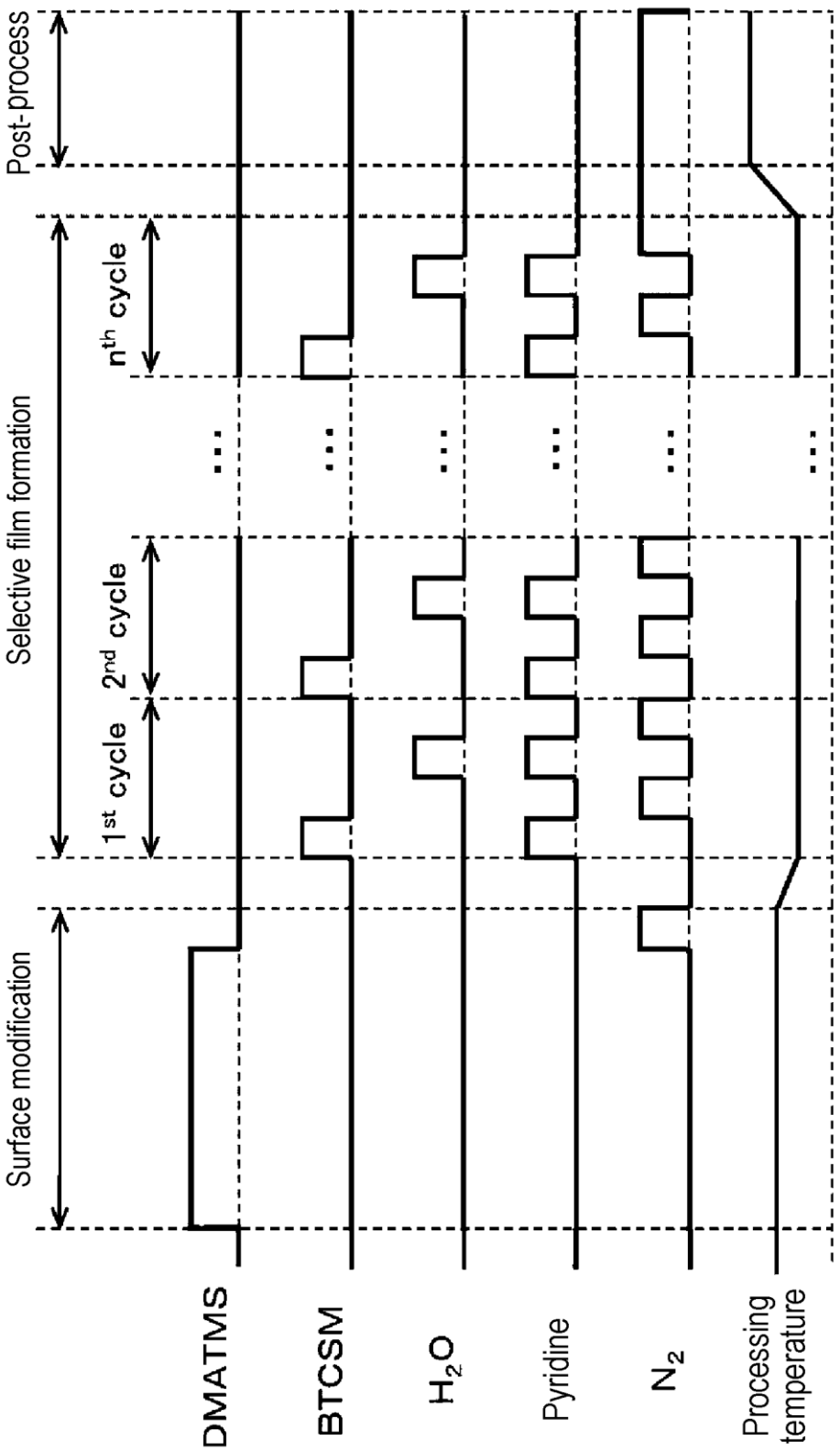

Surface modification
Selective film formation
1st cycle
2nd cycle
nth cycle
Post-process
DMATMS
BTCSM
H2O
Pyridine
N2
Processing temperature

FIG. 5A

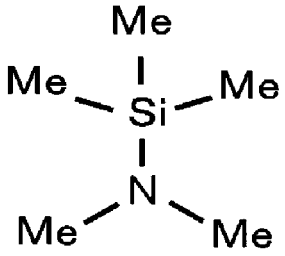


FIG. 5B

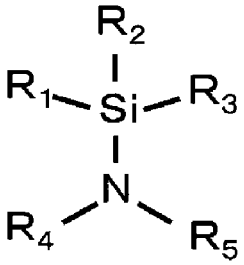


FIG. 5C

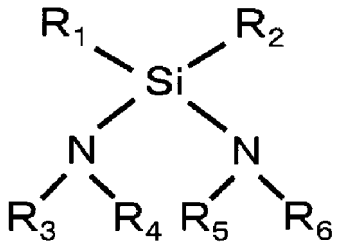


FIG. 6A

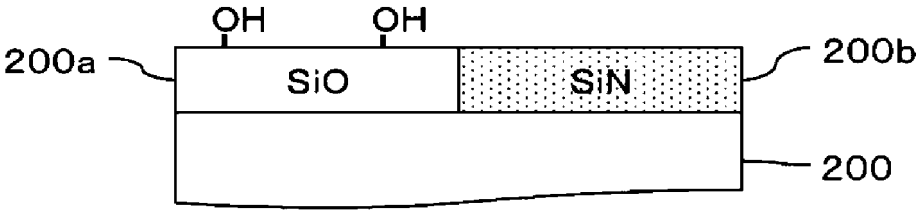


FIG. 6B

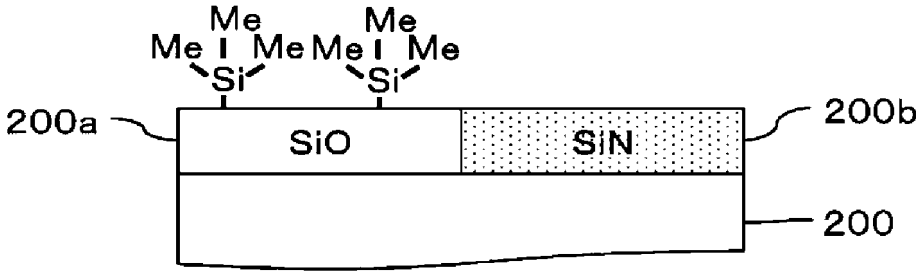


FIG. 6C

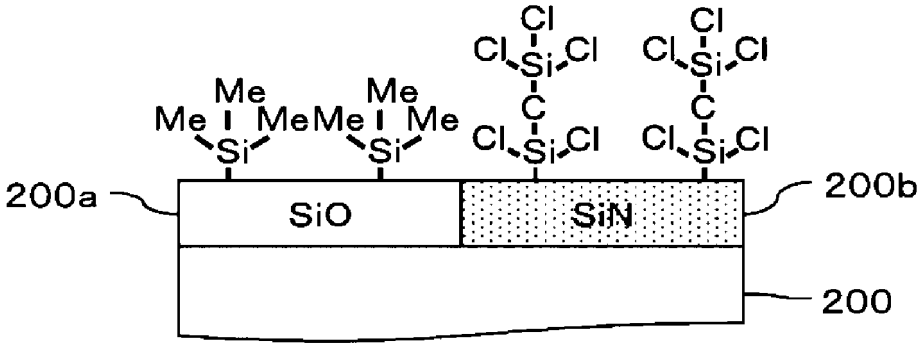


FIG. 6D

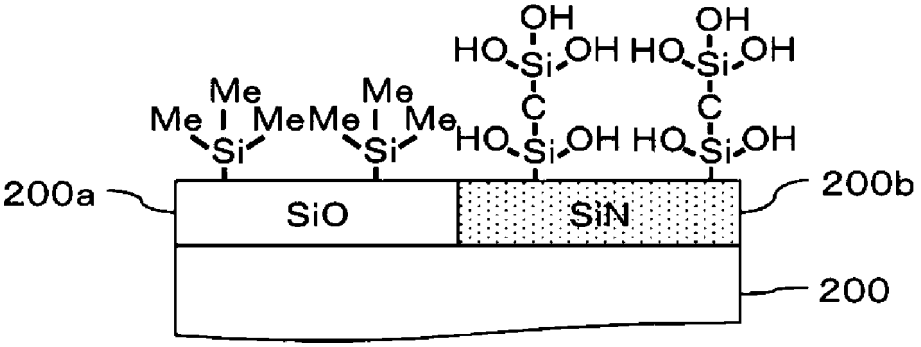


FIG. 6E

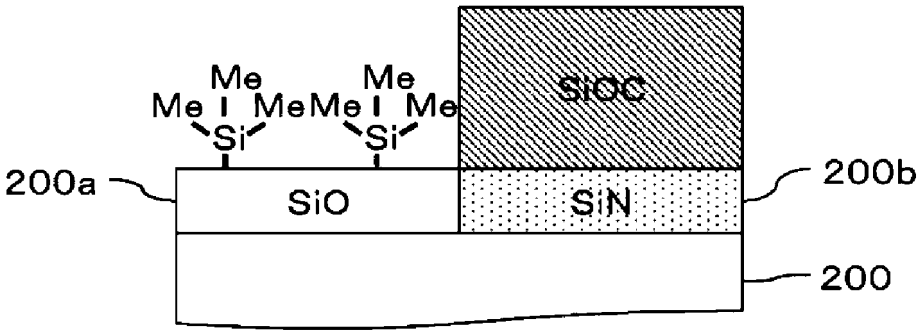


FIG. 6F

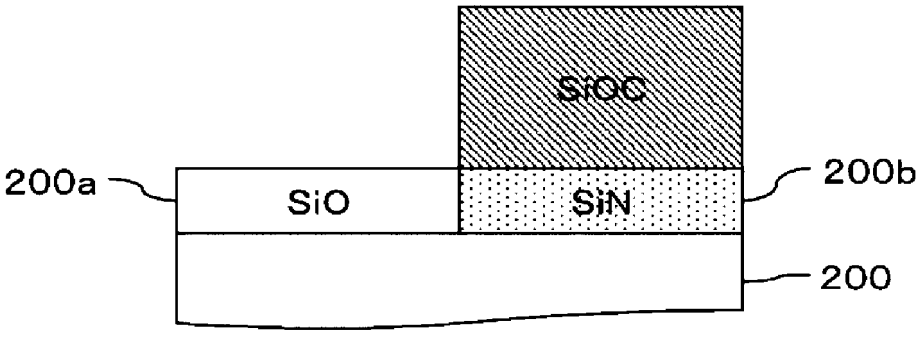
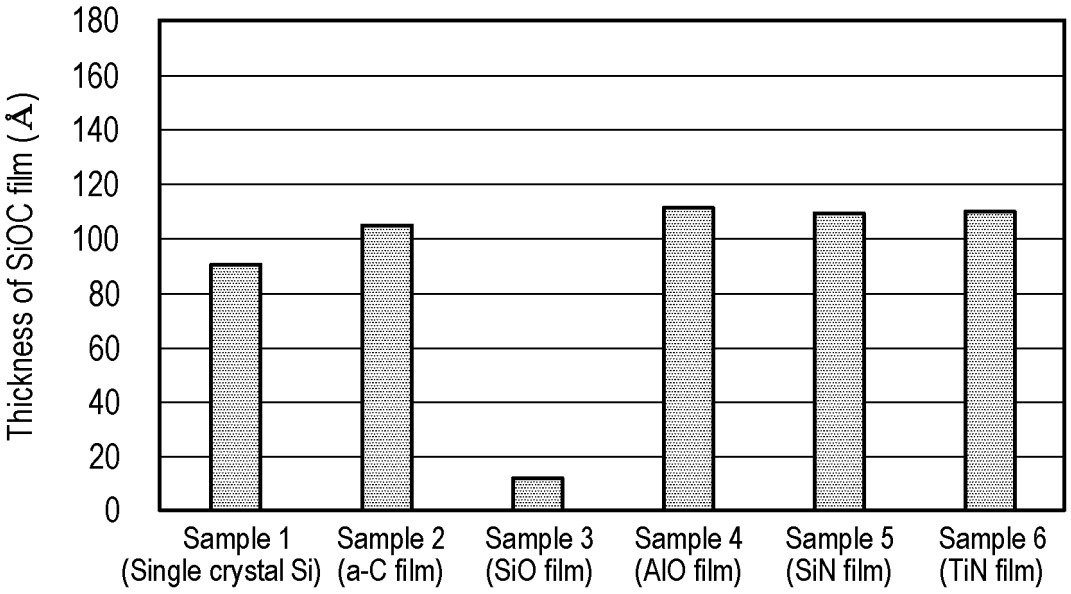


FIG. 7


Thickness of SiOC film (Å)
180
160
140
120
100
80
60
40
20
0
Sample 1 (Single crystal Si)
Sample 2 (a-C film)
Sample 3 (SiO film)
Sample 4 (AlO film)
Sample 5 (SiN film)
Sample 6 (TiN film)