

FIG. 1

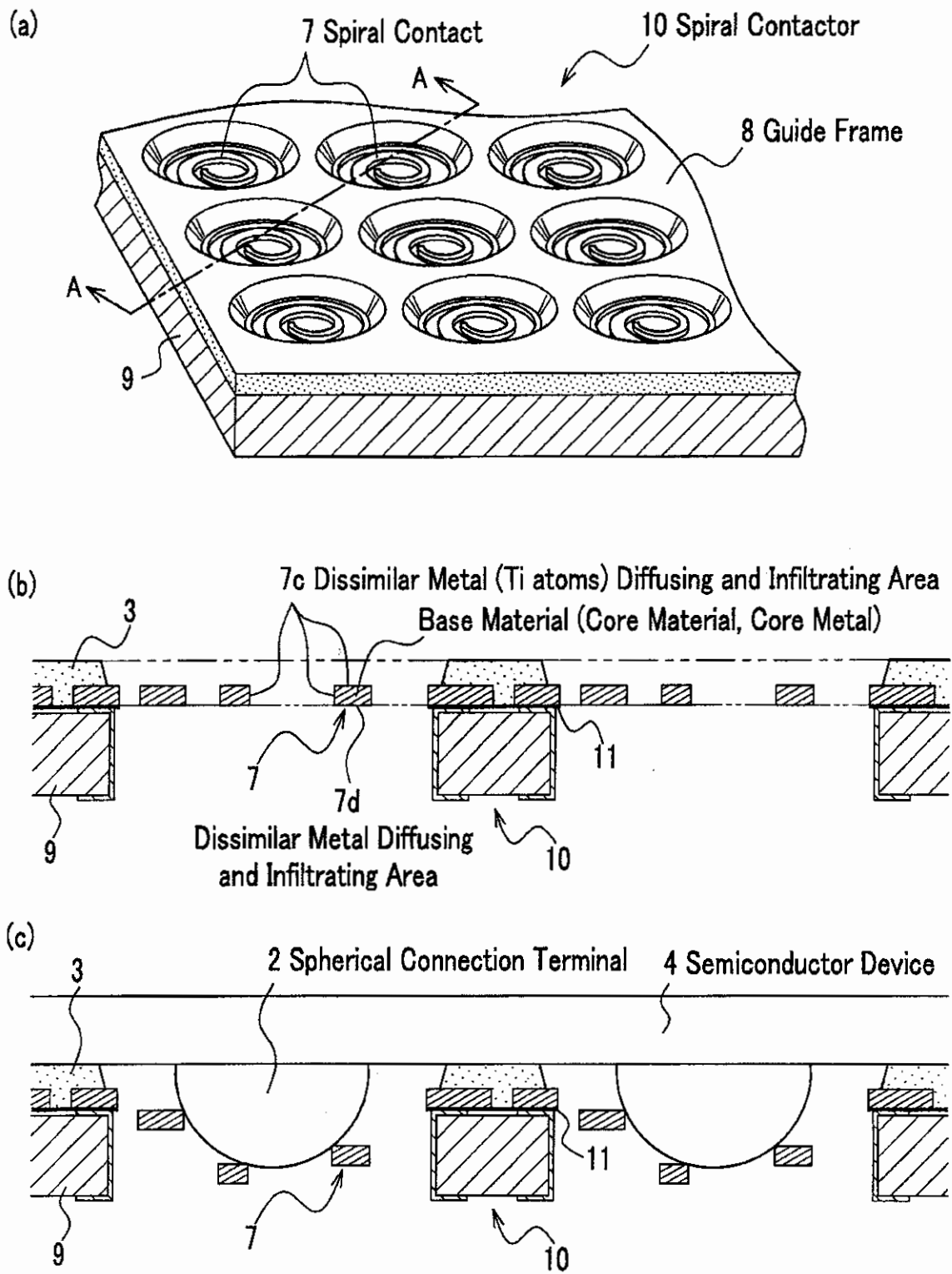
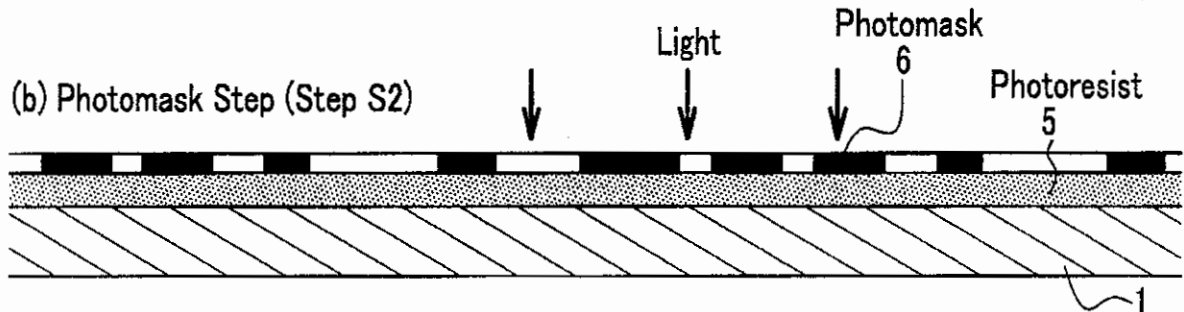
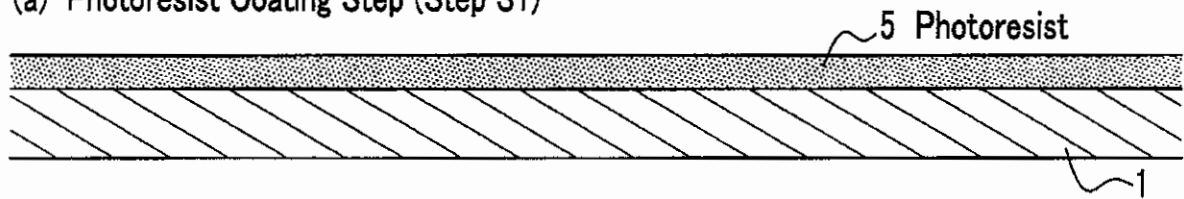
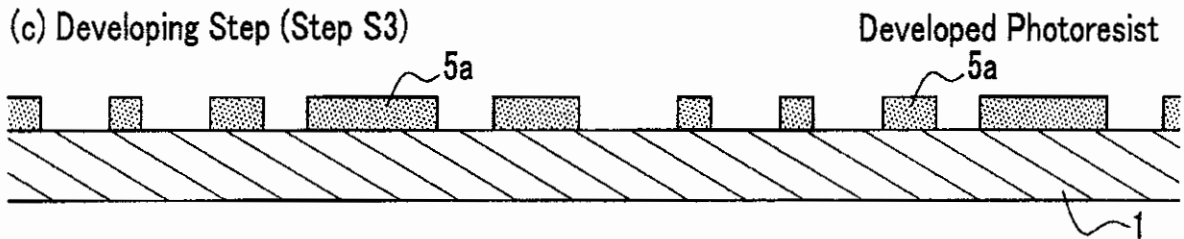


FIG. 2

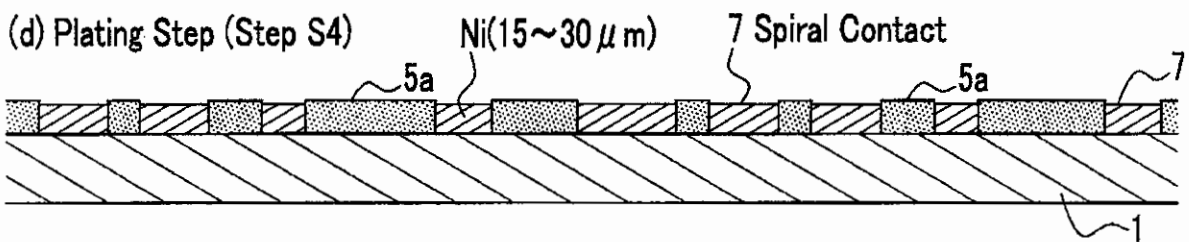
(a) Photoresist Coating Step (Step S1)



(c) Developing Step (Step S3)



(d) Plating Step (Step S4)



(e) Photoresist Removal Step (Step S5)

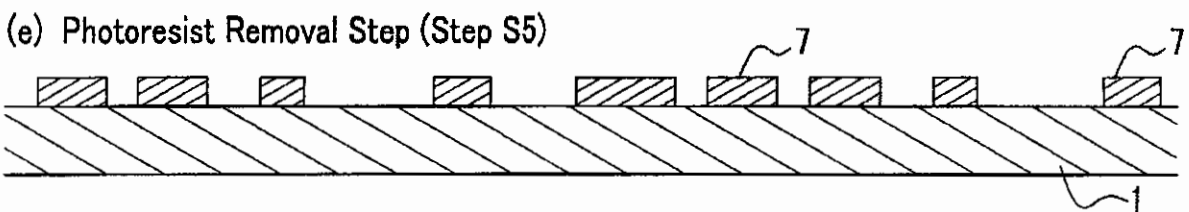
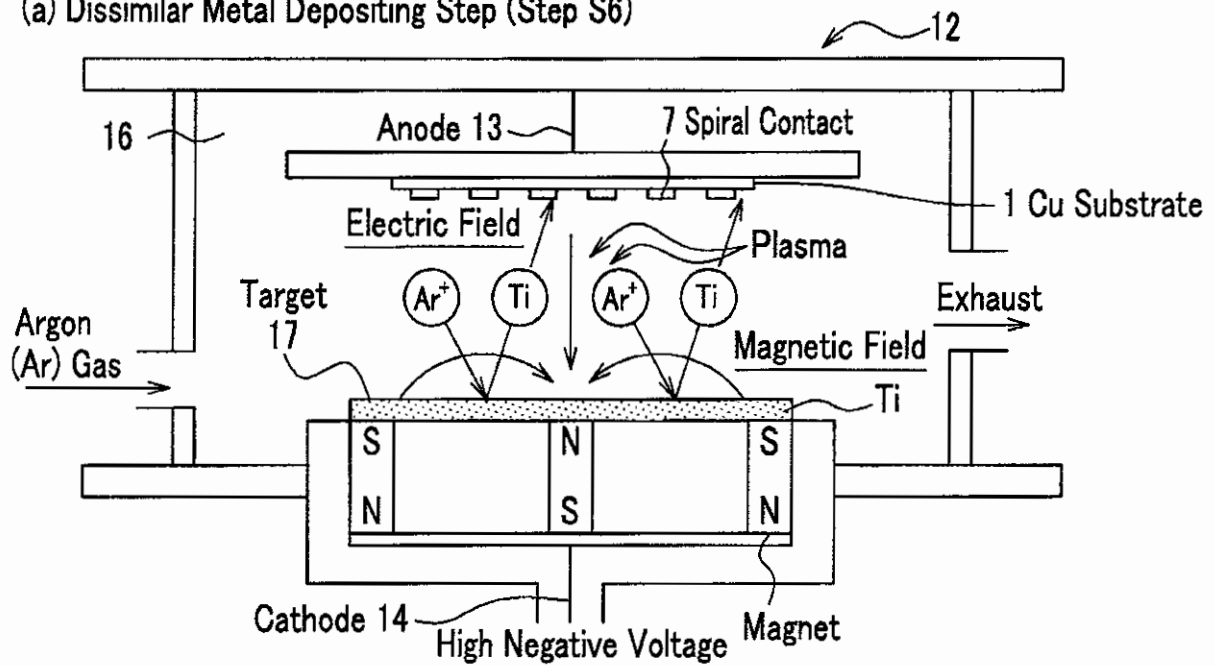
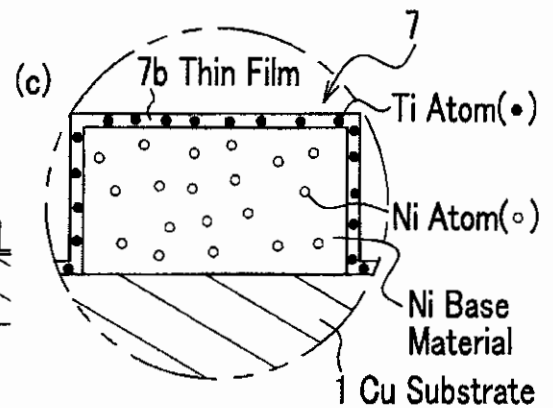
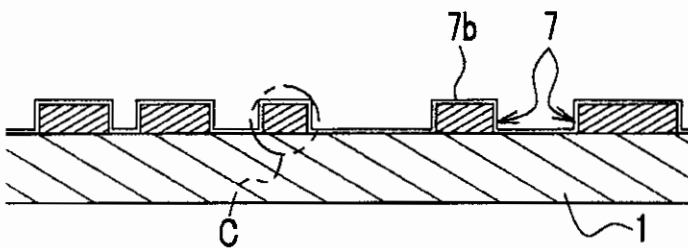


FIG. 3

(a) Dissimilar Metal Depositing Step (Step S6)



(b) Dissimilar Metal Depositing Step (Step S6A)



(d) Dissimilar Metal Depositing Step (Step S6B)

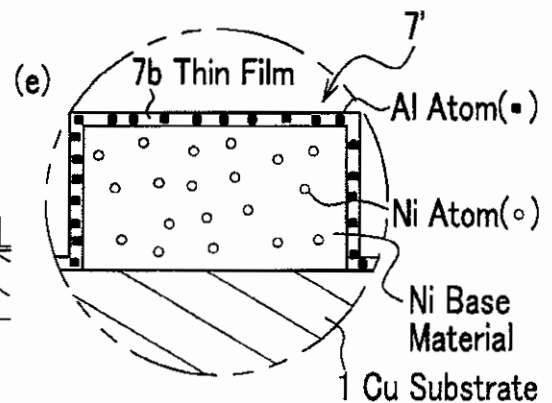
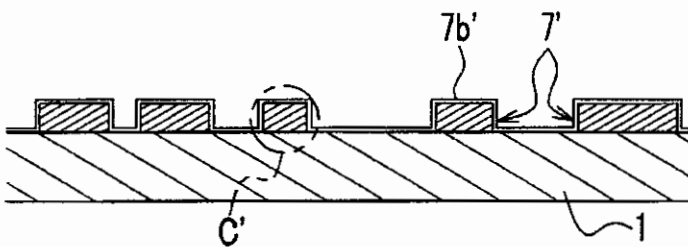


FIG. 4

(a) Dissimilar Metal Diffusing and Infiltrating Step (Step S7A)

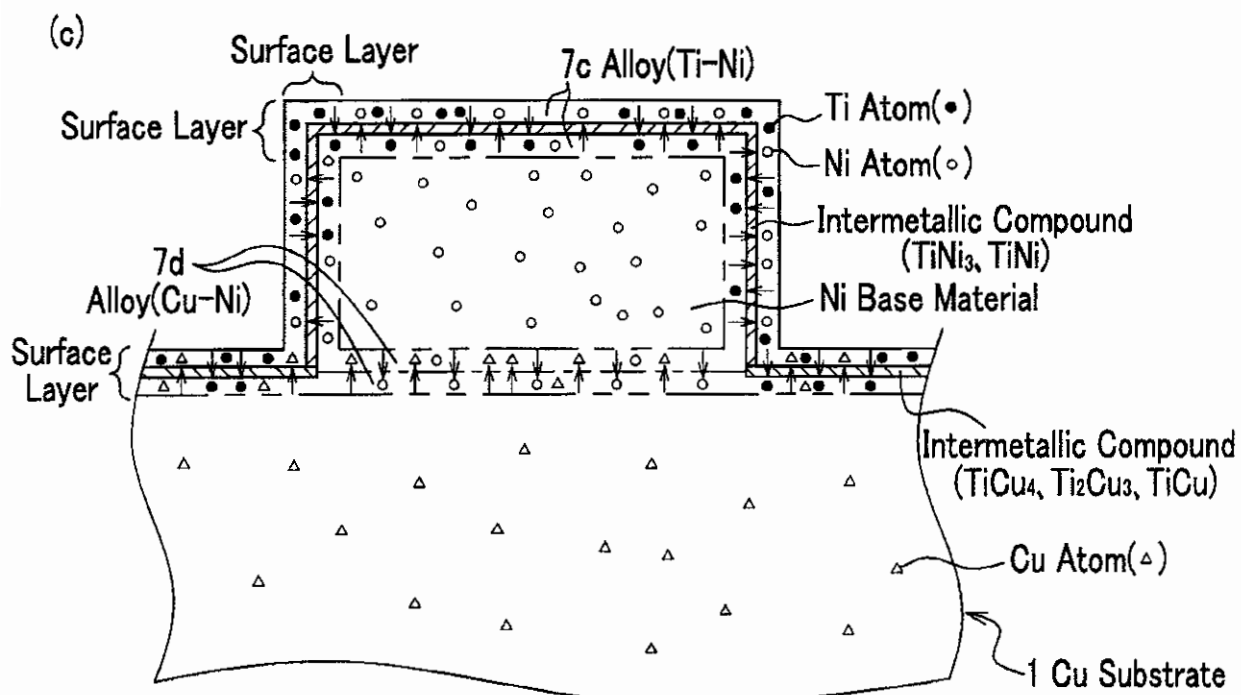
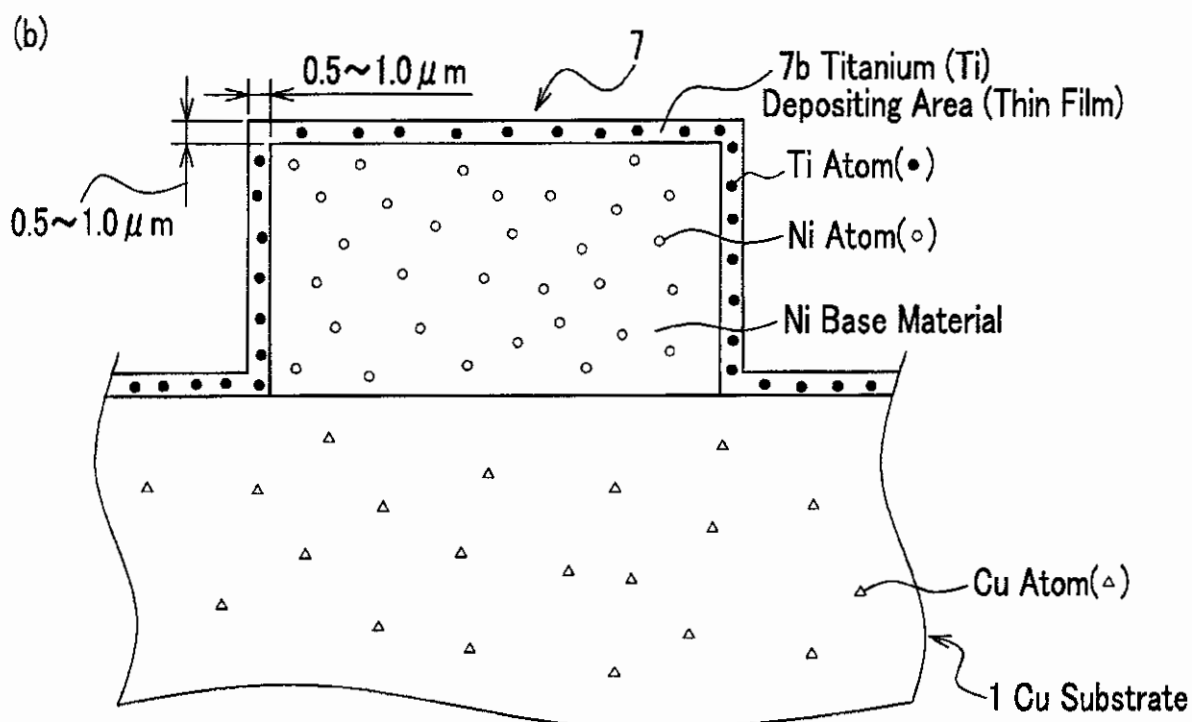
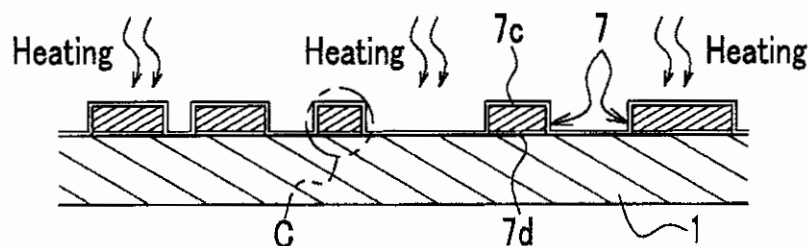


FIG.5

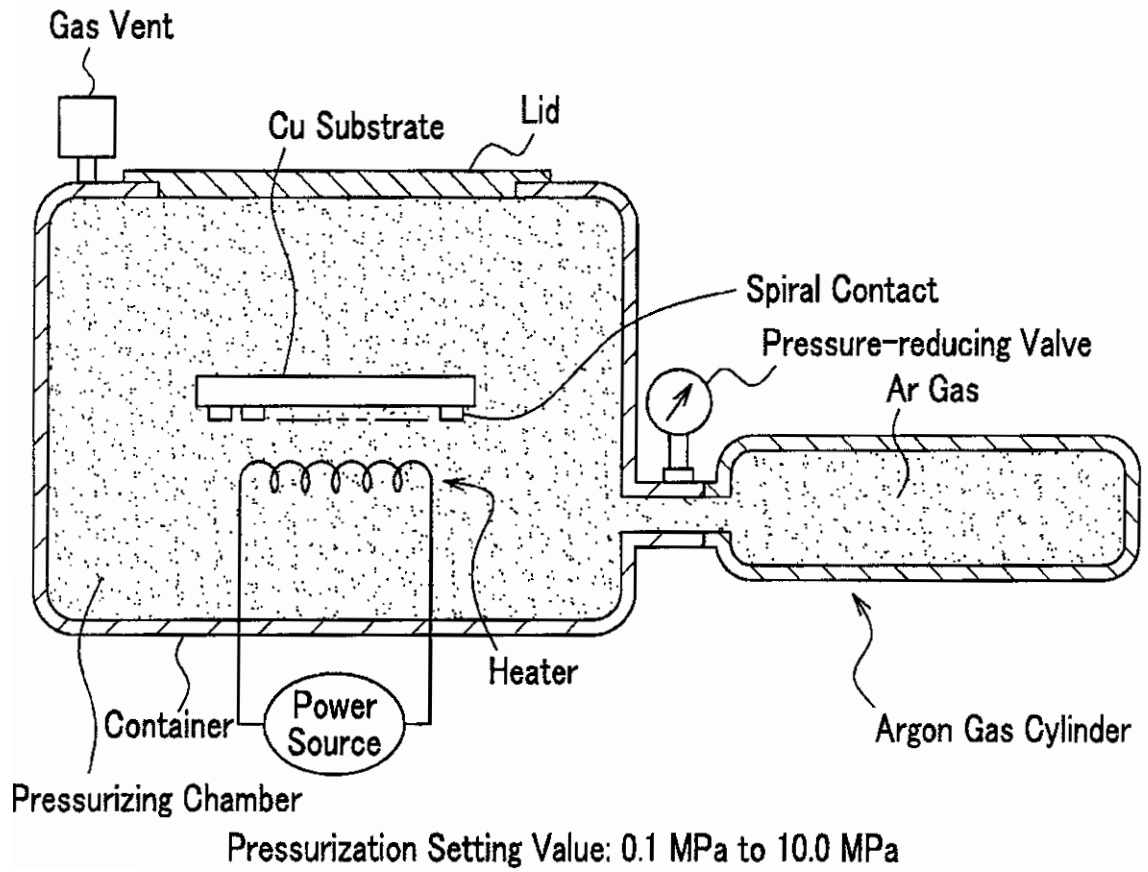
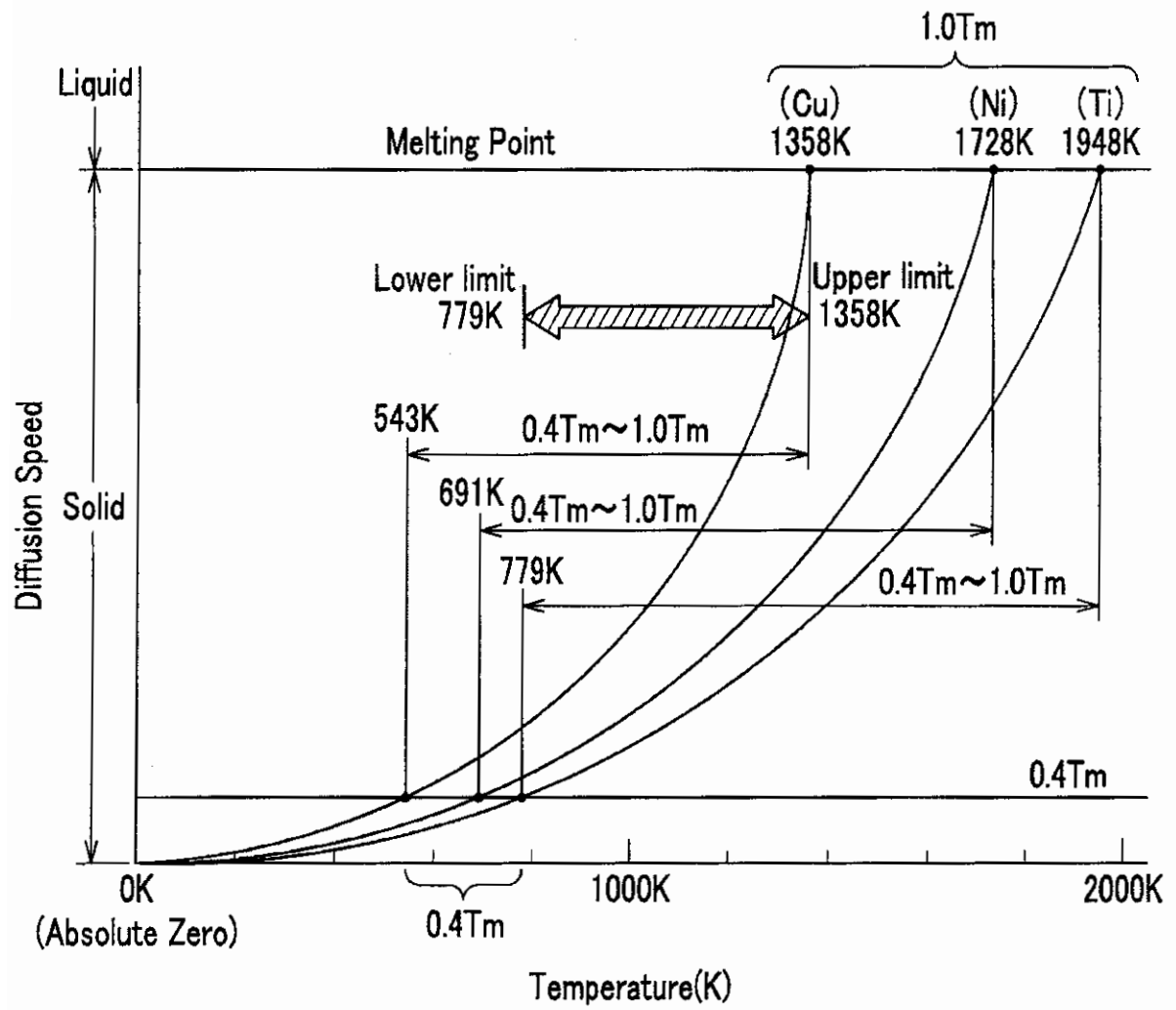


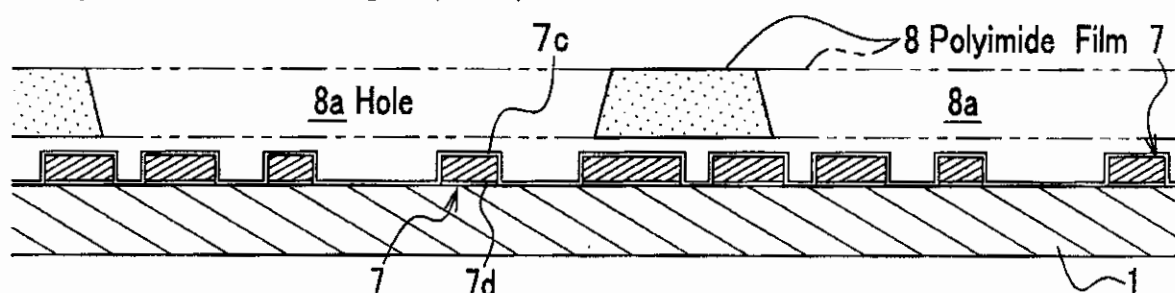
FIG.6



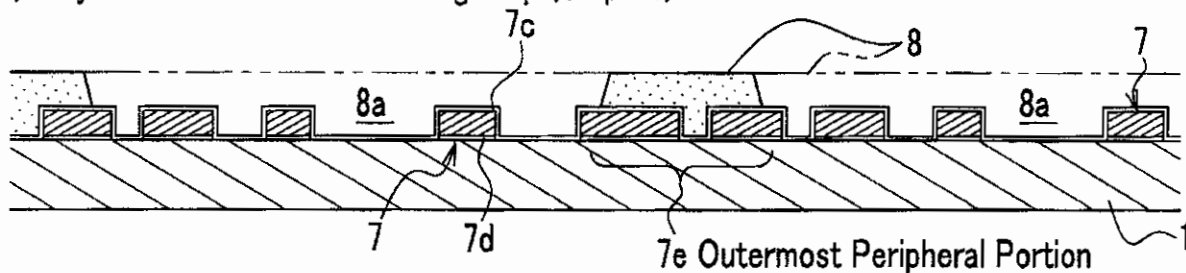
Heating Temperature: $0.4T_m$ to $1.0T_m$

FIG. 7

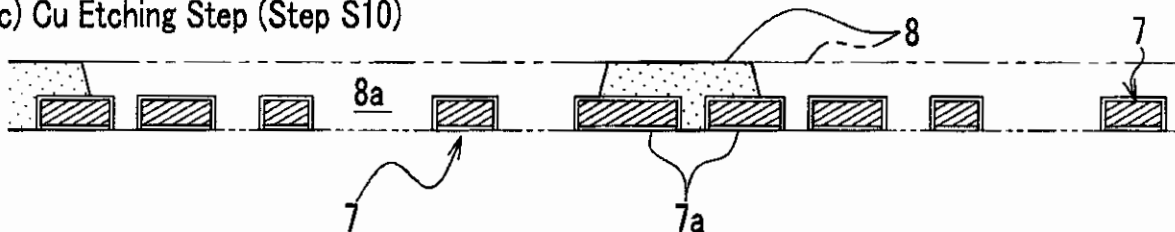
(a) Polyimide Film Laminating Step (Step S8)



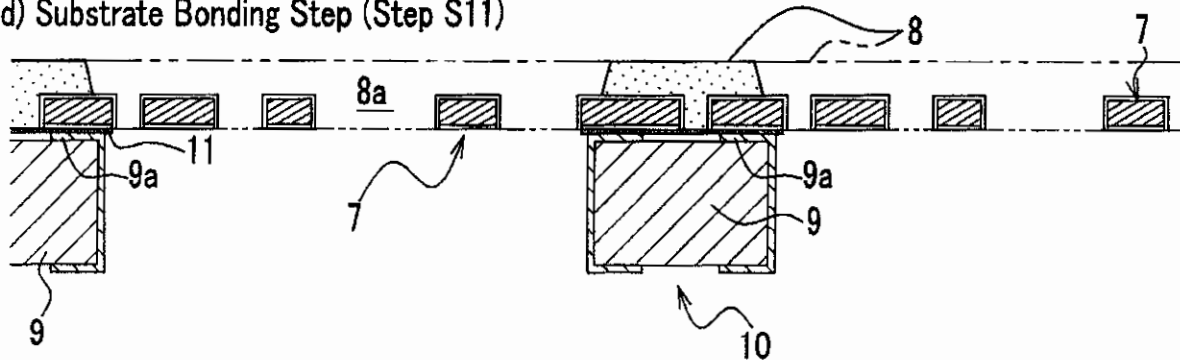
(b) Polyimide Film Press-laminating Step (Step S9)



(c) Cu Etching Step (Step S10)



(d) Substrate Bonding Step (Step S11)



(e) Electroless Au Plating Step (Step S12)

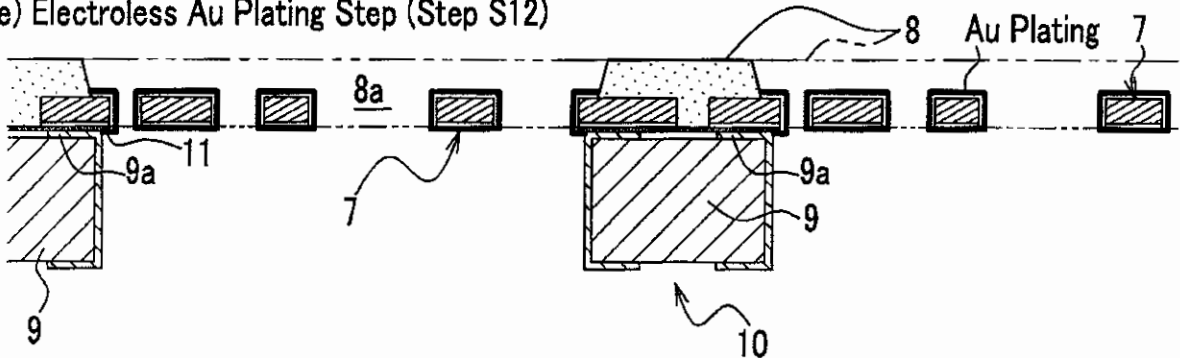


FIG.8

(a) Dissimilar Metal Diffusing and Infiltrating Step (Step S7B)

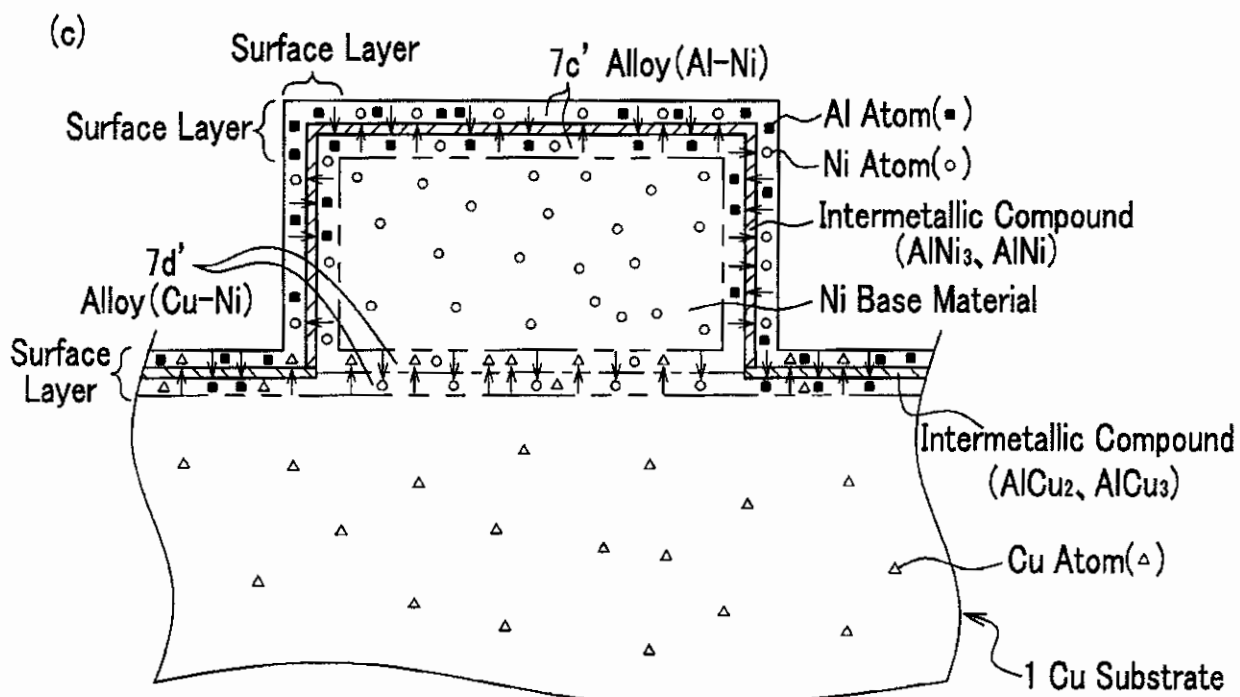
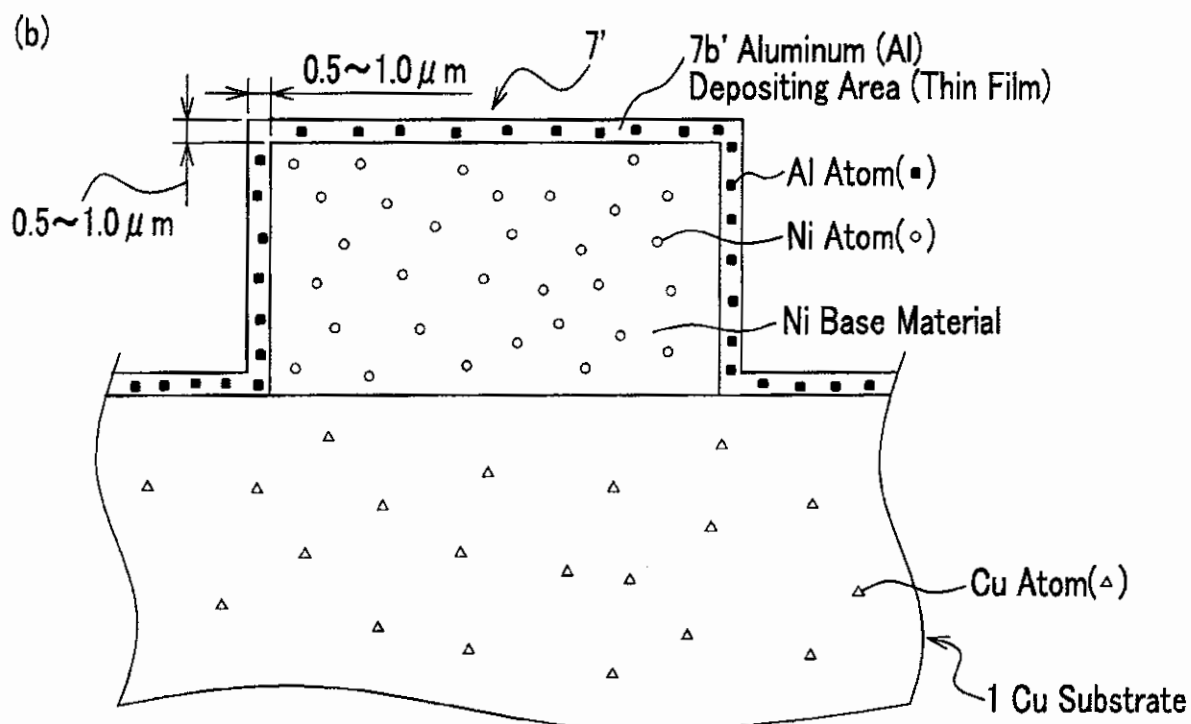
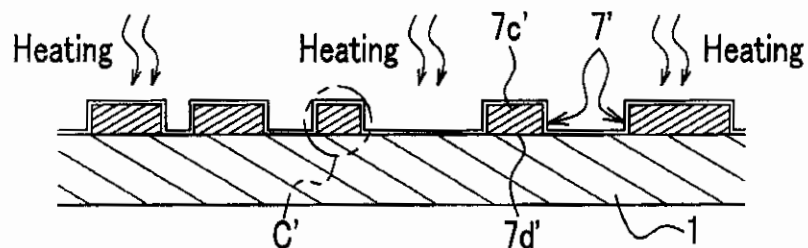
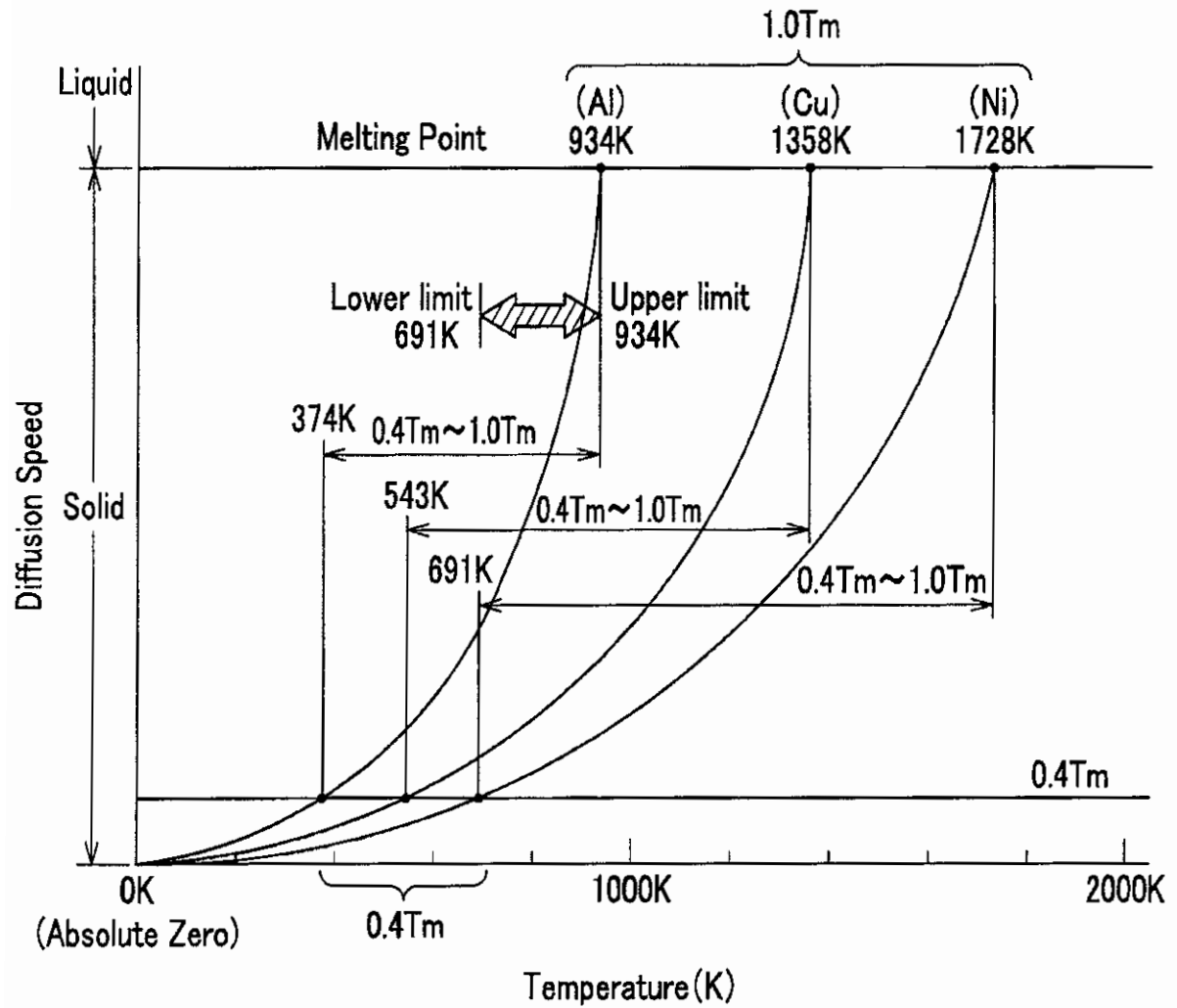


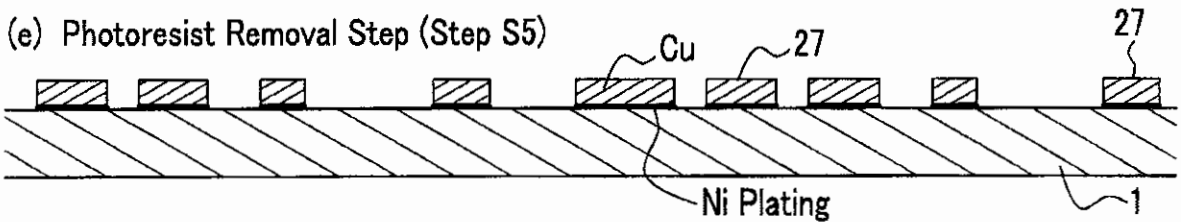
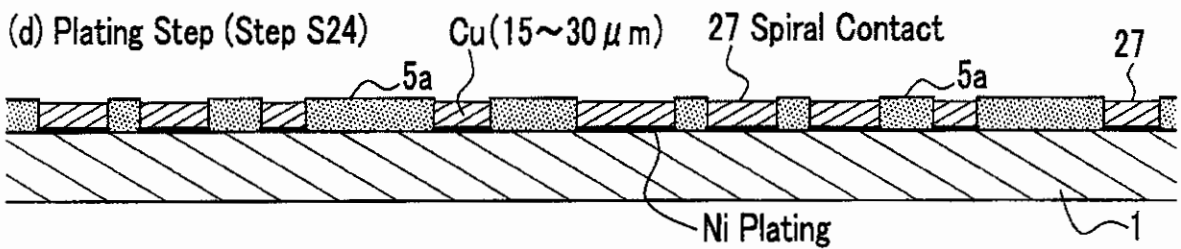
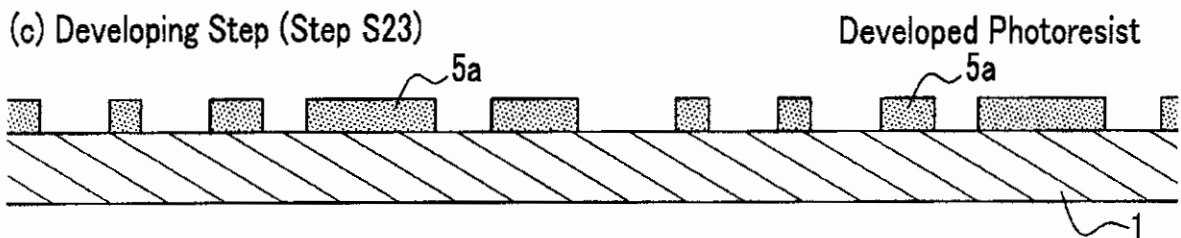
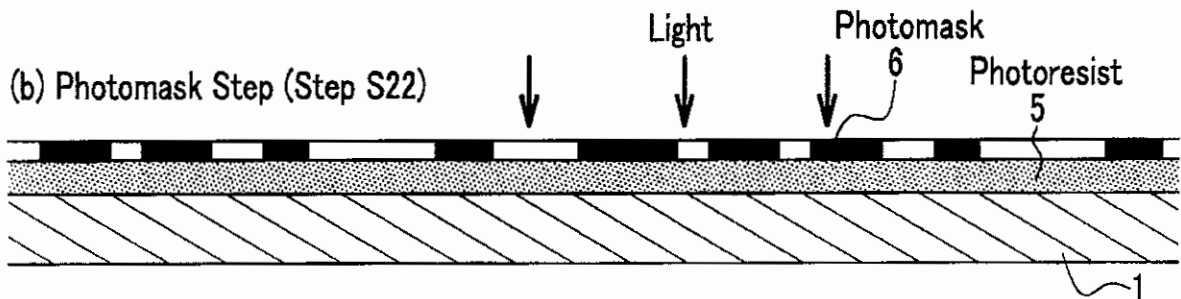
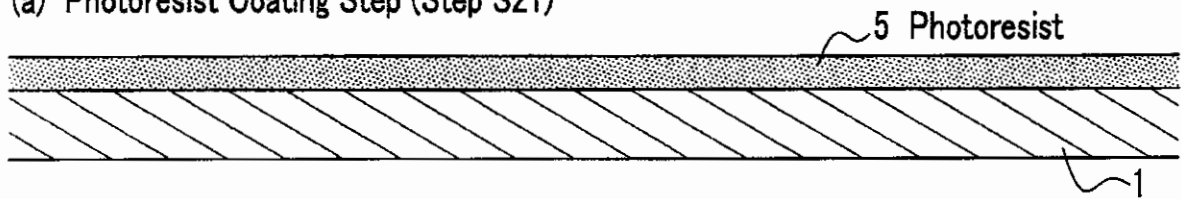
FIG.9



Heating Temperature: 0.4T_m to 1.0T_m

FIG. 10

(a) Photoresist Coating Step (Step S21)



(a) Dissimilar Metal Diffusing and Infiltrating Step (Step S27A)

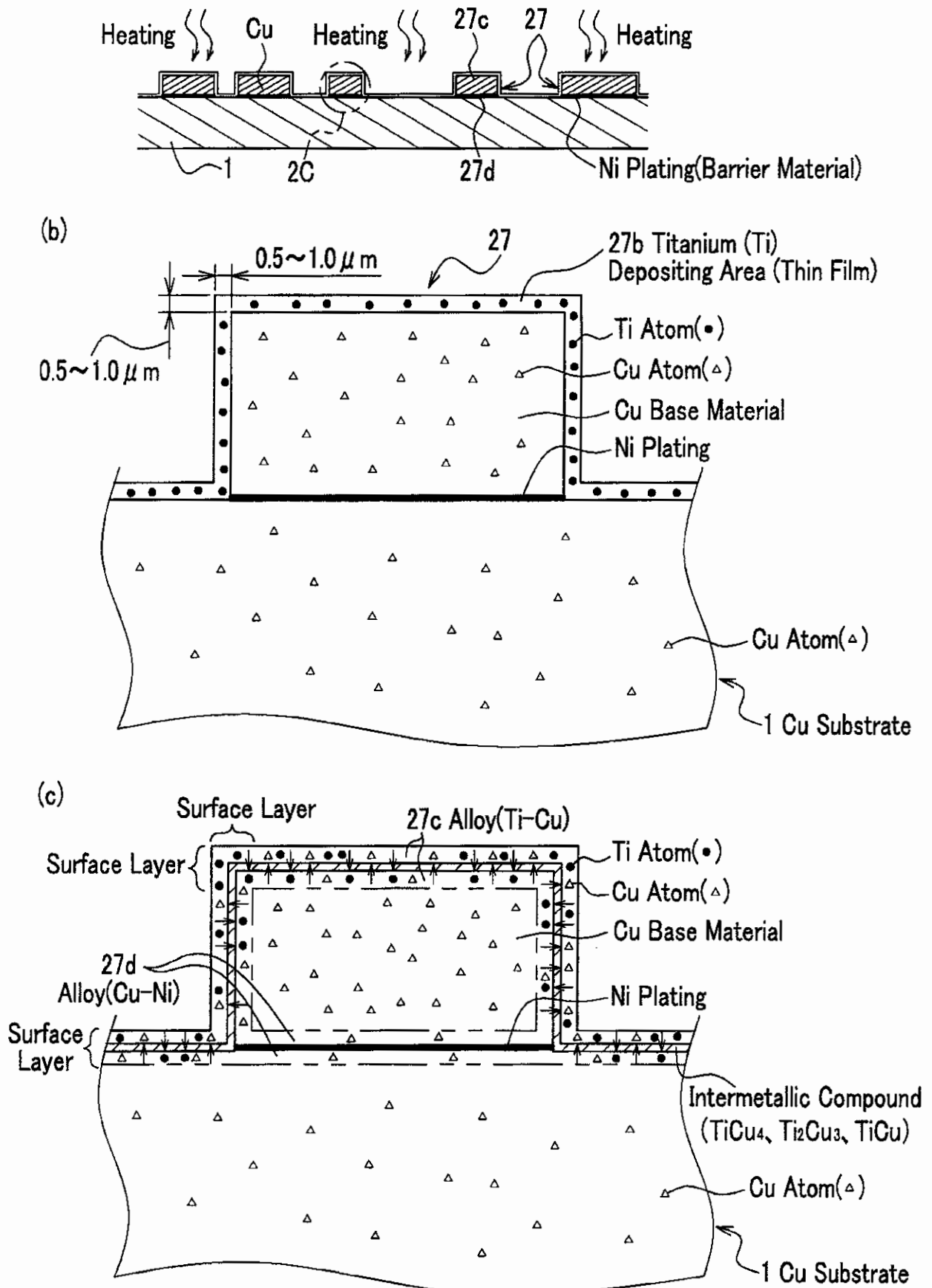
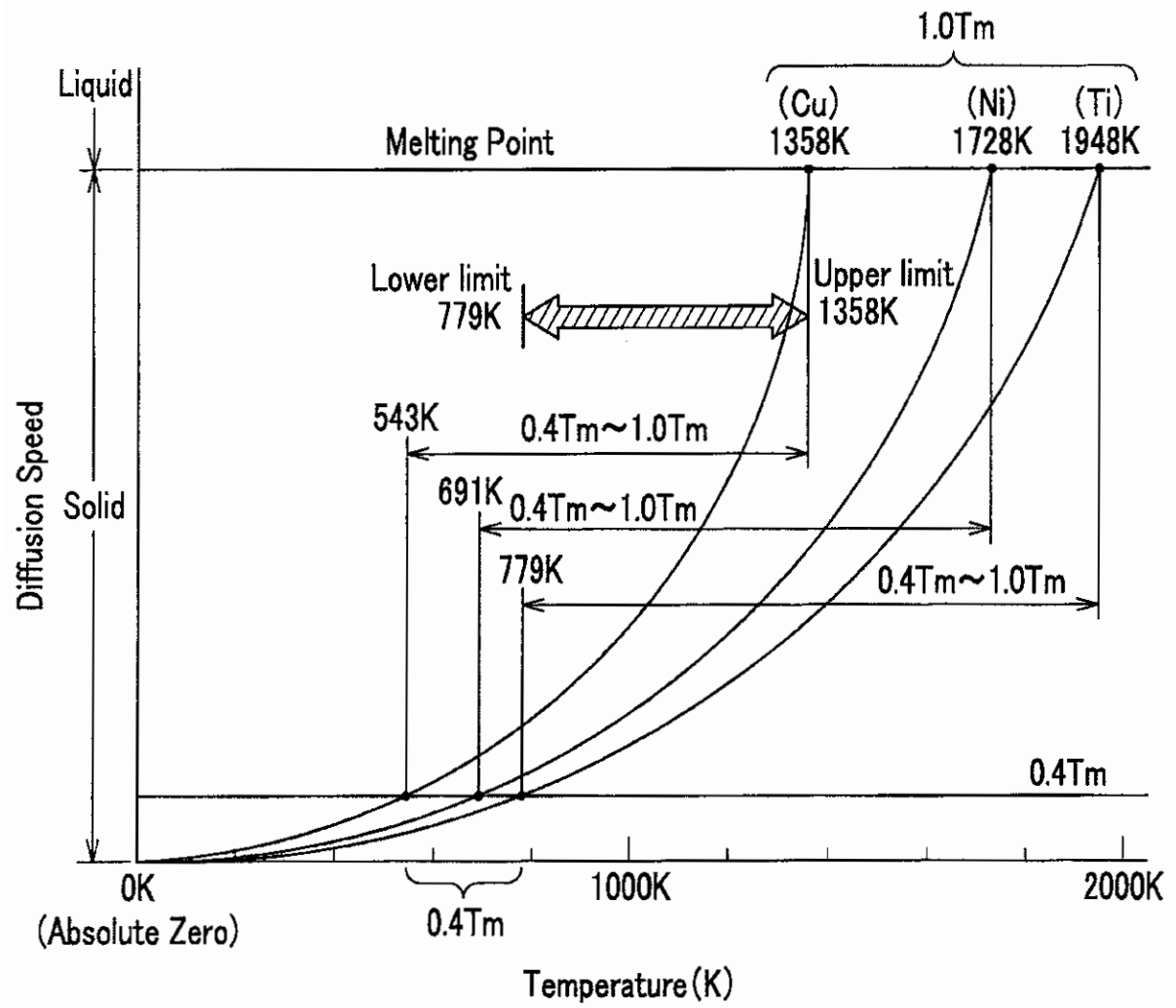


FIG.12



Heating Temperature: $0.4T_m$ to $1.0T_m$

(a) Dissimilar Metal Diffusing and Infiltrating Step (Step S27B)

(b)

0.5~1.0 μm

27'

27b' Aluminum (Al) Depositing Area (Thin Film)

Al Atom (•)

Cu Atom (Δ)

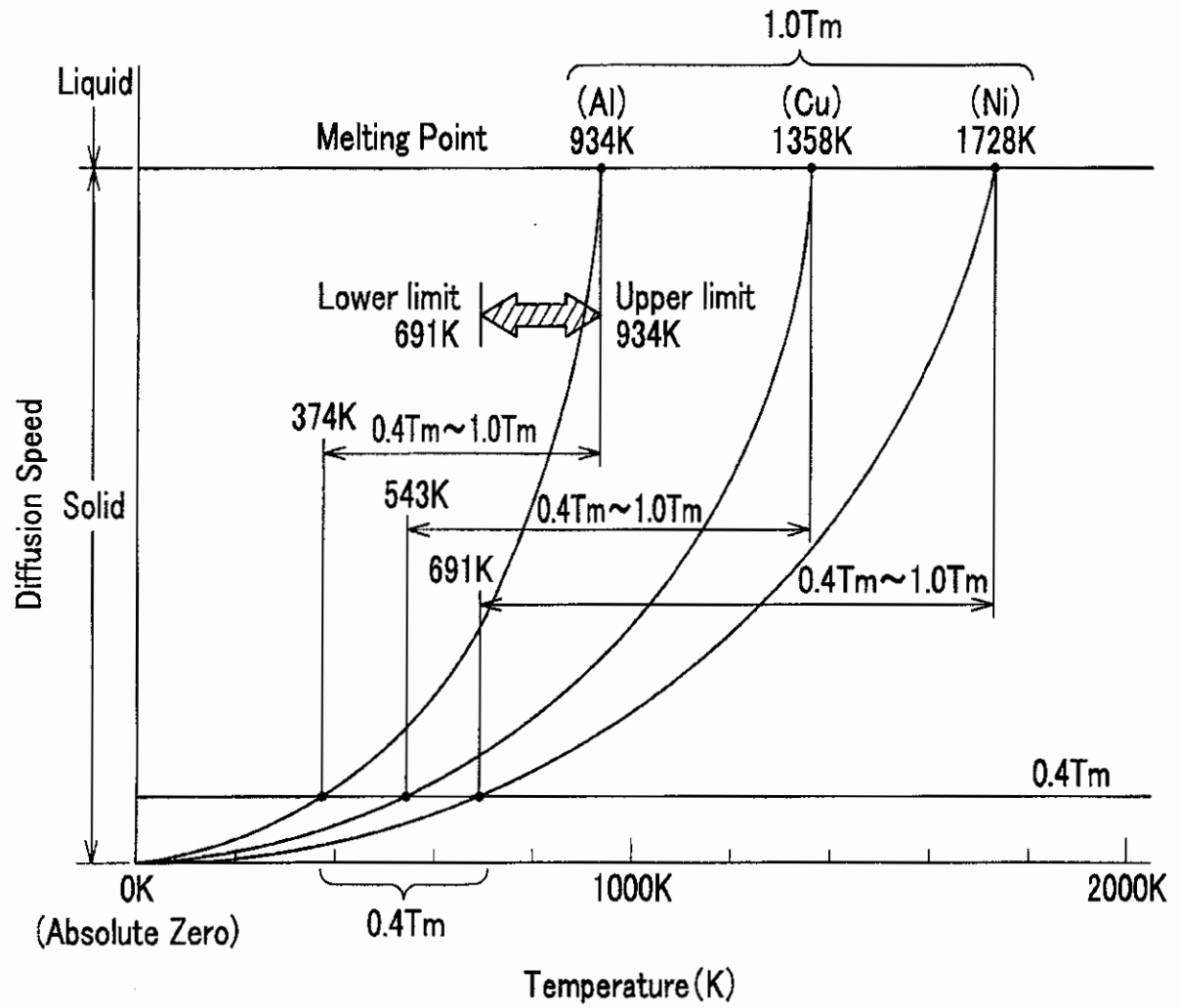
Cu Base Material

Ni Plating

1 Cu Substrate

(c) Schematic diagram showing the cross-section of a Cu substrate with various layers and atoms. The diagram includes labels for the Surface Layer, 27c' Alloy (Al-Cu), Al Atom (■), Cu Atom (△), Cu Base Material, Ni Plating, 27d' Alloy (Cu-Ni), and Intermetallic Compound (AlCu₂, AlCu₃). The Cu Substrate is labeled at the bottom right.

FIG. 14



Heating Temperature: $0.4T_m$ to $1.0T_m$

FIG.15

Prior Art

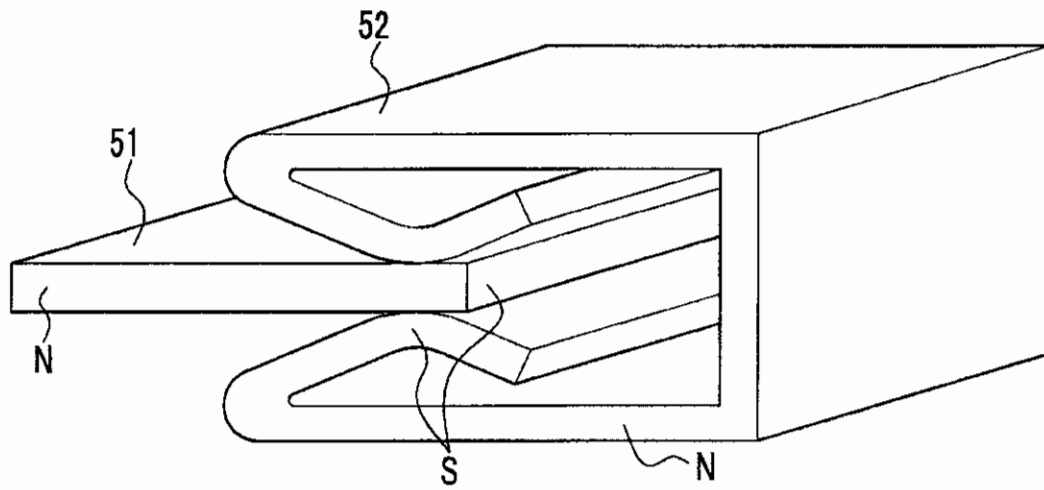


FIG.16

Prior Art

