

1/4

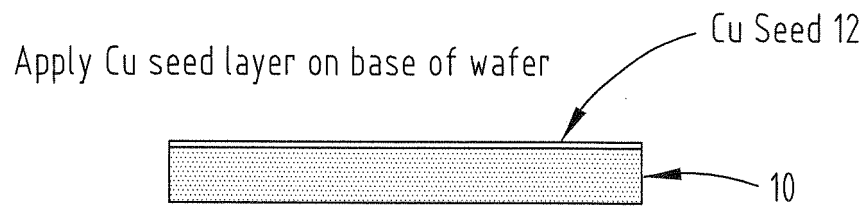


FIG. 1

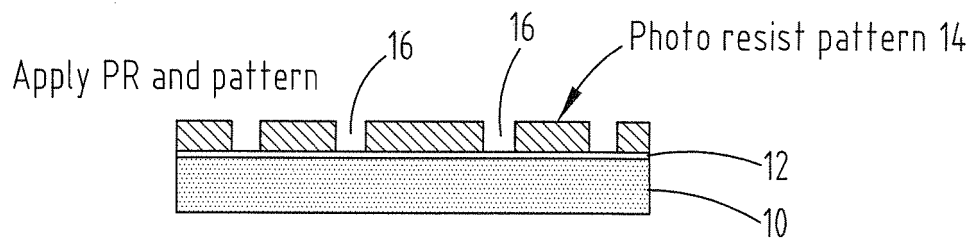


FIG. 2

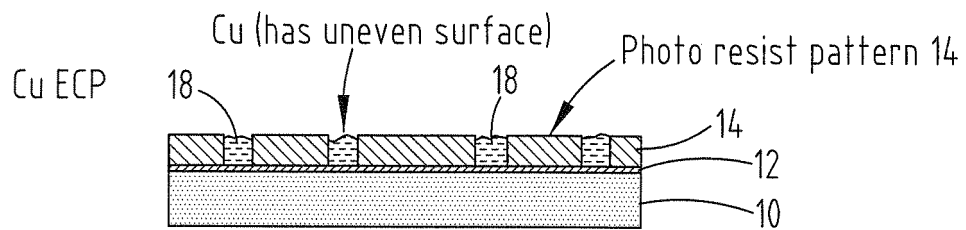


FIG. 3

CMP (or other surface planarizing method)

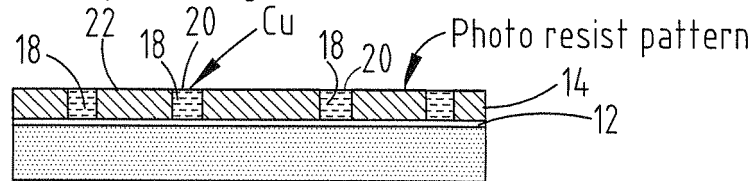


FIG. 4

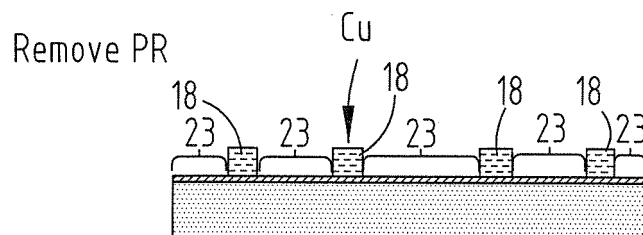


FIG. 5

2/4

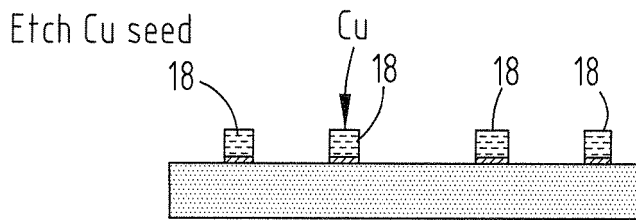


FIG. 6

E'less Sn deposition (few nano meters)

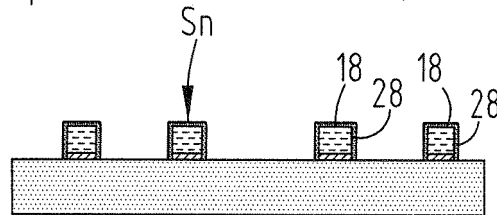
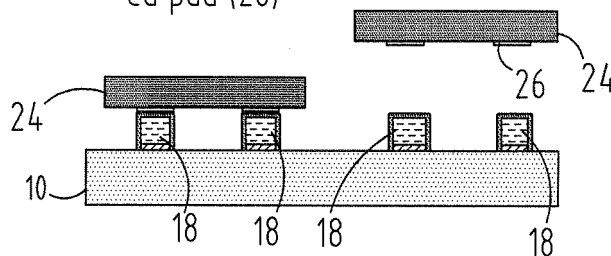


FIG. 7

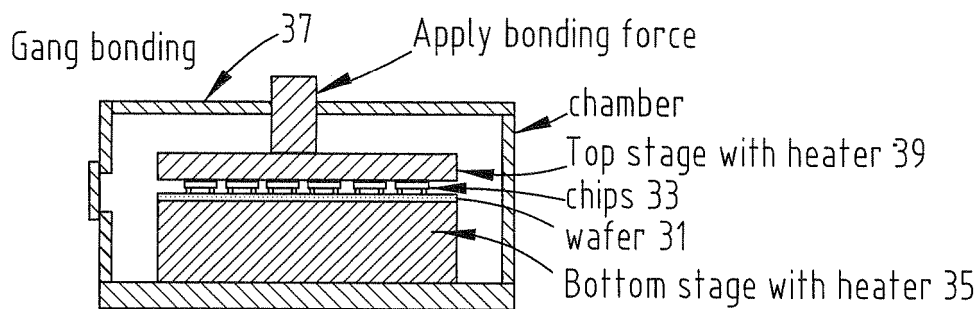
Bring chip and carry on flip chip bonding
Cu pad (26)



Top side chip may have the same configuration of Cu pillar or just a thin layer of Cu

- Keep wafer temperature as Rt to prevent solder diffuse into Cu
- Solder get heated by chip and get bonded

FIG. 8



- There may be other techniques in applying force (e.g. by air)

FIG. 9

3/4

Complete full wafer with temporary bonded chips

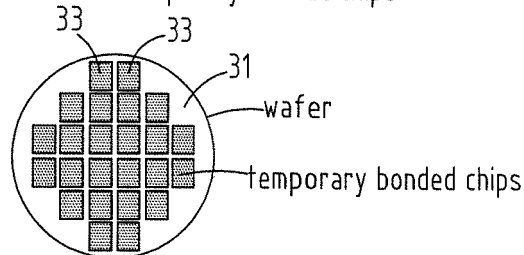
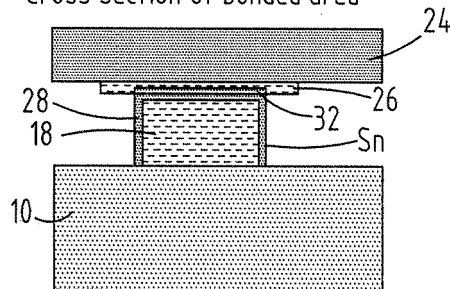


FIG. 10

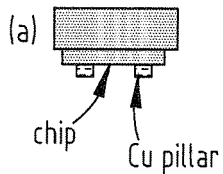
Cross section of bonded area



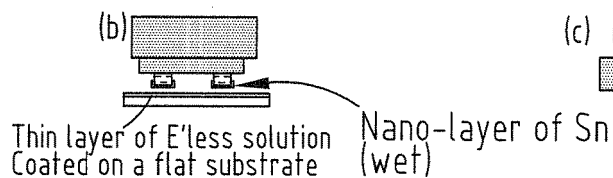
Based on Sn thickness, the thickness of '32' changes

FIG. 11

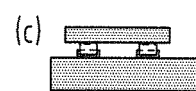
1. Pick up chip by FCB head



2. Dip in E'less solution



3. Temporary tacking



- Wet E'less solution gets dried depositing Sn joining chip and wafer
- Sn nano-layer thickness can be controlled to get permanent or temporary bond

FIG. 12

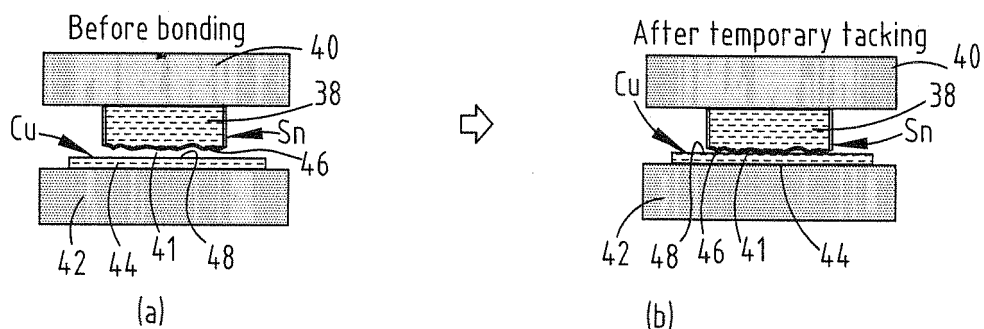


FIG. 13

4/4

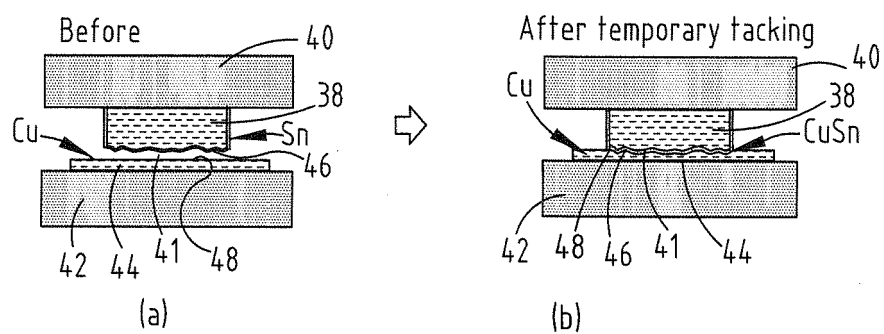


FIG. 14

- Bonding is mainly done by Cu-Cu (or Al-Al) diffusion bonding
- Solder gets diffused into Cu
- No visible Cu-Sn intermetallic layer

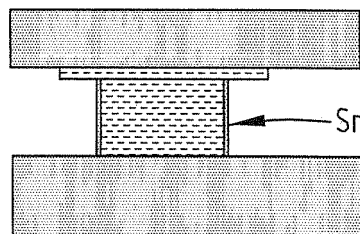


FIG. 15