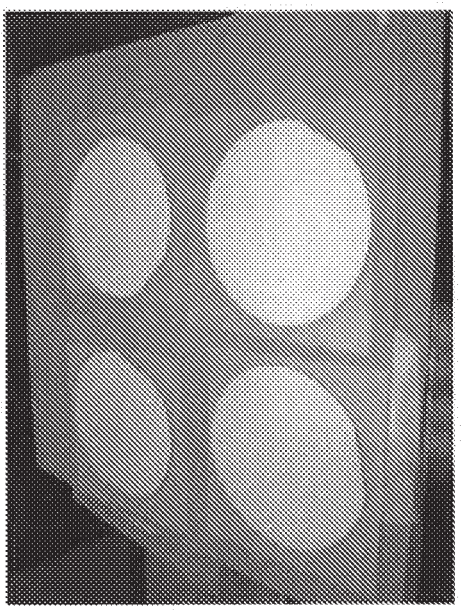


FIG. 1B

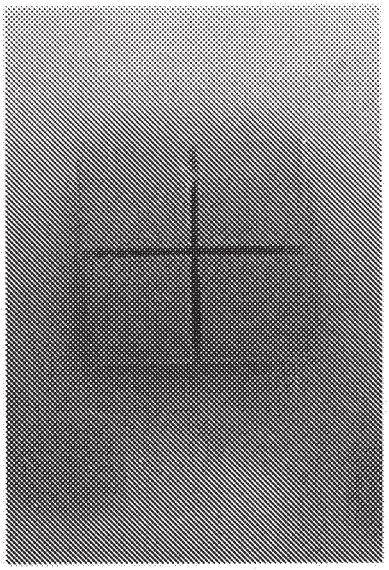


FIG. 1D

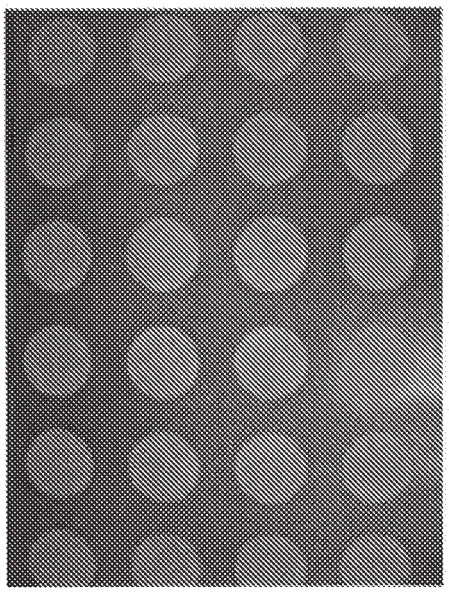


FIG. 1A

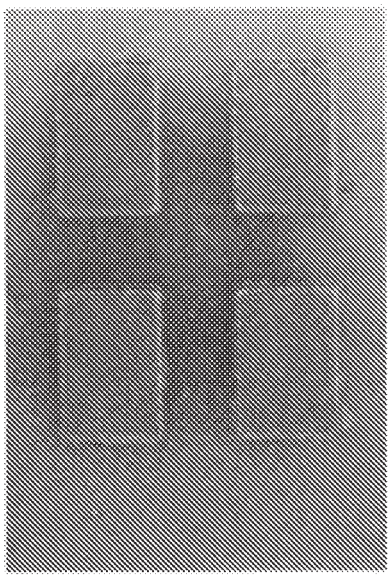


FIG. 1C

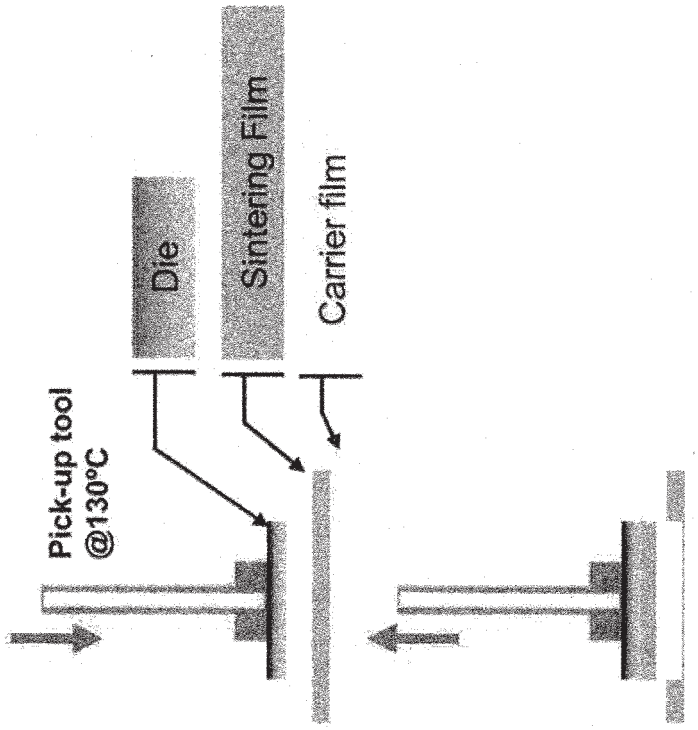


FIG. 2

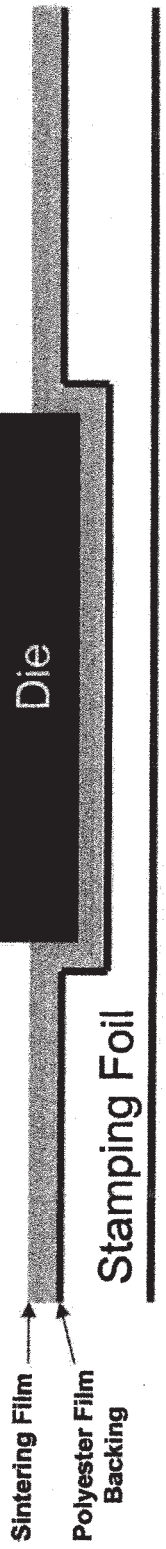


FIG. 3

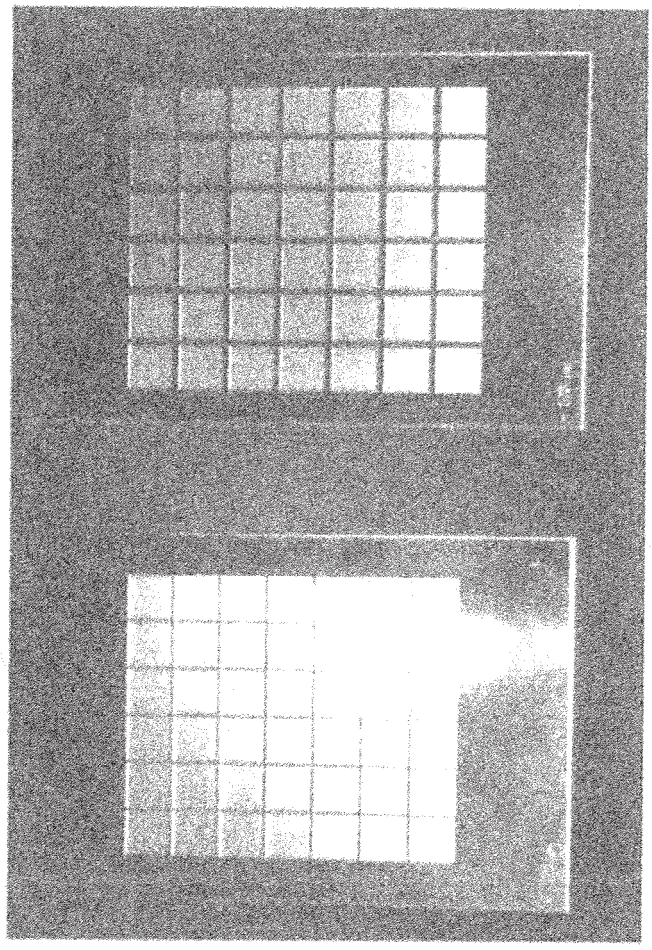


FIG. 4

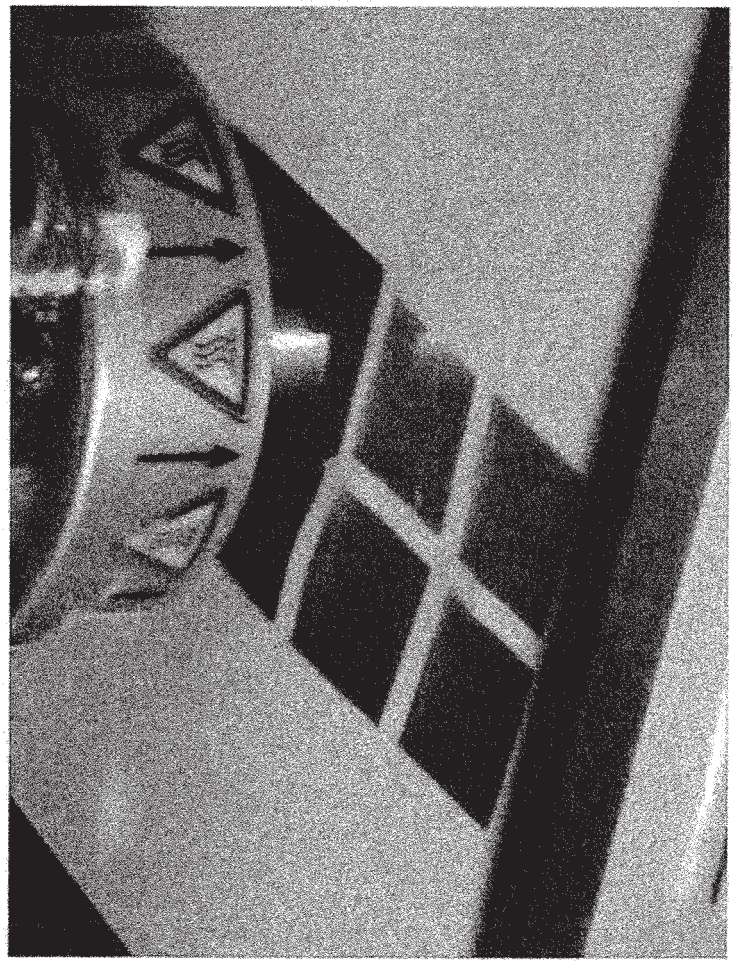


FIG. 5

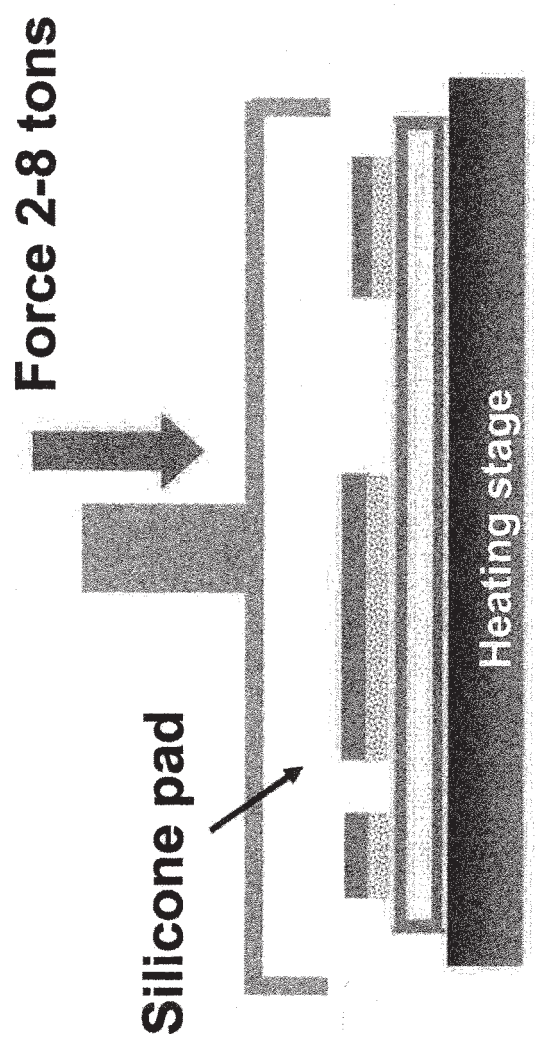


FIG. 6

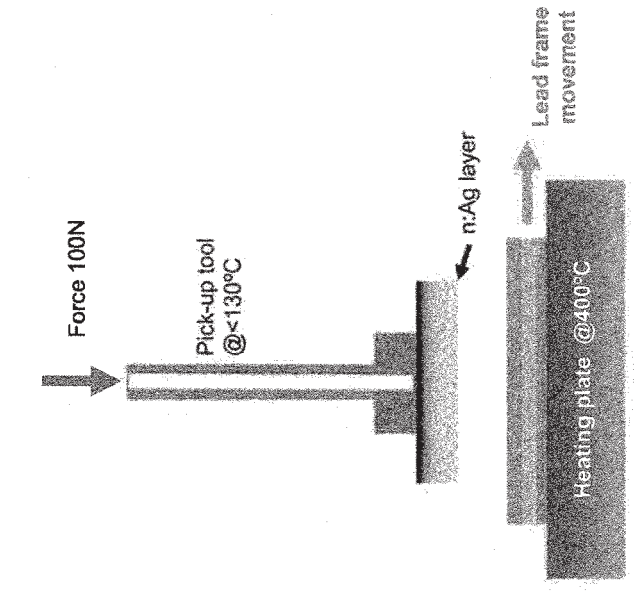

Force 100N
Pick-up tool
@<130°C
n:Ag layer
Lead frame
movement
Heating plate @400°C

FIG. 7B

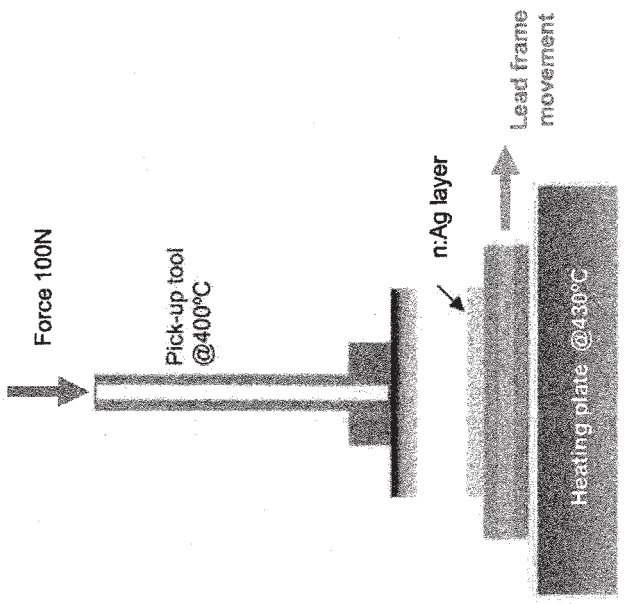

Force 100N
Pick-up tool
@400°C
n:Ag layer
Lead frame
movement
Heating plate @430°C

FIG. 7A

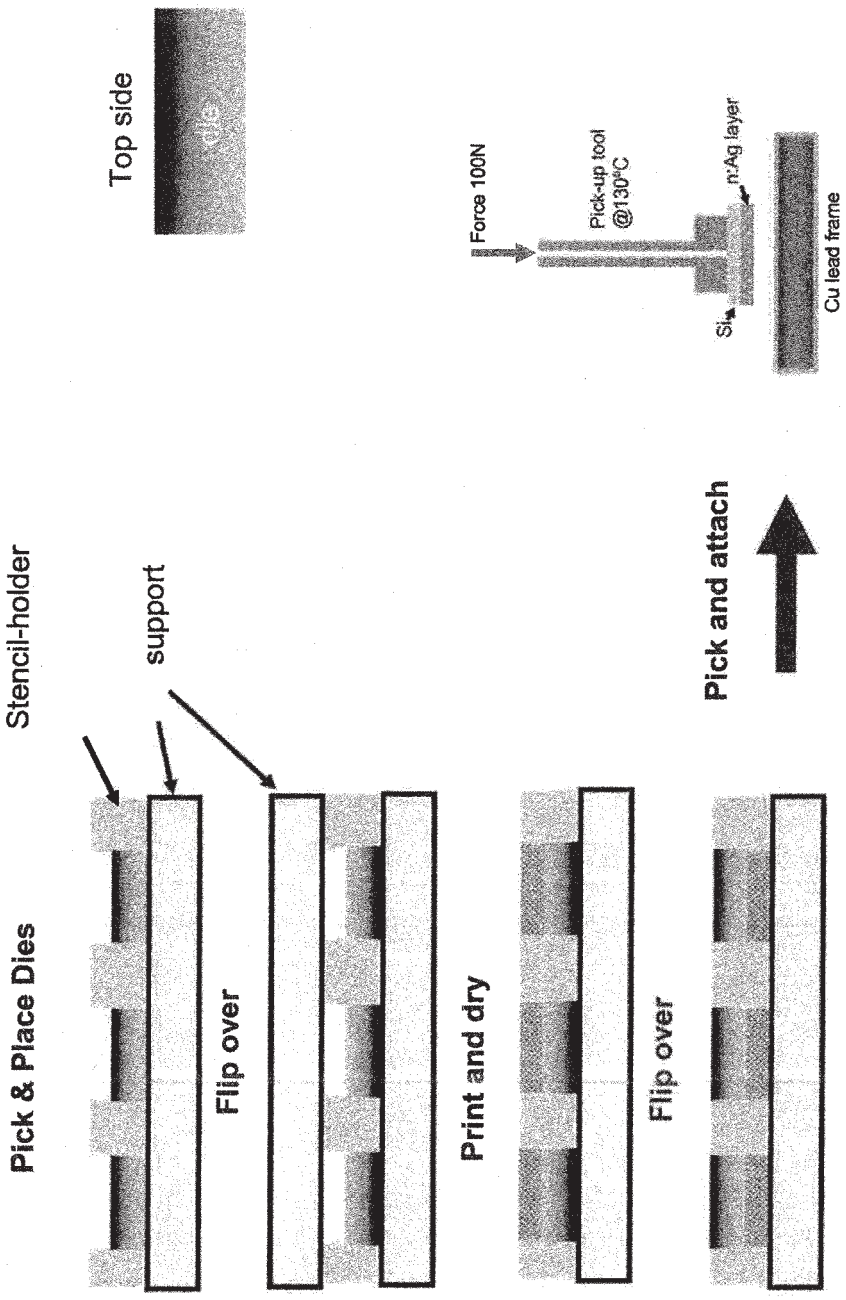

Top side
die
Force 100N
Pick-up tool
@130°C
n:Ag layer
Si
Cu lead frame
Pick and attach
Pick & Place Dies
Stencil-holder
support
Flip over
Print and dry
Flip over

FIG. 8

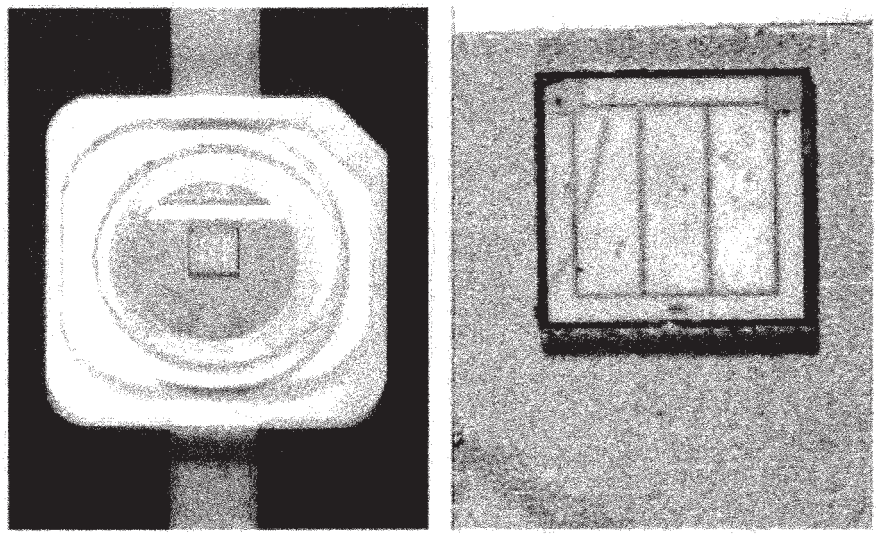


FIG. 9

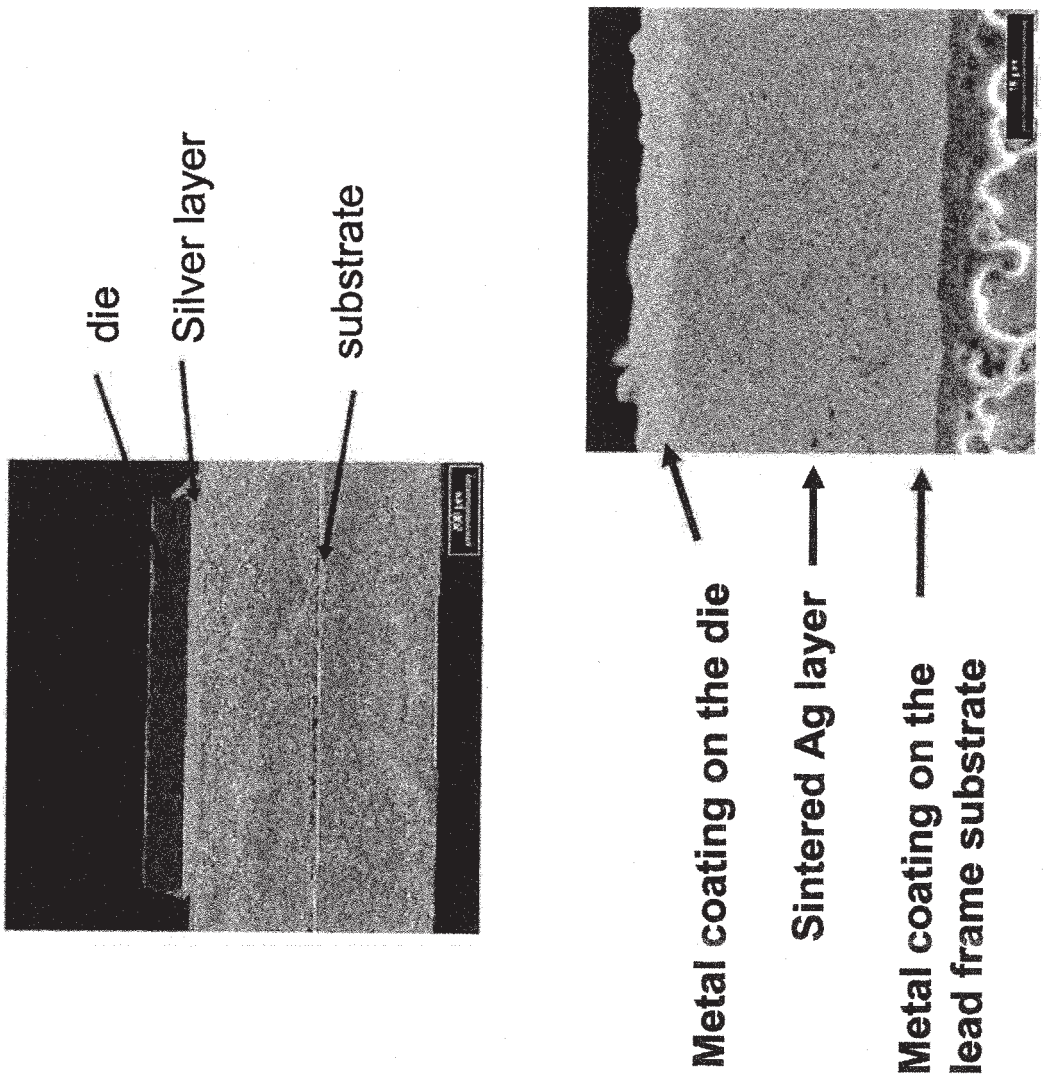

die
Silver layer
substrate
Metal coating on the die
Sintered Ag layer
Metal coating on the lead frame substrate

FIG. 10

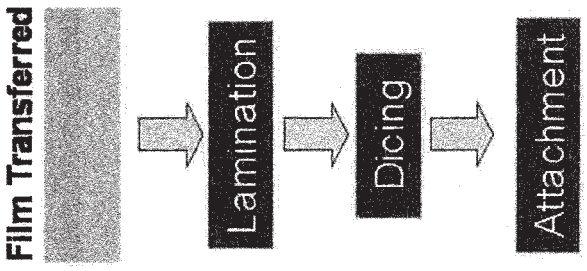


FIG. 11

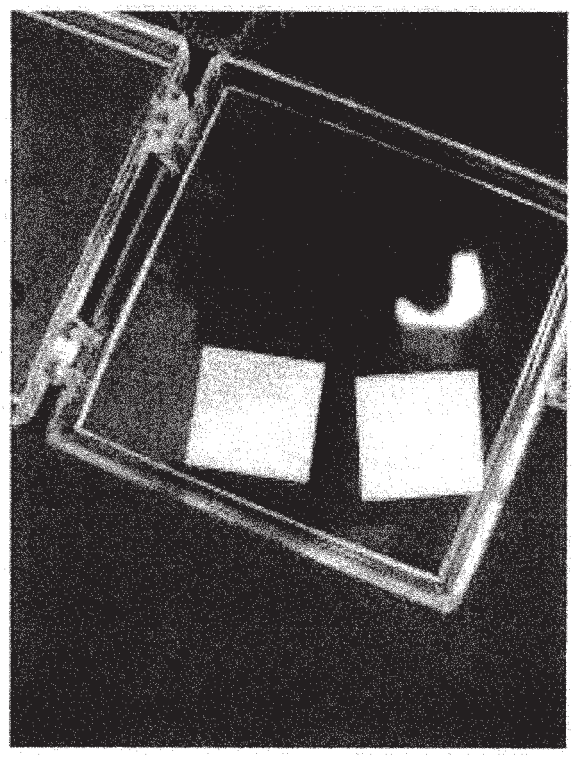


FIG. 12C

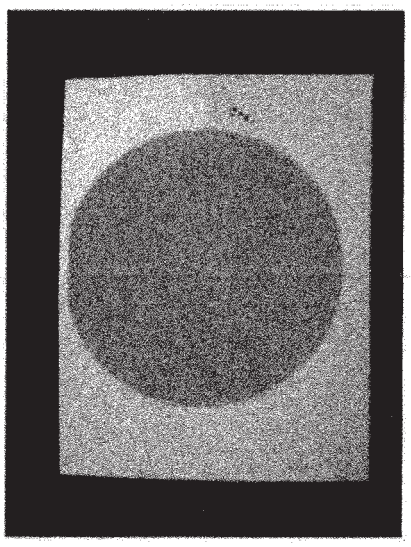


FIG. 12A

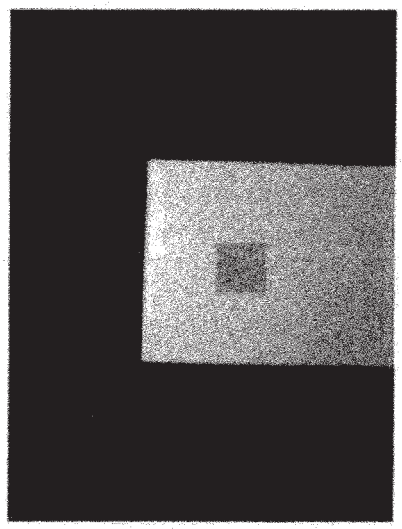


FIG. 12B

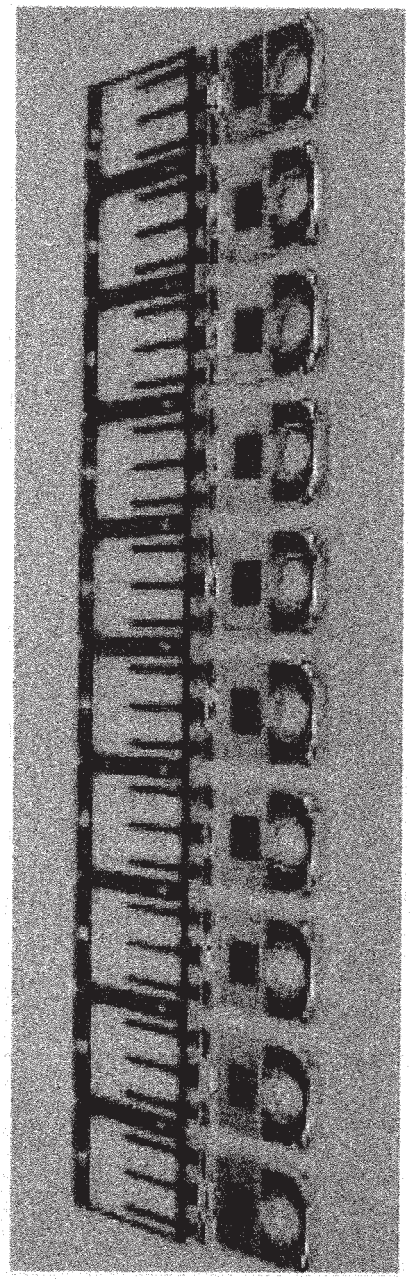


FIG. 13

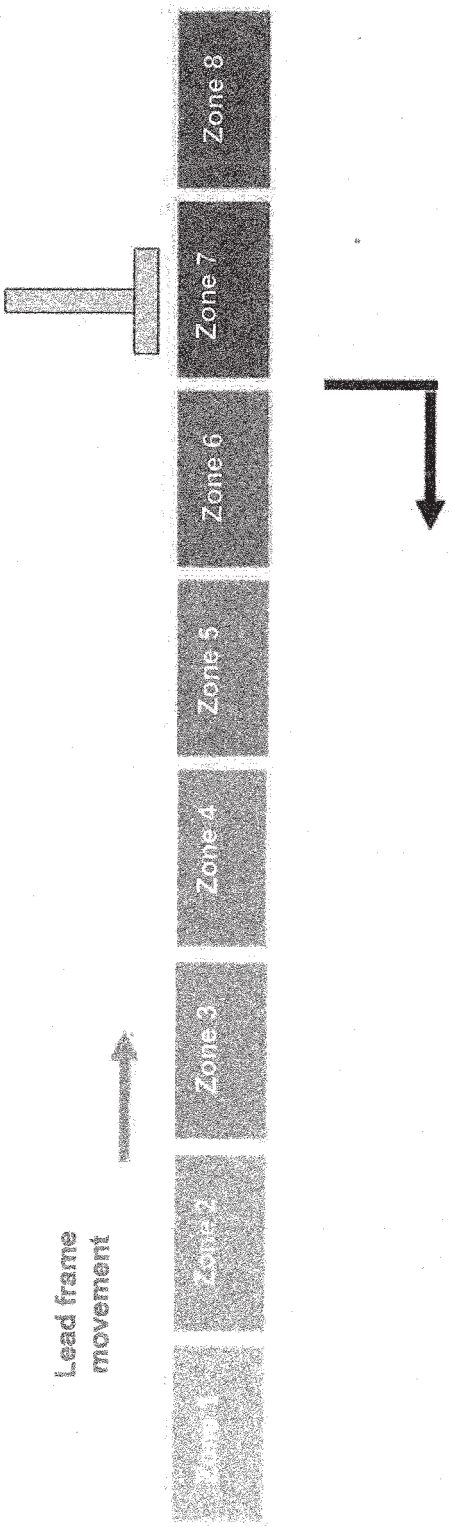

Zone 8
Zone 7
Zone 6
Zone 5
Zone 4
Zone 3
Zone 2
Zone 1
Lead frame movement

FIG. 14

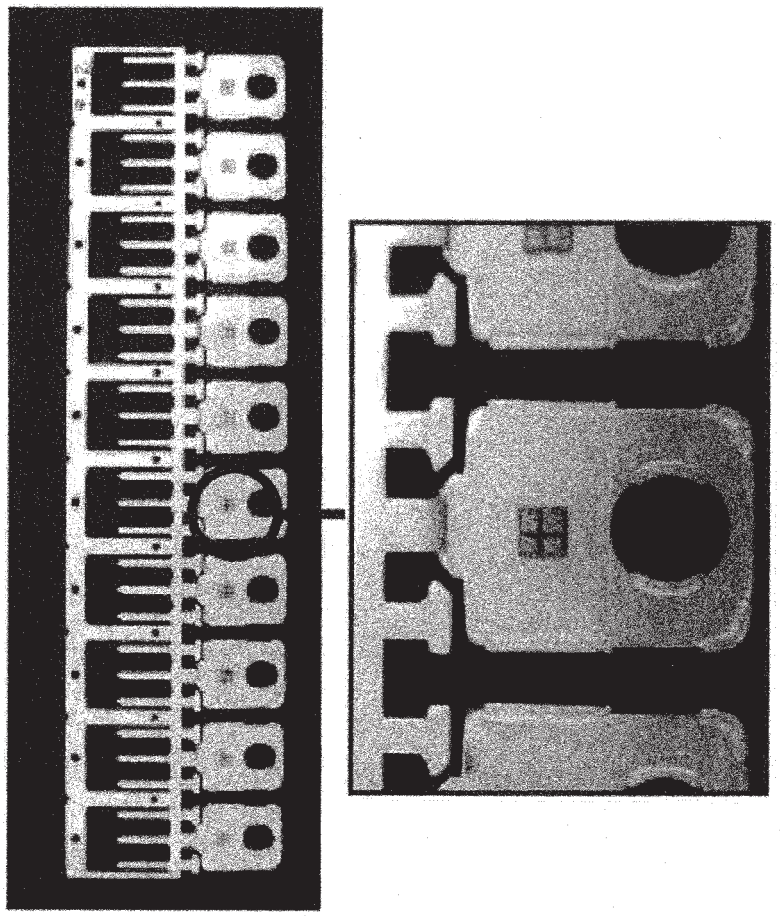


FIG. 15

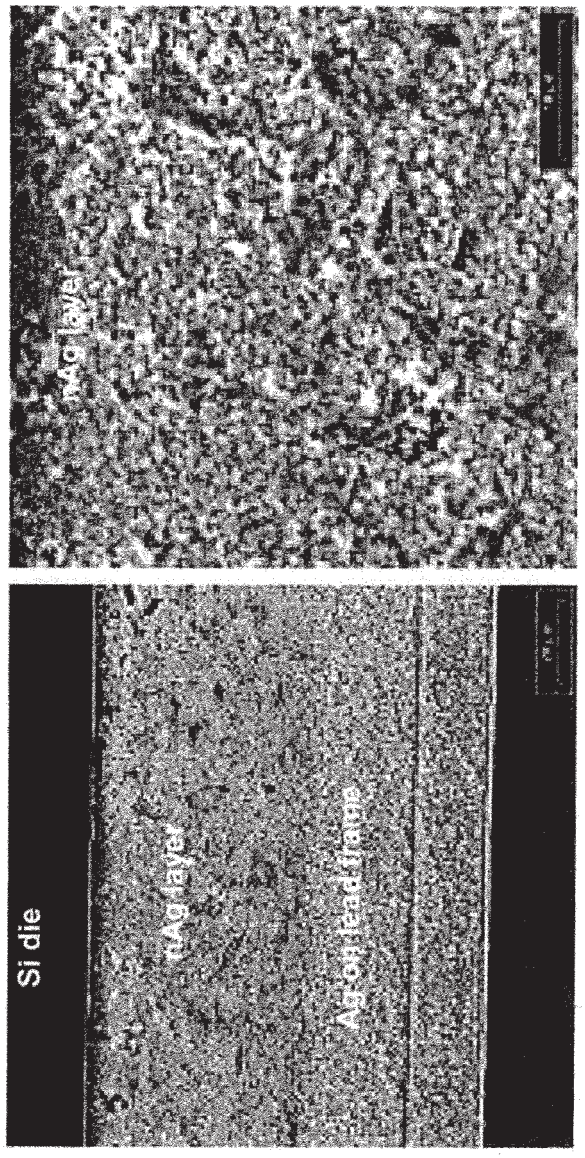


FIG. 16

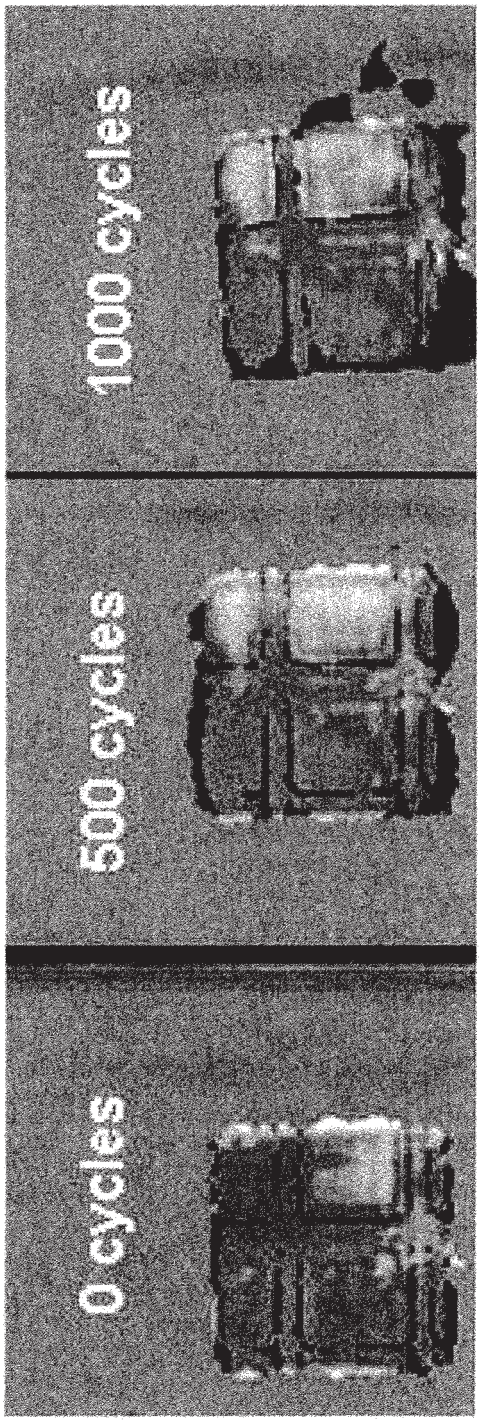


FIG. 17

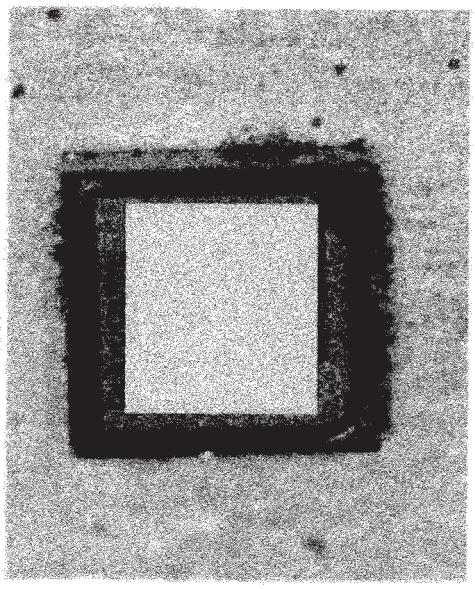


FIG. 18

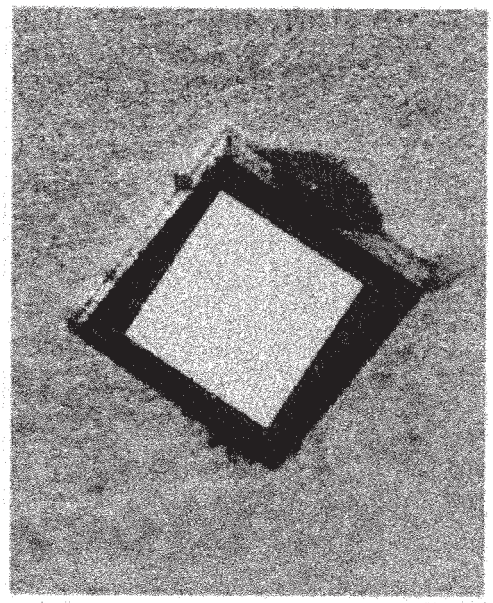


FIG. 19

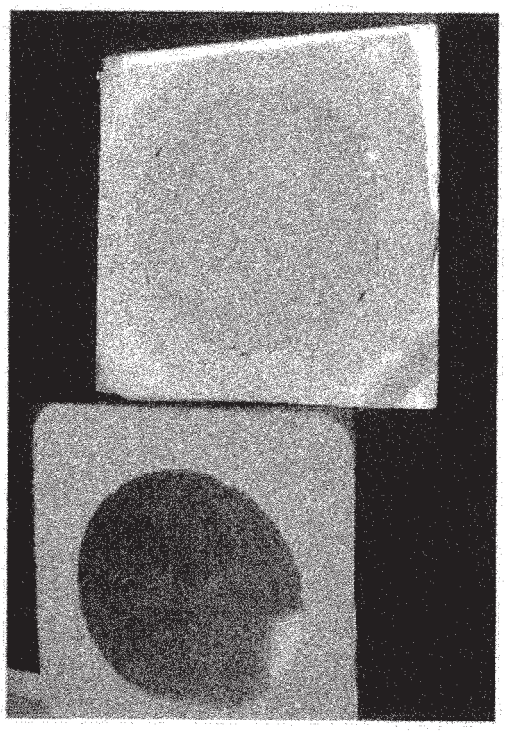


FIG. 20C

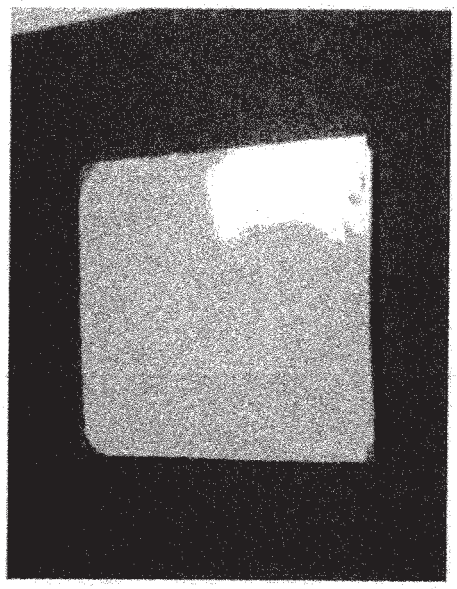


FIG. 20A

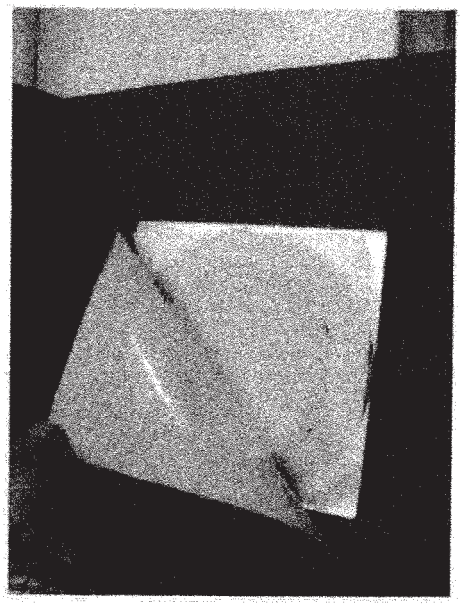


FIG. 20B

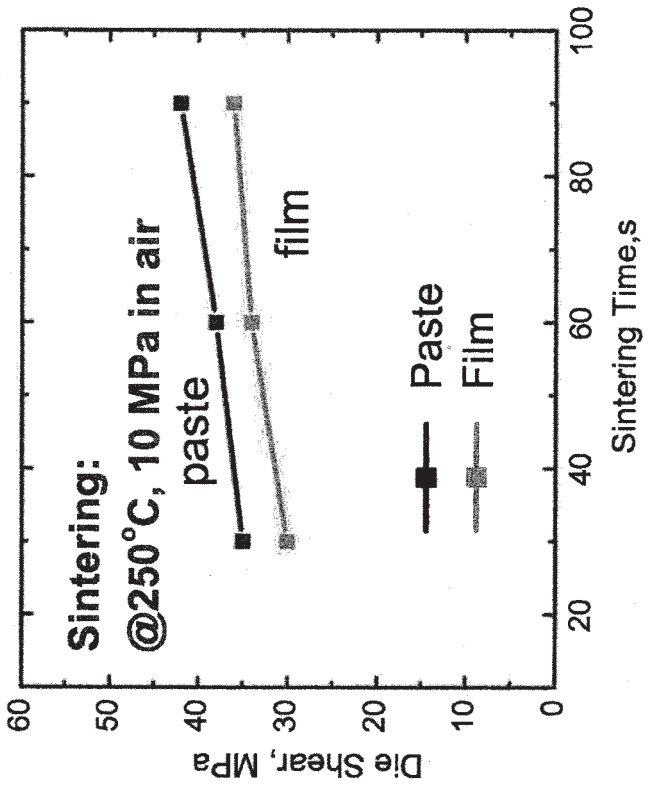

Sintering:
@250°C, 10 MPa in air
paste
film
Paste
Film
Die Shear, MPa
Sintering Time,s
0
10
20
30
40
50
60
20
40
60
80
100

FIG. 21

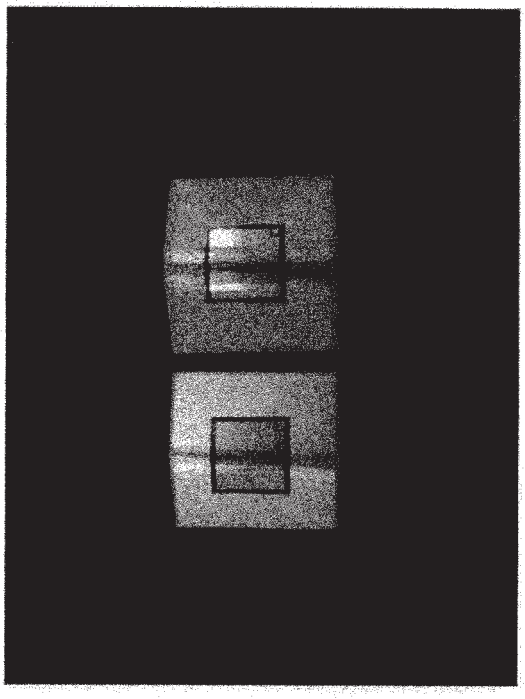


FIG. 22B

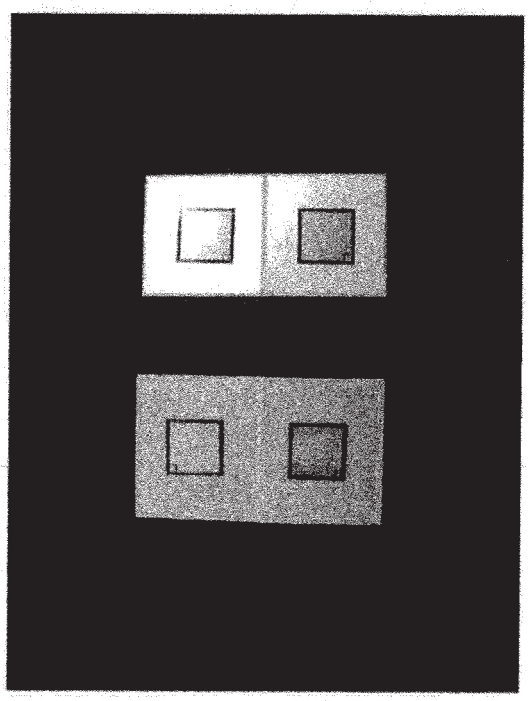


FIG. 22A

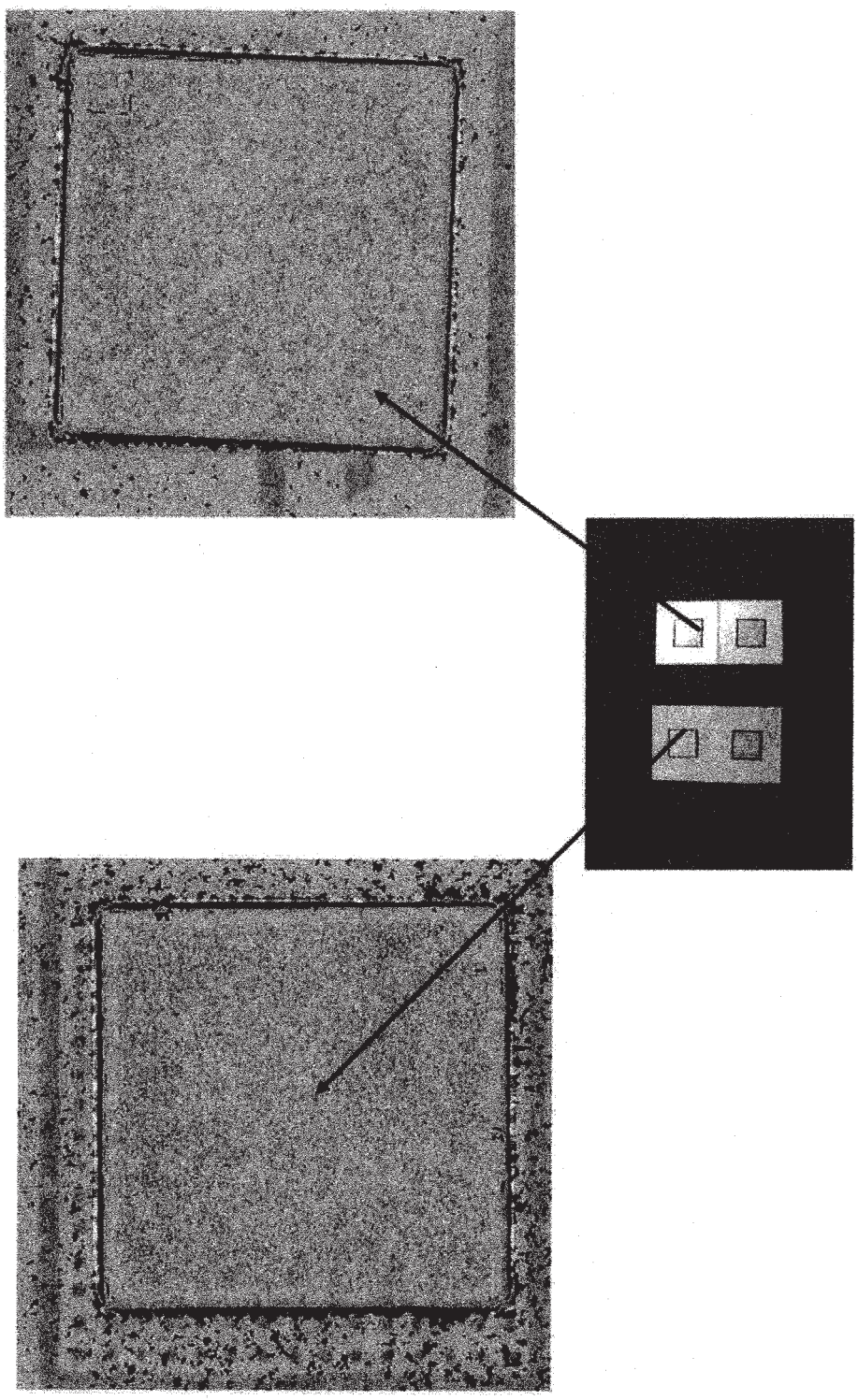
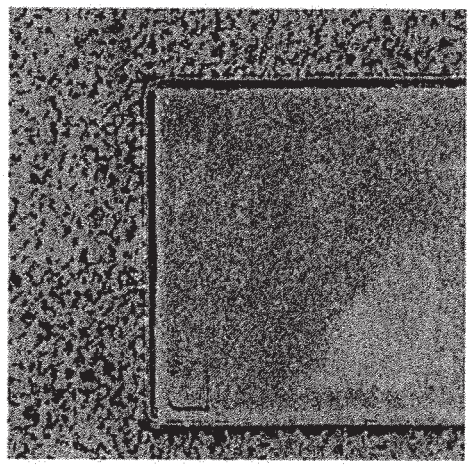


FIG. 23A



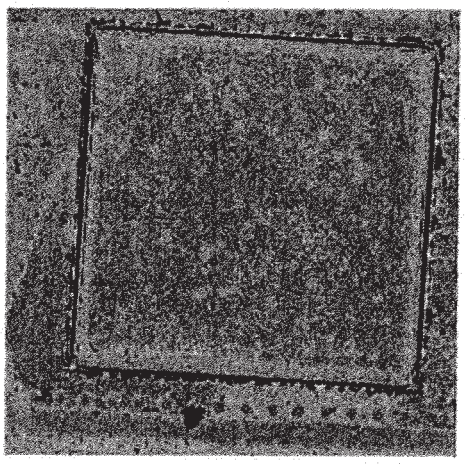


FIG. 23B