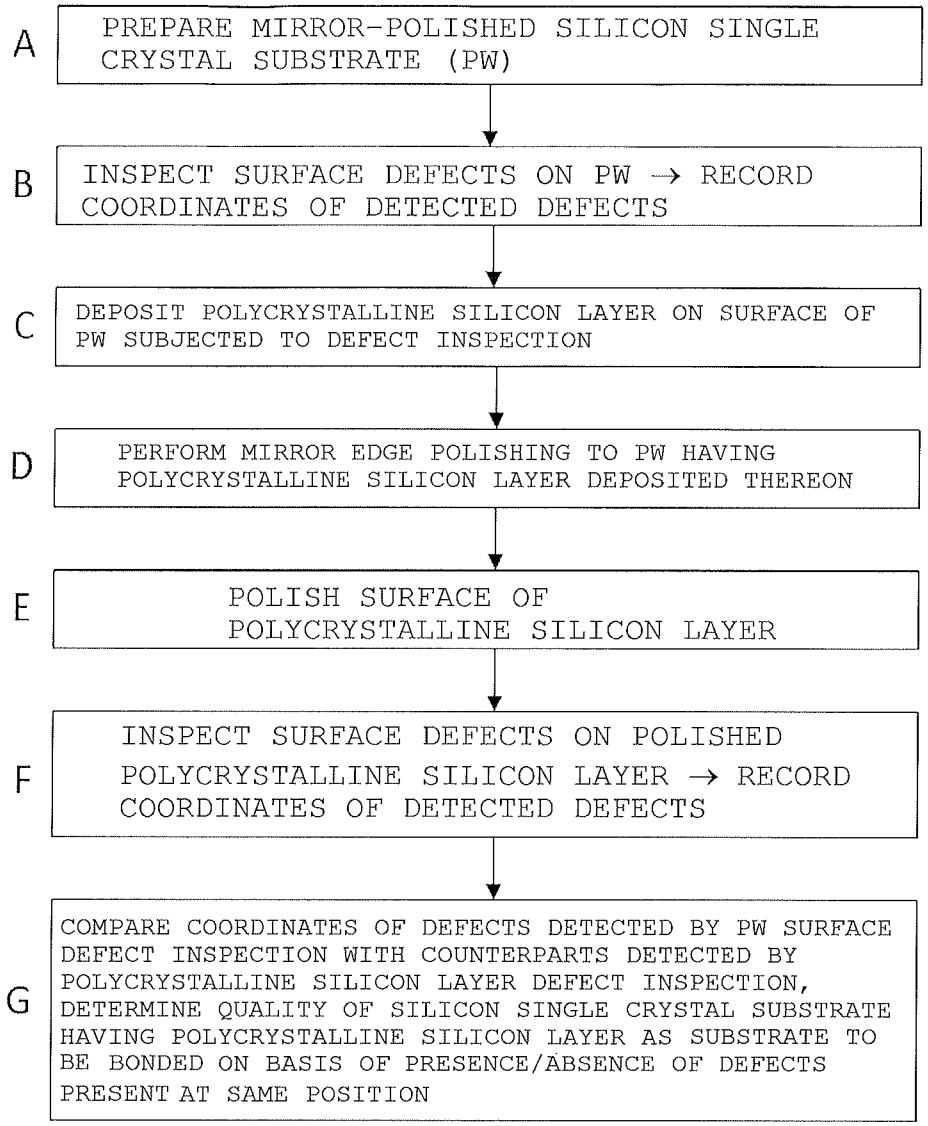
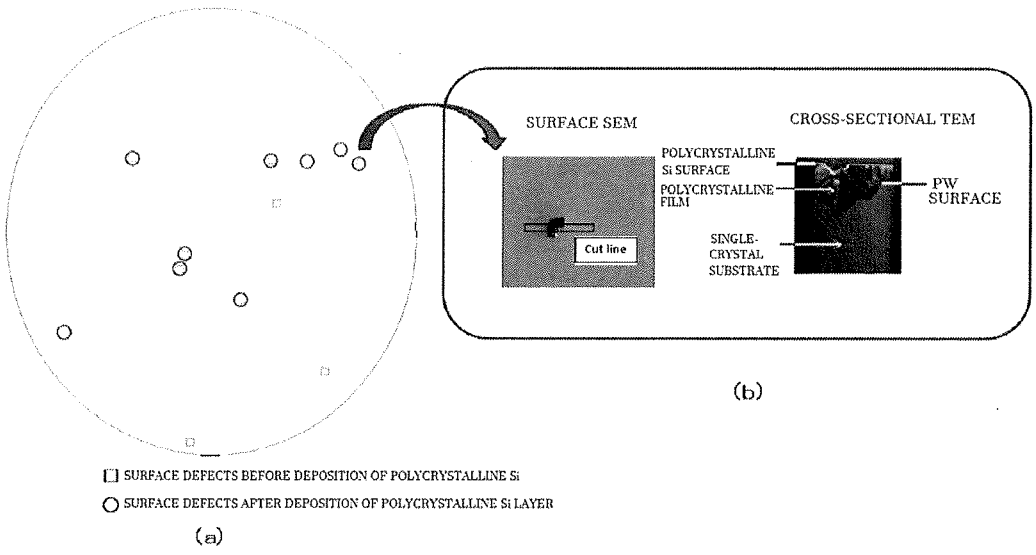
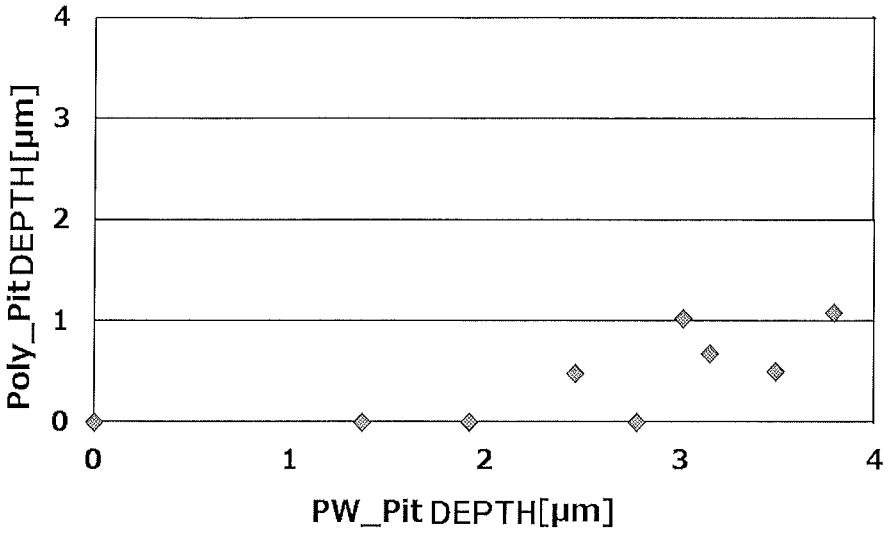
[FIG. 1]


A
PREPARE MIRROR-POLISHED SILICON SINGLE CRYSTAL SUBSTRATE (PW)
B
INSPECT SURFACE DEFECTS ON PW → RECORD COORDINATES OF DETECTED DEFECTS
C
DEPOSIT POLYCRYSTALLINE SILICON LAYER ON SURFACE OF PW SUBJECTED TO DEFECT INSPECTION
D
PERFORM MIRROR EDGE POLISHING TO PW HAVING POLYCRYSTALLINE SILICON LAYER DEPOSITED THEREON
E
POLISH SURFACE OF POLYCRYSTALLINE SILICON LAYER
F
INSPECT SURFACE DEFECTS ON POLISHED POLYCRYSTALLINE SILICON LAYER → RECORD COORDINATES OF DETECTED DEFECTS
G
COMPARE COORDINATES OF DEFECTS DETECTED BY PW SURFACE DEFECT INSPECTION WITH COUNTERPARTS DETECTED BY POLYCRYSTALLINE SILICON LAYER DEFECT INSPECTION, DETERMINE QUALITY OF SILICON SINGLE CRYSTAL SUBSTRATE HAVING POLYCRYSTALLINE SILICON LAYER AS SUBSTRATE TO BE BONDED ON BASIS OF PRESENCE/ABSENCE OF DEFECTS PRESENT AT SAME POSITION

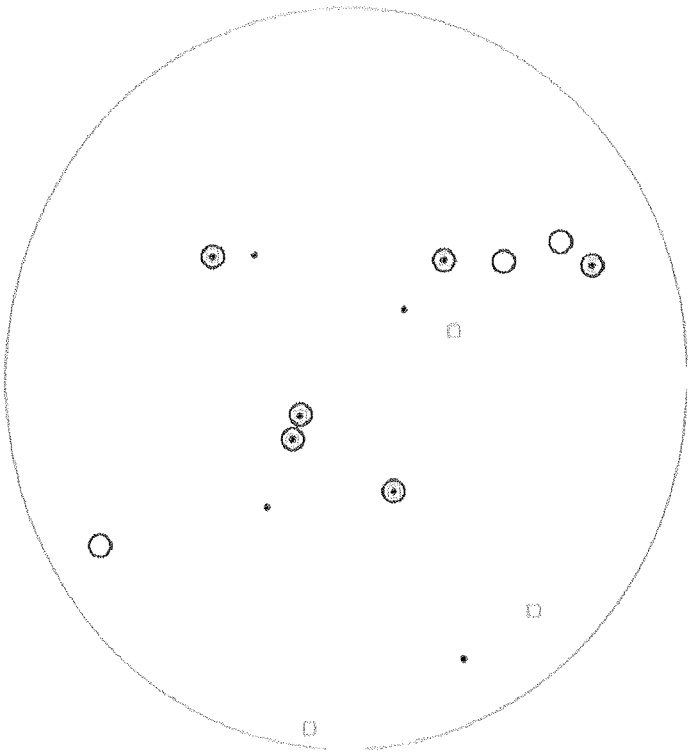
[FIG. 2]


SURFACE SEM
CROSS-SECTIONAL TEM
Cut line
POLYCRYSTALLINE Si SURFACE
POLYCRYSTALLINE FILM
SINGLE-CRYSTAL SUBSTRATE
PW SURFACE
(b)
SURFACE DEFECTS BEFORE DEPOSITION OF POLYCRYSTALLINE Si
SURFACE DEFECTS AFTER DEPOSITION OF POLYCRYSTALLINE Si LAYER
(a)

[FIG. 3]



[FIG. 4]

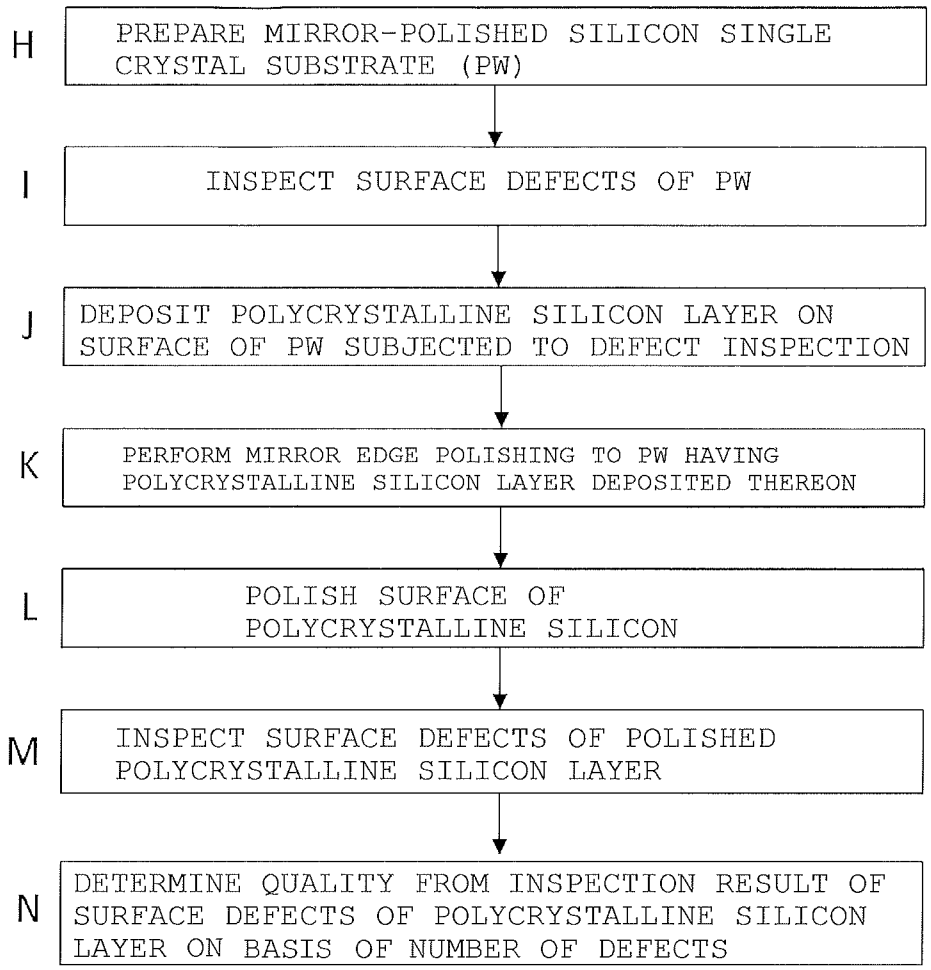


VOIDS AFTER BONDING

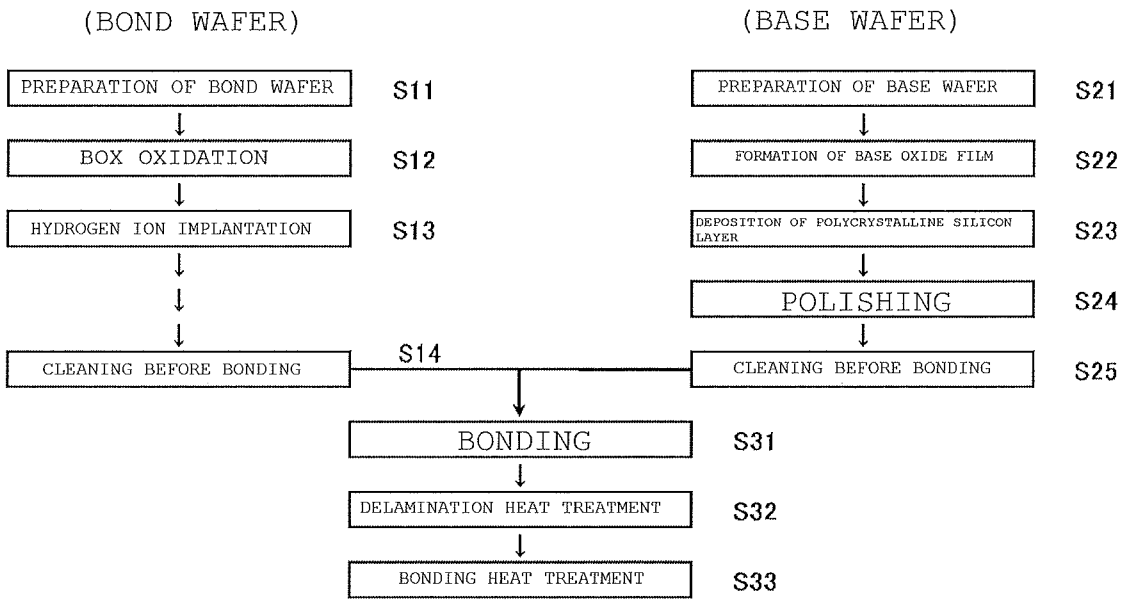
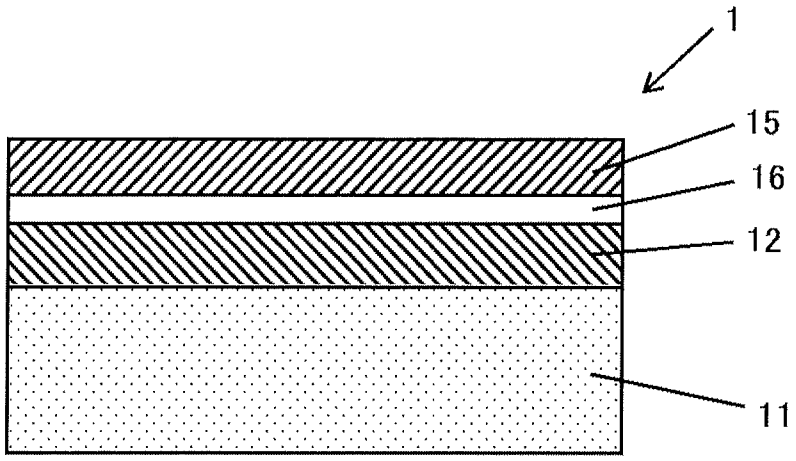
SURFACE DEFECTS BEFORE DEPOSITION OF POLYCRYSTALLINE Si

SURFACE DEFECTS AFTER DEPOSITION OF POLYCRYSTALLINE Si LAYER

[FIG. 5]


H
PREPARE MIRROR-POLISHED SILICON SINGLE CRYSTAL SUBSTRATE (PW)
I
INSPECT SURFACE DEFECTS OF PW
J
DEPOSIT POLYCRYSTALLINE SILICON LAYER ON SURFACE OF PW SUBJECTED TO DEFECT INSPECTION
K
PERFORM MIRROR EDGE POLISHING TO PW HAVING POLYCRYSTALLINE SILICON LAYER DEPOSITED THEREON
L
POLISH SURFACE OF POLYCRYSTALLINE SILICON
M
INSPECT SURFACE DEFECTS OF POLISHED POLYCRYSTALLINE SILICON LAYER
N
DETERMINE QUALITY FROM INSPECTION RESULT OF SURFACE DEFECTS OF POLYCRYSTALLINE SILICON LAYER ON BASIS OF NUMBER OF DEFECTS

[FIG. 6]


(BOND WAFER)
(BASE WAFER)
PREPARATION OF BOND WAFER
S11
BOX OXIDATION
S12
HYDROGEN ION IMPLANTATION
S13
CLEANING BEFORE BONDING
S14
PREPARATION OF BASE WAFER
S21
FORMATION OF BASE OXIDE FILM
S22
DEPOSITION OF POLYCRYSTALLINE SILICON LAYER
S23
POLISHING
S24
CLEANING BEFORE BONDING
S25
BONDING
S31
DELAMINATION HEAT TREATMENT
S32
BONDING HEAT TREATMENT
S33

[FIG. 7]