CLAIMS

1. A method for manufacturing an SOI wafer, at least comprising:

a step of providing a base wafer and a bond wafer, the base wafer comprising a silicon single crystal wafer containing a dopant across the wafer and having a first main surface and a second main surface opposite the first main surface, the bond wafer comprising a silicon single crystal wafer containing a dopant at a lower concentration than a dopant concentration of the base wafer;

a thermal oxidation step of forming a silicon oxide film on an entire surface of the base wafer by thermal oxidation;

a bonding step of bonding one main surface of the bond wafer to the first main surface of the base wafer via the silicon oxide film on the base wafer; and

a thinning step of thinning the bond wafer to form an SOI layer, wherein

the method further comprises, prior to the thermal oxidation step for the base wafer:

a step of forming a CVD insulator film on the second main surface of the base wafer; and

a step of forming a barrier silicon layer on the first main surface of the base wafer, the barrier silicon layer containing a dopant at a lower concentration than the dopant concentration of the base wafer, wherein

in the thermal oxidation step, the barrier silicon layer is thermally oxidized to produce a barrier silicon oxide film as a part of the silicon oxide film, and

in the bonding step, the one main surface of the

bond wafer is bonded to the first main surface of the base wafer via the barrier silicon oxide film as a part of the silicon oxide film.

2. The method for manufacturing an SOI wafer according to claim 1, further comprising a step of forming a silicon oxide film on an entire surface of the bond wafer prior to the bonding step.

3. The method for manufacturing an SOI wafer according to claim 1, wherein, in the bonding step, a silicon single crystal surface in the one main surface of the bond wafer is directly bonded to a surface of the barrier silicon oxide film of the base wafer.

4. The method for manufacturing an SOI wafer according to any one of claims 1 to 3, further comprising, prior to the bonding step, an ion implantation step of implanting at least one kind of ions selected from a group consisting of hydrogen ion and rare gas ions into the bond wafer to form an ion implanted layer, wherein

in the thinning step, the bond wafer is delaminated with the ion implanted layer used as a delaminating plane to thereby thin the bond wafer to produce the SOI layer.

5. The method for manufacturing an SOI wafer according to any one of claims 1 to 4, wherein, in the step of forming the CVD insulator film, any one of a CVD oxide film, a CVD nitride film, and a CVD oxynitride film is formed as the CVD insulator film.

6. The method for manufacturing an SOI wafer according to any one of claims 1 to 5, wherein a wafer with the dopant concentration of 1×10^{17} atoms/cm^3 or more is provided as the base wafer.

7. The method for manufacturing an SOI wafer according to any one of claims 1 to 6, wherein a layer with a dopant concentration of 1×10^{16} atoms/cm^3 or less is formed as the barrier silicon layer.

8. The method for manufacturing an SOI wafer according to any one of claims 1 to 7, wherein

in the thermal oxidation step, thermal oxidation is performed such that a part of the barrier silicon layer remains unoxidized, and

annealing is subsequently applied to diffuse the dopant in the base wafer into a layer of the unoxidized part of the barrier silicon layer.

9. An SOI wafer comprising:

a base wafer;

a buried oxide film; and

an SOI layer bonded to the base wafer via the buried oxide film, wherein

the base wafer comprises a silicon single crystal wafer containing a dopant across the wafer and having a first main surface and a second main surface opposite the first main surface, the first main surface being a bonding surface for bonding to the SOI layer,

a barrier silicon oxide film as at least a part of the buried oxide film is disposed on the first main surface of the base wafer,

a backside silicon oxide film is disposed on the

second main surface of the base wafer,

a CVD insulator film is disposed on a surface of the backside silicon oxide film facing away from the base wafer,

the SOI layer comprises a silicon single crystal containing a dopant at a lower concentration than a dopant concentration of the base wafer, and

a concentration of a dopant in the barrier silicon oxide film is lower than a concentration of a dopant in the backside silicon oxide film.

10. The SOI wafer according to claim 9, wherein

a barrier silicon layer is disposed between the base wafer and the barrier silicon oxide film, and

a dopant of a same kind as the dopant contained in the base wafer is diffused in the barrier silicon layer.