

CLAIMS

1. A method for manufacturing an SOI wafer having an SOI layer including a thinning step to adjust an SOI film thickness of the SOI wafer, comprising the steps of:

(A1) measuring the SOI film thickness of the SOI wafer having the SOI layer before the thinning step;

(A2) determining a rotational position of the SOI wafer in the thinning step on the basis of a radial SOI film thickness distribution obtained in the measuring of the film thickness of the step (A1) and a previously determined radial stock removal distribution in the thinning step so as to make the wafer to have small radial variance of difference between the film thickness of the SOI layer before the thinning step and the stock removal in the thinning step, and rotating the SOI wafer around the central axis thereof so as to bring the SOI wafer to the determined rotational position; and

(A3) thinning the SOI layer of the SOI wafer rotated in the step (A2),

wherein the thinning step is performed by immersion in SC1 solution.

2. A method for manufacturing an SOI wafer having an SOI layer including a thinning step to adjust an SOI film thickness of the SOI wafer, comprising the steps of:

(B0) heat treatment under an oxidizing gas atmosphere to form a thermal oxide film on a surface of the SOI layer;

(B1) measuring the SOI film thickness of the SOI wafer having the thermal oxide film formed in the step (B0) with the thermal oxide film remaining;

(B2) determining a rotational position of the SOI

wafer in the thinning step on the basis of a radial SOI film thickness distribution obtained in the measuring of the film thickness of the step (B1) and a previously determined radial stock removal distribution in the thinning step, and rotating the SOI wafer around the central axis thereof so as to bring the SOI wafer to the determined rotational position; and

(B3) thinning the SOI layer by batch processing cleaning which includes removing the thermal oxide film on the surface of the SOI layer and etching of the SOI layer of the SOI wafer rotated in the step (B2), with the etching amount of the SOI layer being controlled on the basis of the SOI film thickness obtained in the step (B1).

3. A method for manufacturing an SOI wafer having an SOI layer including a first thinning step and a second thinning step to adjust an SOI film thickness of the SOI wafer, comprising the steps of:

(C0) heat treatment under an oxidizing gas atmosphere to form a thermal oxide film on a surface of the SOI layer;

(C1) measuring the SOI film thickness of the SOI wafer having the thermal oxide film formed in the step (C0) with the thermal oxide film remaining;

(C2) determining a rotational position of the SOI wafer in the first thinning step on the basis of a radial SOI film thickness distribution obtained in the measuring of the film thickness of the step (C1) and a previously determined radial stock removal distribution in the first thinning step, and rotating the SOI wafer around the central axis thereof so as to bring the SOI wafer to the determined rotational position;

(C3) thinning the SOI layer to be thicker than a

final target value of the film thickness as the first thinning step by batch processing cleaning which includes removing the thermal oxide film on the surface of the SOI layer and etching of the SOI layer of the SOI wafer rotated in the step (C2), with the etching amount of the SOI layer being controlled on the basis of the SOI film thickness obtained in the step (C1);

(C4) measuring the SOI film thickness of the SOI wafer after the first thinning step;

(C5) determining a rotational position of the SOI wafer in the second thinning step on the basis of a radial SOI film thickness distribution obtained in the measuring of the film thickness of the step (C4) and a previously determined radial stock removal distribution in the second thinning step, and rotating the SOI wafer around the central axis thereof so as to bring the SOI wafer to the determined rotational position; and

(C6) thinning the SOI layer to be the final target value of the film thickness as the second thinning step by cleaning which includes etching of the SOI layer of the SOI wafer rotated in the step (C5), with the etching amount of the SOI layer being controlled on the basis of the SOI film thickness obtained in the step (C4).

4. The method for manufacturing an SOI wafer according to claim 3, wherein the cleaning of the step (C6) is performed by single wafer processing.

5. The method for manufacturing an SOI wafer according to any one of claims 1 to 4, wherein the rotational position is determined to a position where an area showing the maximum value of the radial SOI film thickness distribution obtained in the measuring of the film

thickness corresponds to an area showing the maximum value of the previously determined radial stock removal distribution in the thinning step.

6. The method for manufacturing an SOI wafer according to any one of claims 1 to 4, wherein the rotational position is determined to a position where an area showing the minimum value of the radial SOI film thickness distribution obtained in the measuring of the film thickness corresponds to an area showing the minimum value of the previously determined radial stock removal distribution in the thinning step.

7. The method for manufacturing an SOI wafer according to any one of claims 1 to 4, wherein the rotational position is determined to a position where a difference between a calculated radial maximum value and a calculated radial minimum value of the SOI film thickness after the thinning step is minimum in calculation of the respective radial SOI film thickness distributions after the thinning step when altering the rotational position by a prescribed angle on the basis of the radial SOI film thickness distribution obtained by the measuring of the film thickness and the previously determined radial stock removal distribution in the thinning step.

8. The method for manufacturing an SOI wafer according to any one of claims 1 to 7, wherein the step of measuring the SOI film thickness before the thinning step and the subsequent step of rotating the SOI wafer are performed in the same apparatus.

9. The method for manufacturing an SOI wafer according to any one of claims 1 to 8, wherein the SOI layer is formed by an ion implantation delamination method including at least the steps of:

bonding a bond wafer having a micro bubble layer formed by an ion implantation with a base wafer to be a support substrate, and

delaminating the bond wafer along the micro bubble layer as a boundary to form a thin film on the base wafer.

10. The method for manufacturing an SOI wafer according to any one of claims 2 to 4, wherein the thinning step is performed by immersion in SC1 solution.