

WHAT IS CLAIMED IS:

1. A semiconductor substrate processing method comprising:

a peeling layer forming step of forming a peeling layer at a designated depth within a first semiconductor substrate by irradiating the first semiconductor substrate with a laser beam having a wavelength capable of passing through the first semiconductor substrate while positioning a focal point of the laser beam within the first semiconductor substrate;

a second semiconductor substrate forming step of forming a second semiconductor substrate by epitaxial growth on an upper surface of the first semiconductor substrate after performing the peeling layer forming step thereby forming a two-layer structure semiconductor substrate;

a peeling step of peeling off the first semiconductor substrate from the peeling layer; and

a grinding step of grinding and removing the first semiconductor substrate from the two-layer structure semiconductor substrate after performing the peeling step.

2. The semiconductor substrate processing method according to claim 1, wherein

the first semiconductor substrate is a low-

resistance polycrystalline SiC substrate, and the second semiconductor substrate is a high-resistance polycrystalline SiC substrate.

3. The semiconductor substrate processing method according to claim 1, wherein the peeling layer forming step includes forming a plurality of peeling layers by repeatedly irradiating the first semiconductor substrate, wherein the plurality of peeling layers continuously extend in an X-axis direction at intervals of a predetermined index amount in a Y-axis direction.

4. The semiconductor substrate processing method according to claim 1, wherein the peeling step includes immersing the two-layer structure semiconductor substrate in water and actuating an ultrasonic vibrator.

5. The semiconductor substrate processing method according to claim 1, wherein the peeling step includes applying an impact to the peeling layer.

6. A semiconductor substrate processing method comprising:

a peeling layer forming step of forming a peeling layer by irradiating a first semiconductor substrate with a laser beam having a wavelength capable of passing through the first semiconductor substrate while positioning a focal point of the laser beam within the first semiconductor substrate;

a second semiconductor substrate forming step of forming a second semiconductor substrate by epitaxial growth directly on the first semiconductor substrate after performing the peeling layer forming step thereby forming a two-layer structure semiconductor substrate;

a peeling step of peeling off the first semiconductor substrate from the peeling layer; and a grinding step of grinding and removing the first semiconductor substrate from the two-layer structure semiconductor substrate after performing the peeling step.

7. The semiconductor substrate processing method according to claim 6, wherein the first semiconductor substrate is a low-resistance polycrystalline SiC substrate, and the second semiconductor substrate is a high-resistance polycrystalline SiC substrate.

8. The semiconductor substrate processing method according to claim 6, wherein the peeling layer forming step includes forming a plurality of peeling layers by repeatedly irradiating the first semiconductor substrate, wherein the plurality of peeling layers continuously extend in an X-axis direction at intervals of a predetermined index amount in a Y-axis direction.

9. The semiconductor substrate processing method

according to claim 6, wherein the peeling step includes immersing the two-layer structure semiconductor substrate in water and actuating an ultrasonic vibrator.

10. The semiconductor substrate processing method according to claim 6, wherein the peeling step includes applying an impact to the peeling layer.