

CLAIM

1. A substrate processing system, comprising:
 - a pre-alignment apparatus comprising a pre-alignment stage configured to hold a processing target substrate and a detector configured to detect a center position and a crystal orientation of the processing target substrate held by the pre-alignment stage; and
 - a laser processing apparatus comprising a laser processing stage configured to hold the processing target substrate and a laser processing head configured to radiate and concentrate a laser beam for processing the processing target substrate to the processing target substrate held by the laser processing stage,wherein the pre-alignment apparatus is disposed above the laser processing apparatus.
2. The substrate processing system of Claim 1, further comprising:
 - a carry-in/out station in which a cassette accommodating therein the processing target substrate is carried in or out; and
 - a thinning apparatus configured to thin the processing target substrate,wherein the thinning apparatus and the carry-in/out station are disposed at opposite sides from each other with the laser processing apparatus therebetween in a horizontal direction.
3. The substrate processing system of Claim 2, further comprising:
 - a transfer device configured to be moved between the carry-in/out station and the thinning apparatus while holding the processing target substrate, and deliver the processing target substrate to the carry-in/out station and the thinning apparatus.

4. The substrate processing apparatus of Claim 3,
wherein the transfer device is equipped with a transfer arm configured to be moved along a guide rail which is provided in a transfer section adjacent to the laser processing apparatus in the horizontal direction.

5. The substrate processing apparatus of Claim 4, further comprising:
a coating apparatus configured to coat an adhesive on a bonding surface of a support substrate to be bonded with the processing target substrate or on a bonding surface of the processing target substrate to be bonded with the support substrate; and

a bonding apparatus configured to bond the support substrate and the processing target substrate with the adhesive therebetween,

wherein the coating apparatus and the bonding apparatus are disposed adjacent to the transfer section.

6. The substrate processing apparatus of Claim 4 or 5, further comprising:
a control device configured to control a transfer of the processing target substrate from the pre-alignment apparatus to the thinning apparatus by the transfer arm.

7. The substrate processing apparatus of any one of Claims 1 to 6, further comprising:
a transfer arm disposed inside the laser processing apparatus when viewed from a vertical direction, and configured to transfer the processing target substrate from the pre-alignment apparatus to the laser processing apparatus.

8. A substrate processing method of processing a processing target substrate by using a substrate processing system as claimed in Claim 1, the substrate processing method comprising:

holding the processing target substrate by the pre-alignment stage and detecting, by the detector, the center position and the crystal orientation of the processing target substrate held by the pre-alignment stage; and

holding the processing target substrate by the laser processing stage and radiating and concentrating, by the laser processing head, the laser beam for processing the processing target substrate to the processing target substrate held by the laser processing stage.

9. The substrate processing method of Claim 8, further comprising:

thinning the processing target substrate by a thinning apparatus which is disposed at an opposite side from a carry-in/out station with the laser processing apparatus therebetween in a horizontal direction, the cassette accommodating therein the processing target substrate being carried in or out in the carry-in/out station.

10. The substrate processing method of Claim 9, further comprising:

transferring the processing target substrate to the carry-in/out station and the thinning apparatus by a transfer device configured to be moved between the carry-in/out station and the thinning apparatus while holding the processing target substrate.

11. The substrate processing method of Claim 10,

wherein the transfer device comprises a transfer arm configured to be moved along a guide rail which is provided in a transfer section adjacent to the laser processing apparatus in the horizontal direction,

wherein the substrate processing method comprises:

transferring, by the transfer arm, the processing target substrate to the carry-in/out station and the thinning apparatus.

12. The substrate processing method of Claim 11, further comprising:

coating, by a coating apparatus disposed adjacent to the transfer section in the horizontal direction, an adhesive on a bonding surface of a support substrate to be bonded with the processing target substrate or on a bonding surface of the processing target substrate to be bonded with the support substrate; and

bonding, by a bonding apparatus disposed adjacent to the transfer section in the horizontal direction, the support substrate and the processing target substrate with the adhesive therebetween.

13. The substrate processing method of Claim 11 or 12, further comprising:

transferring, by the transfer arm, the processing target substrate to the thinning apparatus from the pre-alignment apparatus.

14. The substrate processing method of any one of Claims 8 to 12, further comprising:

transferring, by a transfer arm provided inside the laser processing apparatus when viewed from a vertical direction, the processing target substrate to the laser processing apparatus from the pre-alignment apparatus.