CLAIMS

1. A method of bonding a first wafer (202) onto a second wafer (206) by molecular adhesion, the method comprising applying a point (216) of initiation of a bonding wave (222) between said first and second wafers, the method being characterized in that it further comprises projecting a gas stream (228) between the first wafer and the second wafer towards the point of initiation of the bonding wave while the bonding wave is propagating between said wafers.

2. A method according to claim 1, wherein the projected gas stream is a stream of dry gas having water at a concentration of less than 10000 ppm, in order to cause desorption of water over at least one of the bonding surfaces (202a, 206a) of the two wafers.

3. A method according to claim 1 or claim 2, wherein the temperature of said gas stream is in the range from the ambient temperature of said first and second wafers to 200°C.

4. A method according to any one of claims 1 to 3, wherein said gas stream is selected from at least a stream of argon, a stream of neon, a stream of helium, a stream of nitrogen, a stream of carbon dioxide, and a stream of air.

5. A method according to any one of claims 1 to 4, wherein the width of the gas stream corresponds to the diameter of the two wafers.

6. Apparatus (215) for bonding by molecular adhesion a first wafer (202) onto a second wafer (206), the apparatus including means (214) for applying a point of initiation (216) of a bonding wave (222) between the first and second wafers, said apparatus being

characterized in that it further includes projection means (226) configured to project a gas stream (228) between the first and second wafers towards the point of initiation of the bonding wave while the bonding wave is propagating between said wafers.

7. An apparatus according to claim 6, wherein the projection means are configured to project a stream of dry gas having water at a concentration of less than 10000 ppm, in order to cause desorption of water over at least one of the bonding surfaces (202a, 206a) of the two wafers.

8. An apparatus according to claim 6 or claim 7, wherein the projection means are configured to project the gas stream at a temperature in the range from the ambient temperature of said first and second wafers to 200°C.

9. An apparatus according to any one of claims 6 to 8, wherein said gas stream is selected from at least a stream of argon, a stream of neon, a stream of helium, a stream of nitrogen, a stream of carbon dioxide, and a stream of air.

10. An apparatus according to any one of claims 6 to 9, wherein the projection means are configured such that the width of the gas stream corresponds to the diameter of the two wafers.

CLAIMS

1. A method of bonding a first wafer onto a second wafer by molecular adhesion, the method comprising:

applying a point of initiation of a bonding wave between the first wafer and the second wafer using an initiation device; and

projecting a gas stream between the first wafer and the second wafer toward the point of initiation of the bonding wave while the bonding wave is propagating between the first wafer and the second wafer using a projection device including a plurality of nozzles each directed toward a common point;

using a control device to control directions of gas streams respectively projected from the nozzles of the plurality of nozzles; and

using a sensor to detect a position of the point of initiation.

2. The method of claim 1, further comprising selecting the projected gas stream to comprise a stream of dry gas including water at a concentration of less than 10,000 ppm.

3. The method of claim 2, further comprising selecting the projected gas stream to comprise a stream of dry gas including water at a concentration of less than 1,000 ppm.

4. The method of claim 1, further comprising selecting the projected gas stream to comprise a stream having a temperature in a range extending from an ambient temperature of the first wafer and the second wafer to 200°C.

5. The method of claim 1, further comprising selecting the projected gas stream from the group consisting of a stream of argon, a stream of neon, a stream of helium, a stream of nitrogen, a stream of carbon dioxide, and a stream of air.

6. The method of claim 1, further comprising forming the projected gas steam to have a width corresponding to a diameter of the first wafer and a diameter of the second wafer.

7. The method of claim 1, further comprising applying the point of initiation of the bonding wave between the first wafer and the second wafer at a location close to a side of the first wafer.

8. The method of claim 7, further comprising applying the point of initiation of the bonding wave by applying a force to an exposed surface of the first wafer.

9. The method of claim 1, wherein projecting the gas stream between the first wafer and the second wafer toward the point of initiation of the bonding wave comprises slowing a rate of propagation of the bonding wave between the first wafer and the second wafer.

10. The method of claim 1, further comprising maintaining the projection of the gas stream throughout propagation of the bonding wave between the first wafer and the second wafer.

11. The method of claim 1, further comprising selecting at least one nozzle of the plurality of nozzles to have a flow cross-section dimension less than approximately 500 μm.

12. The method of claim 11, further comprising selecting the at least one nozzle to have a flow cross-section dimension on the order of 10 μm.

13. The method of claim 12, further comprising configuring the at least one nozzle such that a side of the at least one nozzle is located a constant distance from a periphery of the first wafer and the second wafer.

14. The method of claim 13, further comprising configuring the at least one nozzle such that the side of the at least one nozzle has an inwardly curved profile.

15. The method of claim 1, further comprising projecting the gas stream generally in a direction of the point of initiation of the bonding wave.

16. The method of claim 15, further comprising projecting the gas stream generally in a direction perpendicular to the bonding wave.

17. An apparatus for bonding a first wafer onto a second wafer by molecular adhesion, the apparatus comprising:

an initiation device configured to initiate a bonding wave at a point of initiation between the first wafer and the second wafer; and

a projection device configured to project a gas stream between the first wafer and the second wafer toward the point of initiation of the bonding wave while the bonding wave is propagating between the first wafer and the second wafer, the projection device comprising a plurality of nozzles each directed toward a common point;

a control device configured to control directions of gas streams respectively projected from the nozzles of the plurality of nozzles; and

a sensor configured to detect a position of the point of initiation.

18. The apparatus of claim 17, wherein the projection device is configured to project a stream of dry gas having water at a concentration of less than 10,000 ppm.

19. The apparatus of claim 17, wherein the projection device is configured to project the gas stream at a temperature in a range extending from an ambient temperature of the first wafer and the second wafer to 200°C.

20. The apparatus of claim 17, wherein the projected gas stream is selected from the group consisting of a stream of argon, a stream of neon, a stream of helium, a stream of nitrogen, a stream of carbon dioxide, and a stream of air.

21. The apparatus of claim 17, wherein the projection device is configured such that a width of the gas stream corresponds to a diameter of the first wafer and a diameter of the second wafer.

22. The apparatus of claim 17, wherein at least one nozzle of the plurality of nozzles has a flow cross-section dimension of less than approximately 500 μm.

23. The apparatus of claim 22, wherein the at least one nozzle has a flow cross-section dimension on the order of 10 μm.

24. The apparatus of claim 17, wherein a side of the at least one nozzle is located a constant distance from a periphery of the first wafer and the second wafer.

25. The apparatus of claim 24, wherein the side of the at least one nozzle has an inwardly curved profile.