CLAIMS

1. Bonding module for bonding semiconductor wafers, comprising

   a pumping device;

   a vacuum chamber connected to the pumping device; and

   an optical system configured to determine the position of alignment marks on the surfaces of the semiconductor wafers to be bonded in the bonding module.

2. The bonding module according to claim 1, further comprising at least a first moveable bonding chuck configured to hold a first wafer and a second moveable bonding chuck different from the first bonding chuck and configured to hold a second wafer different from the first wafer.

3. The bonding module according to claim 2, wherein the first and second bonding chucks are configured to hold the first and the second wafer, respectively, in a vertical position within less than 10° with respect to a vertical plane.

4. The bonding module according to claim 2 or 3, wherein the first bonding chuck and/or the second bonding chuck have a bow below 1 micron or below 0.1 micron.

5. The bonding module according to one of the claims 2 to 4, wherein the first bonding chuck and/or the second bonding chuck is made of metal or ceramics.

6. The bonding module according to one of the claims 2 to 5, further comprising a control unit configured to control the first and the second bonding chucks to move to each other to locate the first and the second wafers at a predetermined distance to each other, release the first and the second wafers at the predetermined distance and to initiate local application of a force to at least one of the first and the second wafers such that they locally become that close to each other that bonding is initiated.

7. The bonding module according to one of the claims 2 to 5, further comprising a control unit configured to control the first and the second bonding chucks to move to each other to locate the first and the second wafers at a predetermined distance to each other and, subsequently, locally decreasing the clamping force applied by the first and/or second bonding chucks in order to hold the first and second wafer, respectively, such that the first and the second wafers locally become that close to each other that bonding is initiated.

8. The bonding module according to claim 7, wherein the control unit is configured to control gradual or non-gradual release of the first and/or second wafer upon the first and the second wafer locally became that close to each other that bonding is initiated.

9. The bonding module according to one of the claims 6 to 8, wherein the control unit is configured to compute the displacement of the first and the second bonding chucks in order to align the first and the second wafers.

CLAIMS

1. Bonding module for bonding semiconductor wafers, comprising

a pumping device;

a vacuum chamber connected to the pumping device;

an optical system configured to determine the position of alignment marks on the surfaces of the semiconductor wafers to be bonded in the bonding module;

at least a first moveable bonding chuck configured to hold a first wafer and a second moveable bonding chuck different from the first bonding chuck and configured to hold a second wafer different from the first wafer; and

a control unit configured to control the first and the second bonding chucks to move to each other, locally decrease the clamping force applied by the first and/or second bonding chucks thereby deforming locally at least one of the first and second wafers thereby initiating contact of the first and second wafers and to un-clamp gradually or non-gradually at least one of the first and second wafers once contact of the first and second wafers has been created.

2. The bonding module according to claim 1, wherein the first and second bonding chucks are configured to hold the first and the second wafer, respectively, in a vertical position within less than 10° with respect to a vertical plane.

3. The bonding module according to claim 1 or 2, wherein the first bonding chuck and/or the second bonding chuck have a bow below 1 micron or below 0.1 micron.

4. The bonding module according to one of the claims 1 to 3, wherein the first bonding chuck and/or the second bonding chuck is made of metal or ceramics.

5. The bonding module according to one of the claims 1 or 4, wherein the control unit is configured to compute the displacement of the first and the second bonding chucks in order to align the first and the second wafers.