Claims

1. A method for alignment and contact-making of a first substrate (15) with a second substrate (15') with the following steps, in particular the following sequences:

- fixing of the first substrate (15) on a first mount (9) and of the second substrate (15') on a second mount (9') which is located oppositely the first mount (9), the first and second substrate (15, 15') being located between the first and second mount (9, 9') with a distance A between a first contact surface of the first substrate (15) and a second contact surface of the second substrate (15) in the Z direction,
- detecting a first X-Y position of a first alignment marking (20') located in a peripheral region of the first substrate (15) in a first detection position which has moved in an X and/or Y direction along a first contact surface (15o),
- detecting a second X-Y position of a second alignment marking (20") located in a peripheral region of the second substrate (15') in a second detection position which has moved in an X and/or Y direction along a second contact surface (15k'),
- detecting a third X-Y position of a third alignment marking (20"') located in a peripheral region of the first substrate (15) in the second detection position,
- detecting a fourth X-Y position of a fourth alignment marking (20) located in a peripheral region of the second substrate (15') in the first detection position,
- aligning the first substrate (15) relative to the second substrate (15') by adjustment units (4, 4') based on the first, second, third and fourth X-Y positions which have been detected by the detections and

- contact-making of the first substrate (15), which has been aligned relative to the second substrate (15'), with the second substrate (15').

2. The method as claimed in Claim 1, wherein the first and fourth alignment marking (20', 20) and/or the second and third alignment marking (20", 20") are arranged oppositely in the Z direction.

3. The method as claimed in Claim 1 or 2, wherein the detection of the first and second alignment marking (20', 20") and/or the detection of the third and fourth alignment marking (20", 20"') takes place in a coherent method step, especially at the same time, especially with a first detection unit (11) for detection of the first and/or second alignment markings (20', 20") and a second detection unit (11') for detection of the third and/or fourth alignment markings (20", 20"').

4. A device for aligning and contact-making of a first substrate (15) with a second substrate (15') with:

- a first mount (9) for fixing of the first substrate (15) and a second mount (9') located oppositely the first mount (9) for fixing of the second substrate (15'), the first and second substrate (15, 15') being able to be located between the first and second mount (9, 9') with a distance between a first contact surface of the first substrate (15) and a second contact surface of the second substrate (15) in a Z direction,
- a first adjustment unit (4) for moving the first mount (9) at least in one X direction and/or Y direction which runs transversely to the Z direction,
- a second adjustment unit (4') for moving the second mount (9') at least in one X direction and/or Y direction,

- detection means for:
  a) detecting a first X-Y position of a first alignment marking (20') located in a peripheral region of the first substrate (15) in a first detection position which has moved in a X and/or Y direction along a first contact surface (15o),
  b) detecting a second X-Y position of a second alignment marking (20") located in a peripheral region of the second substrate (15') in a second detection position which has moved in an X and/or Y direction along a second contact surface (15k'),
  c) detecting a third X-Y position of a third alignment marking (20"') located in a peripheral region of the first substrate (15) in the second detection position,
  d) detecting a fourth X-Y position of a fourth alignment marking (20) located in a peripheral region of the second substrate (15') in the first detection position,
- adjustment units (4, 4') for aligning the first substrate (15) relative to the second substrate (15') by adjustment units (4, 4') based on the first, second, third and fourth X-Y positions which have been detected by the detection,
- contact-making means for contact-making of the first substrate (15), which has been aligned relative to the second substrate (15'), with the second substrate (15').

5. The device as claimed in Claim 4, wherein the contact-making means comprise the first and/or the second adjustment unit (4, 4').

6. The device as claimed in Claim 4 or 5, wherein the detection means have a first detection unit (11) for detection of the first and/or second alignment markings (20, 20') and a second detection unit (11') located especially on one side of the mounts (9, 9') which is opposite the first

detection unit (11), for detection of the third and/or fourth alignment markings (20", 20'").

7. The device as claimed in Claim 6, wherein the first detection unit (11) has several electromagnetically operating, especially two first detection devices (8, 8') located oppositely, preferably microscopes, and/or the second detection unit (11') has several electromagnetically operating, especially two second detection devices (8", 8'") located oppositely, preferably microscopes.

8. The device as claimed in Claim 7, wherein the first detection unit (11) has a first optics fixing (6) for attaching the first detection devices (8, 8') and/or the second detection unit (11') has a second optics fixing (6') for attaching the second detection devices (8", 8'"), and wherein the first detection devices (8, 8') can be moved jointly by a first fixing translation unit (5) which holds the first optics fixing (6) and/or the second detection devices (8", 8'") can be moved jointly by a second fixing translation unit (5, 5') which holds the second optics fixing (6').

9. The device as claimed in Claim 8, wherein the first detection devices (8, 8') can each be moved separately via first optics translation units (7, 7') on the first optics fixing (6) and/or the second detection devices (8", 8'") can each be moved separately via second optics translation units (7", 7'") on the second optics fixing (6').

CLAIMS:

1. A method for alignment and contact-making of a first substrate with a second substrate, the method comprising:

fixing the first substrate on a first mount and fixing the second substrate on a second mount which is located opposite the first mount, wherein the first and second substrate are located between the first and second mount with a distance A between a first contact surface of the first substrate and a second contact surface of the second substrate in the Z direction,

moving the first mount to a first detection unit in a first detection position and moving the second mount to a second detection unit in a second detection position opposite to the first detection position,

detecting a first X-Y position of a first alignment marking located in a peripheral region of the first substrate in the first detection position which has moved in an X and/or Y direction along the first contact surface,

detecting a second X-Y position of a second alignment marking located in a peripheral region of the second substrate in the second detection position which has moved in an X and/or Y direction along the second contact surface,

moving the first mount to the second detection unit in the second detection position and the second mount to the first detection unit in the first detection position,

detecting a third X-Y position of a third alignment marking located in a peripheral region of the first substrate in the second detection position,

detecting a fourth X-Y position of a fourth alignment marking located in a peripheral region of the second substrate in the first detection position,

aligning the first substrate relative to the second substrate by adjustment units based on the first, second, third and fourth X-Y positions which have been detected by the detections, and

contacting the first substrate, which has been aligned relative to the second substrate, with the second substrate.

2. The method as claimed in claim 1, wherein the first and fourth alignment marking and/or the second and third alignment marking are arranged oppositely in the Z direction.

3. The method as claimed in claim 1, wherein the detection of the first and second alignment marking and/or the detection of the third and fourth alignment marking takes place using a first detection unit for detection of the first and/or second alignment markings and a second detection unit for detection of the third and/or fourth alignment markings.

4. A device for aligning and contact-making of a first substrate with a second substrate, the device comprising:

a first mount for fixing of the first substrate and a second mount located opposite the first mount for fixing of the second substrate, wherein the first and the second substrate are locatable between the first and second mount with a distance between a first contact surface of the first substrate and a second contact surface of the second substrate in a Z direction,

a first adjustment unit for moving the first mount at least in one X direction and/or Y direction which runs transversely to the Z direction,

a second adjustment unit for moving the second mount at least in one X direction and/or Y direction,

detection means for:

a) detecting a first X-Y position of a first alignment marking located in a peripheral region of the first substrate in a first detection position which has moved in a X and/or Y direction along a first contact surface,

b) detecting a second X-Y position of a second alignment marking located in a peripheral region of the second substrate in a second detection position which has moved in an X and/or Y direction along the second contact surface,

c) detecting a third X-Y position of a third alignment marking located in a peripheral region of the first substrate in the second detection position,

d) detecting a fourth X-Y position of a fourth alignment marking located in a peripheral region of the second substrate in the first detection position,

wherein the detection means are provided such that visible light is usable for detecting the positions,

adjustment units for aligning the first substrate relative to the second substrate based on the first, second, third and fourth X-Y positions which have been detected by the detection means, and

contact-making means for contacting the first substrate, which has been aligned relative to the second substrate, with the second substrate in the Z-direction.

5. The device as claimed in claim 4, wherein the contact-making means comprise the first and/or the second adjustment unit.

6. The device as claimed in claim 4, wherein the detection means includes:

a first detection unit for detection of the first and/or second alignment markings, and

a second detection unit located on one side of the mounts which is opposite the first detection unit, for detection of the third and/or fourth alignment markings.

7. The device as claimed in claim 6, wherein the first detection unit has a plurality of electromagnetically operating first detection devices located oppositely, and/or the second detection unit has several electromagnetically operating second detection devices located oppositely.

8. The device as claimed in claim 7, wherein the first detection unit has a first optics fixing for attaching the first detection devices and/or the second detection unit has a second optics fixing for attaching the second detection devices, and

wherein the first detection devices are movable jointly by a first fixing translation unit which holds the first optics fixing and/or the second detection devices is moveable jointly by a second fixing translation unit which holds the second optics fixing.

9. The device as claimed in claim 8, wherein the first detection devices are each movable separately via first optics translation units on the first optics fixing and/or the second detection devices are each moveable separately via second optics translation units on the second optics fixing.

10. The method as claimed in claim 3, wherein the detection of the first and second alignment markings and/or the detection of the third and fourth alignment markings take place at the same time.

11. The device as claimed in claim 7, wherein said first and second detection devices are microscopes.