

The disadvantages of these approaches are substantially due to the fact that the steps of detachment, by inserting a blade between the assembled original and target substrates, by applying high tensile stresses, and/or by immersion in a chemical solution, are capable of degrading the quality of the thin layer. Furthermore, the detachment can sometimes occur at interfaces or layers other than the weakened one because it is difficult to localize the mechanical stress and/or chemical attack precisely at the weakened layer or interface.

Still other processes, based on laser separation at an interface ("laser lift-off"), require the use of a transparent substrate (for the final substrate or for the original support substrate), which limits the scope of application.

## OBJECT OF THE INVENTION

The present disclosure relates to an alternative solution aimed at solving all or part of the disadvantages of the prior art. An aspect of the disclosure provides a structure detachable at a detachable layer, which can be used for transferring or handling layers.

## BRIEF DESCRIPTION OF THE INVENTION

The present invention relates to a method for transferring a superficial layer from a detachable structure comprising the following steps:

a) Supplying the detachable structure comprising:

- a support substrate,
- a detachable layer arranged on the support substrate along a main plane and comprising a plurality of walls that are separated from

one another, each wall having at least one side perpendicular to the main plane;

- a superficial layer arranged on the detachable layer along the main plane;

5        b) Applying a mechanical force configured to cause said walls to bend, along a direction that is secant to said side, until causing the mechanical rupture of the walls, in order to detach the superficial layer from the support substrate; and

10        wherein step a) comprises transferring the superficial layer onto the detachable layer by assembling a donor substrate on the detachable layer and by thinning the donor substrate in order to form the superficial layer.

15        According to advantageous features of the invention, taken alone or in any feasible combination:

- the walls are distributed in the main plane according to a predefined grid;
- the predefined grid of walls is such that there is at least one transverse direction in the main plane forming a non-zero angle with one side of each wall;
- each wall comprises two longitudinal sides defined by a length and a height of the wall, and two transverse sides defined by a width and the height of the wall, the longitudinal and transverse sides being perpendicular to the main plane;
- the length of each wall is greater than the width of each wall, and the transverse direction forms a non-zero angle with a longitudinal side of each wall;
- the mechanical force of step b) is a shearing force applied to the detachable layer along the transverse direction;
- the shearing force is applied by means of a roller, advancing gradually over the detachable structure, in the main plane and along the transverse direction, with a specific pressing force;
- the mechanical force of step b) is a shock applied to the detachable structure, along the transverse direction;
- the mechanical force of step b) is a vibrating wave applied to the detachable structure, along the transverse direction, and capable of making the walls oscillate;

- each wall has a width, in the main plane, of between 0.1 and 10 microns;
- the width of each wall at the lower part in the vicinity of the support substrate is smaller than the width of each wall at the upper part in the vicinity of the superficial layer;
- the walls have a height, perpendicular to the main plane, of between 0.5 and 5 microns;
- each wall has a width in the main plane and a height perpendicular to the main plane, and the height-to-width ratio is greater than 1, preferably greater than 5;
- the detachable layer of the detachable structure supplied in step a) is formed by local etching of a layer of silicon oxide arranged on the support substrate;
- the detachable layer of the detachable structure supplied in step a) is formed by local etching of the support substrate;
- the support substrate is made of silicon;
- step a) comprises the production of microelectronic components on the superficial layer;
- the transfer method comprises, prior to step b), a step of cutting the superficial layer in order to delimit a plurality of local superficial layers to be transferred;
- the transfer method comprises, prior to step b), a step a') comprising the assembly of the superficial layer on a target substrate;
- the transfer method comprises, after detaching the superficial layer in step b), a step c) including the removal of detachable layer remainders in order to expose a detached face of the superficial layer;
- step c) comprises carrying out microelectronic steps on the detached face of the superficial layer.

**CLAIMS**

1. A method for transferring a superficial layer from a detachable structure, comprising the following steps:
  - 5 a) supplying a detachable structure comprising:
    - a support substrate,
    - a detachable layer arranged on the support substrate along a main plane and comprising a plurality of walls that are separated from one another, each wall having at least one side perpendicular
    - 10 to the main plane;
    - a superficial layer arranged on the detachable layer along the main plane; and
  - b) applying a mechanical force configured to cause said walls to bend, along a direction that is secant to the at least one side,
  - 15 until causing the mechanical rupture of the walls, in order to detach the superficial layer from the support substrate; and
  - wherein step a) comprises transferring the superficial layer onto the detachable layer by assembling a donor substrate on the detachable layer and by thinning the donor substrate in order to
  - 20 form the superficial layer.
2. The method of claim 1, wherein the walls are distributed in the main plane according to a predefined grid.
- 25 3. The method of claim 2, wherein the predefined grid of walls is such that there is at least one transverse direction in the main plane forming a non-zero angle with one side of each wall.
4. The method of claim 3, wherein each wall comprises two
- 30 longitudinal sides defined by a length and a height of the wall, and two transverse sides defined by a width and the height of the wall, the longitudinal and transverse sides being perpendicular to the main plane.
- 35 5. The method of claim 4, wherein the length of each wall is greater than the width of each wall, and wherein the transverse direction forms a non-zero angle with a longitudinal side of each wall.

6. The transfer method according to claim 3, wherein the mechanical force of step b) is a shearing force applied to the detachable layer along the transverse direction.
- 5 7. The method of claim 6, wherein the shearing force is applied by a roller, advancing gradually over the detachable structure, in the main plane and along the transverse direction, with a pressing force.
- 10 8. The transfer method according to claim 3, wherein the mechanical force of step b) is a shock applied to the detachable structure, along the transverse direction.
- 15 9. The transfer method according to claim 3, wherein the mechanical force of step b) is a vibrating wave applied to the detachable structure, along the transverse direction, and capable of making the walls oscillate.
- 20 10. The transfer method according to claim 1, wherein each wall has a width, in the main plane, of between 0.1 and 10 microns.
- 25 11. The transfer method according to claim 1, wherein a width of each wall at the lower part in the vicinity of the support substrate is smaller than a width of each wall at the upper part in the vicinity of the superficial layer.
- 30 12. The transfer method according to claim 1, wherein the walls have a height, perpendicular to the main plane, of between 0.5 and 5 microns.
13. The transfer method according to claim 1, wherein each wall has a width in the main plane and a height perpendicular to the main plane and wherein the height-to-width ratio is greater than 1.
- 35 14. The transfer method according to claim 1, wherein the detachable layer of the detachable structure supplied in step a) is formed by local etching of a layer of silicon oxide arranged on the support substrate.

15. The transfer method according to claim 1, wherein the detachable layer of the detachable structure supplied in step a) is formed by local etching of the support substrate.
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16. The transfer method according to claim 1, wherein step a) comprises the production of microelectronic components on the superficial layer.
- 10 17. The transfer method according to claim 1, further comprising, prior to step b), a step of cutting the superficial layer in order to delimit a plurality of local superficial layers to be transferred.
- 15 18. The transfer method according to claim 13, wherein each wall has a width in the main plane and a height perpendicular to the main plane and wherein the height-to-width ratio is greater than 5.