CLAIMS

1. A process for fabricating a semiconductor or piezoelectric structure, comprising the following steps in succession:

(a) providing a donor substrate comprising a semiconductor or piezoelectric layer,

(b) providing a receiver substrate,

(c) treating a free surface of the donor substrate and/or a free surface of the receiver substrate,

(d) bonding the donor substrate to the receiver substrate, said at least one treated surface being at the interface between the donor substrate and the receiver substrate, and

(e) transferring a portion of the semiconductor or piezoelectric layer from the donor substrate to the receiver substrate,

the treatment of the free surface of the donor substrate and/or of the free surface of the receiver substrate comprising the following steps in succession:

(c1) chemical mechanical polishing,

(c2) removal of matter in a peripheral region of the polished surface.

2. The process according to Claim 1, wherein at the end of the step of chemical mechanical polishing of the donor substrate and/or of the receiver substrate (c1), the polished surface has a relief at the periphery of said substrate, such that the step of removal of matter (c2) in the peripheral region of said surface is carried out to planarize said relief.

3. The process according to either of Claims 1 and 2, wherein the removal of peripheral matter is carried out by milling with an ion beam focused on an area of the periphery of the polished semiconductor or piezoelectric layer, the ion beam scanning the whole of said periphery.

4. The process according to any one of Claims 1 to 3, wherein the removal of peripheral matter is carried out after recording the topographical profile of the polished surface by profilometry and is performed such that the modified profile after removal of matter has only one maximum and said maximum is the point closest to the centre of the polished surface of the modified profile.

5. The process according to any one of Claims 1 to 4, wherein the portion of the semiconductor or piezoelectric layer of the donor substrate to be transferred to the receiver substrate is delimited by formation of a weakened region prior to bonding (d) of the donor substrate to the receiver substrate, such that the transfer of said portion to the receiver substrate comprises detaching the donor substrate along the weakened region.

6. The process according to Claim 5, wherein the weakened region in the donor substrate is formed by implanting hydrogen and/or helium.

7. The process according to any one of Claims 1 to 6, wherein the donor substrate comprises a piezoelectric layer, the surface of the donor substrate to be treated and to be bonded being a free surface of the piezoelectric layer and the portion of the donor substrate transferred being a portion of the piezoelectric layer.

8. The process according to Claim 7, wherein the provision of the donor substrate comprises the following steps in succession:

(a1) bonding a thick piezoelectric layer to a handle substrate,

(a2) thinning the thick piezoelectric layer from the side thereof opposite the handle substrate,

such that the chemical mechanical polishing (c1) is carried out on the free surface of the thinned piezoelectric layer, opposite the handle substrate.

9. The process according to Claim 8, characterized in that the thick piezoelectric layer has a thickness of between 100 μm and 2 mm, preferably a thickness of between 200 μm and 1 mm and in that the thinned and polished piezoelectric layer has a thickness of between 1 μm and 100 μm, preferably a thickness of between 5μm and 50 μm.

10. The process according to either of Claims 8 and 9, wherein the provision of the donor substrate further comprises a step (a3) of removal of a peripheral portion of the donor substrate prior to chemical mechanical polishing (c1) of the free surface of the thinned piezoelectric layer.

11. The process according to any one of Claims 1 to 6, wherein the donor substrate comprises a semiconductor layer, the surface of the donor substrate to be treated and to be bonded being a free surface of the semiconductor layer and the portion of the donor substrate transferred being a portion of the semiconductor layer.

12. The process according to any one of Claims 7 to 11, characterized in that it further comprises a step of formation of an electrically insulating layer on the free surface of the semiconductor or piezoelectric layer, such that bonding (d) of the donor substrate to the receiver substrate is carried out by way of said electrically insulating layer.

13. The process according to Claim 12, characterized in that the electrically insulating layer formed at the surface of the polished semiconductor or piezoelectric layer has a thickness of between 10 nm and 10 μm, preferably a thickness of between 30 nm and 5 μm.

14. The process according to either of Claims 12 and 13, wherein the step (c) comprises a treatment of the free surface of the semiconductor or piezoelectric layer of the donor substrate and wherein the formation of the electrically insulating layer on said free surface is carried out after said treatment step (c) and prior to bonding (d).

15. The process according to any one of Claims 1 to 14, wherein the provision of the receiver substrate (b) comprises the formation of an electrically insulating layer, preferably an oxide layer, the surface of the receiver substrate to be treated and to be bonded being a free surface of the electrically insulating layer.

16. The process according to Claim 15, characterized in that the electrically insulating layer formed at the surface of the receiver substrate has a thickness of between 10 nm and 10 μm, preferably a thickness of between 30 nm and 5 μm.

17. The process according to either of Claims 15 and 16, wherein the electrically insulating layer is formed by plasma-enhanced chemical vapour deposition (PECVD).

18. The process according to any one of Claims 15 to 17, wherein the step of removal of matter (c2) is carried out over the whole of the polished surface of the receiver substrate.

19. The process according to Claim 18, wherein the quantity of matter to be removed locally at the surface of the electrically insulating layer during the step of removal of matter at the surface of said electrically insulating layer is determined on the basis of measurements of the thickness of said electrically insulating layer by ellipsometry and/or reflectometry.