

CLAIMS

1. Method for manufacturing a film (12), notably monocrystalline, on a flexible sheet (20), characterised in that it comprises the following steps:
- 5 - providing a donor substrate (10),
- forming an embrittlement zone (11) in the donor substrate (10) so as to delimit the film (12),
- forming the flexible sheet (20) by deposition on the surface of the film (12),
- detaching the donor substrate (10) along the embrittlement zone (11), so as to
- 10 transfer said film (12) onto the flexible sheet (20).
2. Method according to claim 1, wherein the formation of the embrittlement zone (11) is carried out by implantation of ionic species in the donor substrate (10).
- 15 3. Method according to claim 2, wherein the implanted ionic species are hydrogen and/or helium.
4. Method according to one of claims 1 to 3, wherein the detachment of the donor substrate (10) is caused by a heat treatment.
- 20 5. Method according to one of claims 1 to 4, wherein the film (12) is made of a material selected from: semiconductor materials, piezoelectric materials, magnetic materials and functional oxides.
- 25 6. Method according to one of claims 1 to 5, wherein the thickness of the film (12) is comprised between 100 nm and 10 μm , preferably between 100 nm and 1 μm .
7. Method according to one of claims 1 to 6, wherein the flexible sheet (20) is made of a material selected from metals, glasses and ceramics.
- 30 8. Method according to one of claims 1 to 7, wherein the flexible sheet (20) has a thickness comprised between 1 and 50 μm .
9. Method according to one of claims 1 to 8, wherein the deposition of the flexible sheet (20) is implemented by one of the following techniques: physical vapour deposition, chemical vapour deposition, electrochemical deposition, spin coating, lacquering and spraying.
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10. Method according to one of claims 1 to 9, wherein the flexible sheet (20) has a rigidity (R) comprised between $100 \text{ GPa} \cdot \mu\text{m}^3$ and $10^6 \text{ GPa} \cdot \mu\text{m}^3$, said rigidity being defined by the formula:

$$R = \frac{E \times H^3}{12 \times (1 - \nu^2)}$$

5 where E is the Young's modulus of the material of the sheet, H the thickness of said sheet and ν the Poisson coefficient.

11. Method according to one of claims 1 to 10, comprising, before the formation of the flexible sheet (20), the formation of an intermediate layer (21) by deposition on the surface of the film (12).

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12. Method according to claim 11, wherein said intermediate layer (21) is configured to increase the adherence of the flexible sheet (20) vis-à-vis the film (12).

13. Method according to one of claims 11 or 12, wherein said intermediate layer
15 forms an electrical contact with the film (12).

14. Method according to one of claims 1 to 13, further comprising, after the detachment of the donor substrate, the deposition of an additional film (13) on the face of the transferred film (12) opposite to the support (20).

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15. Method according to one of claims 1 to 14, wherein the residue (10') of the donor substrate at the end of the detachment is recycled with a view to the implementation of a new film (12).

25 16. Method according to claim 15, wherein the donor substrate has a non-flat surface obtained before the formation of the embrittlement zone (11) and wherein, before the recycling, the residue of the donor substrate is subjected to an operation of regeneration of its surface involving a removal of material that is substantially zero or conforming to the topology of said residue (10').

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17. Method according to one of claims 1 to 16, wherein the donor substrate comprises a plurality of pads (1001) laid out on the surface of a wafer (1000), each pad (1001) comprising an embrittlement zone (1011) delimiting a respective film (1012) to transfer, and the flexible sheet (20) is deposited on the surface of the whole of said pads
35 (1001).