

CLAIMS

1. A detachable structure comprising a carrier substrate and a silicon oxide layer positioned on the carrier substrate at a first interface, the detachable structure being characterized in that:

- the oxide layer has a thickness of less than 200 nm;
- light hydrogen and/or helium species are distributed deeply and over the entire area of the structure according to an implantation profile, a concentration maximum of which is located in the thickness of the oxide layer;
- a total dose of implanted light hydrogen and/or helium species, relative to the thickness of the oxide layer, exceeds, at least by a factor of five, a solubility limit of the light hydrogen and/or helium species in the oxide layer.

2. The detachable structure according to claim 1, comprising a thin layer suitable for the fabrication of components and/or forming a barrier layer, positioned on the oxide layer at a second interface.

3. The detachable structure according to claim 2, in which the carrier substrate is made of silicon and the silicon oxide layer is a thermal oxide.

4. The detachable structure according to claim 3, in which the thin layer suitable for the fabrication of components is made of monocrystalline silicon.

5. The detachable structure according to Claim 3, in which the thin layer suitable forming a barrier layer is made of silicon nitride.

6. A process for detaching the detachable structure according to Claim 2, comprising:

- 5 a) attaching the detachable structure to a second substrate along a bonding interface to form an assembly;
- b) applying a heat treatment to the assembly to make at least some of the light species migrate level with the first interface or second interface;
- 10 c) spontaneously detaching the assembly at the first interface or the second interface, forming a detached surface of the oxide layer and leading to the transfer of at least the thin layer to the second substrate in order to form a composite
- 15 structure.

7. The process according to claim 6, in which step b) is carried out at a temperature between 200°C and 600°C.

20 8. The process according to claim 6 or 7, in which step c) is carried out during the heat treatment of step b).

9. The process according to any one of claims 6 to 8, in which the roughness of the detached surface of the oxide layer is less than 0.5 nm RMS.

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10. The process according to any one of claims 6 to 9, in which the detachable structure provided in step a) comprises a thin layer suitable for the fabrication of components and which is positioned on the oxide layer, at the second interface and in which the light hydrogen and/or helium species have been implanted in the thickness of the oxide layer after a step of finishing the thin layer.

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11. The process according to claim 10, in which the step of finishing the thin layer comprises a high-temperature heat treatment above 1000°C.

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12. The process according to claim 10 or 11, in which the second substrate provided in step a) comprises a second carrier substrate, a trapping layer positioned on the second carrier substrate and a second silicon oxide layer positioned on the trapping layer, the second oxide layer being intended to be attached to the detachable substrate at the bonding interface.

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13. The process according to claim 10 or 11, in which the second substrate provided in step a) comprises a glass substrate.

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14. The process according to claim 10 or 11, in which the second substrate provided in step a) comprises a second carrier substrate and a second silicon oxide layer positioned on the second carrier substrate and having a thickness of greater than 800 nm, the second silicon oxide layer being intended to be attached to the detachable substrate at the bonding interface.

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15. The process according to any one of claims 10 to 14, comprising, after step c), a step of heat treatment of the composite structure at a temperature below 1000°C, in order to discharge the light species still present in the transferred thin layer.

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