

CLAIMS

1. Detachable structure comprising a carrier substrate and a silicon oxide layer positioned on said 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, the concentration maximum of which is located in the thickness of the oxide layer;
- the total dose of implanted light species, relative to the thickness of the oxide layer, exceeds, at least by a factor of five, the solubility limit of these light species in said oxide layer.

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

4. Detachable structure according to the preceding claim, in which the thin layer suitable for the manufacture of components is made of monocrystalline silicon.

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

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

a) the attaching of the detachable structure (to a second substrate along a bonding interface;

b) the application of a heat treatment to the assembly to make at least some of the light species migrate level with the first interface or second interface;

c) the spontaneous detachment of 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 structure.

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

8. Detachment process according to one of the preceding two claims, in which step c) is carried out during the heat treatment of step b).

9. Detachment process according to one of the preceding three claims, in which the roughness of the detached surface of the oxide layer is less than 0.5 nm RMS.

10. Detachment process according to one of the preceding four claims, 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.

11. Detachment process according to preceding claim, in which the step of finishing the thin layer comprises a high-temperature heat treatment, in particular above 1000°C, or even above 1100°C.

12. Detachment process according to one of the preceding two claims, 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.

13. Detachment process according to either of Claims 10 and 11, in which the second substrate provided in step a) comprises a glass substrate.

14. Detachment process according to either of Claims 10 and 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.

15. Detachment process according to one of the preceding five claims, 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.