

based on "double-sided polishing". Depending on the subsequent use which will be made of the remainder, it may be beneficial to reduce this loss of materials.

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OBJECT OF THE INVENTION

Embodiments of the invention seek to provide a method for preparing a remainder of a donor substrate that at least partly solves the above-mentioned problem. Embodiments of the invention also seek to provide a simpler, less expensive preparation method that causes less loss of material than those of the prior art.

BRIEF DESCRIPTION OF THE INVENTION

An aspect of the invention provides a method for preparing the remainder of a donor substrate, a layer having been removed from the donor substrate by delamination in a plane weakened by ion implantation, the remainder comprising, on a main face, an annular step corresponding to a non-removed part of the donor substrate, the method comprising the deposition of a smoothing oxide on the main face of the remainder in order to fill the inner space defined by the annular step and to cover at least part of the annular step, as well as heat treatment for densification of the smoothing oxide.

According to other advantageous non-limiting features of the invention, taken alone or according to any technically feasible combination:

- the smoothing oxide belongs to the SOG (Spin-On Glass) family;
- the densification heat treatment has a temperature of between 225°C and 900°C;
- the densification heat treatment is carried out under a nitrogen (N₂) atmosphere;
- the deposition of smoothing oxide is carried out under conditions leading to the formation of a layer having a thickness at least equal to one and a half times the height of the annular step;
- the method comprises a step of preparing the main surface of the remainder, before the deposition step;

- the step of preparing the main surface of the remainder comprises the removal of a peripheral zone of the main surface damaged by ion implantation.

5 Another aspect of the invention relates to a substrate comprising a remainder of a donor substrate, a layer having been removed from the donor substrate by delamination in a plane weakened by ion implantation, the remainder comprising on a main face an annular step corresponding to a non-removed part of the donor substrate, the
10 substrate also comprising an oxide layer on the main face of the remainder, the oxide layer filling the inner space defined by the annular step and covering at least part of the annular step.

According to other advantageous non-limiting features of the invention, taken alone or according to any technically feasible
15 combination:

- the oxide layer has a thickness at least equal to one and a half times the height of the annular step;
- the remainder comprises a surface oxide layer;
- the donor substrate consists of silicon.

20 Another aspect of the invention relates to the use of a substrate, which comprises providing a substrate prepared as specified above, assembling said substrate with a donor substrate and thinning the donor substrate to form a structure on insulator (for example of SOI-
25 Silicon on Insulator-type).

The assembly may comprise a heat treatment at a temperature of between 100°C and 500°C.

30 **BRIEF DESCRIPTION OF THE DRAWINGS**

Other features and advantages of the invention will emerge from the following detailed description of the invention with reference to the appended figures, in which:

- Figure 1 depicts the various steps of an example of a layer
35 removal method;
- Figure 2 depicts the remainder obtained after the layer removal;
- Figure 3 depicts the various steps of a first embodiment according to the invention;