

metal oxide semiconductor) transistors, the channel of which is formed in or on the semiconductor layer 10.

Because of the extreme fineness of the thickness of the semiconductor layer 10 (i.e. around 10 nm), the threshold voltage of the transistor (usually denoted V_t), which depends on this thickness, is very sensitive to the variations in thickness of the semiconductor layer 10.

Embodiments of the invention seek to propose a method for dissolving a silicon dioxide layer affording precise control of the thicknesses of the semiconductor and silicon dioxide layers.

Brief description of the invention

According to an aspect of the present invention, there is provided a method for dissolving a silicon dioxide layer in a semiconductor-on-insulator type structure, the method comprising: providing semiconductor-on-insulator type structures on a support in a furnace, each of the semiconductor-on-insulator type structures having a rear face and a front face and including a supporting substrate, a silicon dioxide layer over the supporting substrate, and a semiconductor layer on a side of the silicon dioxide layer opposite the supporting substrate, the support being configured for holding the semiconductor-on-insulator type structures with a predetermined distance

between the semiconductor-on-insulator type structures, the front face of one of the semiconductor-on-insulator type structures being opposite the rear face of another of the semiconductor-on-insulator type structures adjacent to the front face of the one of the semiconductor-on-insulator type structures; providing a non-oxidizing atmosphere within the furnace; heating the semiconductor-on-insulator type structures within the furnace and causing the diffusion of oxygen atoms included in the silicon dioxide layers through the semiconductor layers and generating volatile products resulting from the reaction of the oxygen atoms with the semiconductor layers; and reacting the volatile products with traps located within a reactor and reducing a concentration gradient of the volatile products in a direction parallel to the front face of at least one of the semiconductor-on-insulator type structures.

According to another aspect of the present invention, there is provided a method for dissolving a silicon dioxide layer in a semiconductor-on-insulator type structure, the method comprising: providing semiconductor-on-insulator type structures on a support in a furnace, each of the semiconductor-on-insulator type structures having a rear face and a front face and including a supporting substrate, a silicon dioxide layer over the supporting substrate, and a semiconductor layer on a side of the silicon dioxide

layer opposite the supporting substrate, the support being configured for holding the semiconductor-on-insulator type structures with a predetermined distance between the semiconductor-on-insulator type structures, the front face of one of the semiconductor-on-insulator type structures being opposite the rear face of another of the semiconductor-on-insulator type structures adjacent to the front face of the one of the semiconductor-on-insulator type structures; providing a non-oxidizing atmosphere within the furnace; heating the semiconductor-on-insulator type structures within the furnace and causing the diffusion of oxygen atoms included in the silicon dioxide layers through the semiconductor layers and generating volatile products resulting from the reaction of the oxygen atoms with the semiconductor layers; and reacting the volatile products with traps located within a reactor and reducing a concentration gradient of the volatile products in a direction parallel to the front face of at least one of the semiconductor-on-insulator type structures; wherein the traps are included in a coating completely or partly covering an internal wall of the furnace; wherein reacting the volatile products with the traps located within the reactor comprises absorption of the volatile products by the traps; and wherein the traps comprise at least one material of the group consisting of titanium, tungsten, aluminum nitride, and alumina.

The present disclosure aims to remedy the
aforementioned drawbacks completely or partially, and
relates to a method for dissolving a silicon dioxide
layer in a structure of the semiconductor on insulator
5 type, comprising, from its rear face to its front face,
a supporting substrate, the silicon dioxide layer and a
semiconductor layer, the dissolution method being
implemented in a furnace in which a plurality of
structures are held on a support, the support being
10 suitable for maintaining a predetermined distance
between each structure, the front face of a structure
being opposite the rear face of the structure adjacent
to said front face, the atmosphere of the furnace being
a non-oxidising atmosphere, the dissolution method

CLAIMS

1. A method for dissolving a silicon dioxide layer in a semiconductor-on-insulator type structure, the method comprising: providing semiconductor-on-insulator type structures on a support in a furnace, each of the semiconductor-on-insulator type structures having a rear face and a front face and including a supporting substrate, a silicon dioxide layer over the supporting substrate, and a semiconductor layer on a side of the silicon dioxide layer opposite the supporting substrate, the support being configured for holding the semiconductor-on-insulator type structures with a predetermined distance between the semiconductor-on-insulator type structures, the front face of one of the semiconductor-on-insulator type structures being opposite the rear face of another of the semiconductor-on-insulator type structures adjacent to the front face of the one of the semiconductor-on-insulator type structures; providing a non-oxidizing atmosphere within the furnace; heating the semiconductor-on-insulator type structures within the furnace and causing the diffusion of oxygen atoms included in the silicon dioxide layers through the semiconductor layers and generating volatile products resulting from the reaction of the oxygen atoms with the semiconductor layers; and reacting the volatile products with traps located within a reactor and reducing a concentration gradient of the volatile products in a direction parallel to the front face of at least one of the semiconductor-on-insulator type structures.

2. The method of claim 1, wherein the traps are disposed on the rear faces of the semiconductor-on-insulator type structures.

3. The method of claim 1, wherein the traps are included in a

coating completely or partly covering the support.

4. The method of claim 1, wherein the traps are included in trapping layers on front faces of trap substrates, the trap substrates disposed on the support, each trap substrate being inserted between two of the semiconductor-on-insulator type structures, the front face of each trap substrate being opposite the rear face of one of the semiconductor-on-insulator type structures, respectively.

5. The method of claim 1, wherein the traps are included in a coating completely or partly covering an internal wall of the furnace.

6. The method of claim 5, wherein reacting the volatile products with the traps located within the reactor comprises absorption of the volatile products by the traps.

7. The method of claim 6, wherein the traps comprise silicon dioxide.

8. A method for dissolving a silicon dioxide layer in a semiconductor-on-insulator type structure, the method comprising: providing semiconductor-on-insulator type structures on a support in a furnace, each of the semiconductor-on-insulator type structures having a rear face and a front face and including a supporting substrate, a silicon dioxide layer over the supporting substrate, and a semiconductor layer on a side of the silicon dioxide layer opposite the supporting substrate, the support being configured for holding the semiconductor-on-insulator type structures with a predetermined distance between the semiconductor-on-insulator type structures,

the front face of one of the semiconductor-on-insulator type structures being opposite the rear face of another of the semiconductor-on-insulator type structures adjacent to the front face of the one of the semiconductor-on-insulator type structures; providing a non-oxidizing atmosphere within the furnace; heating the semiconductor-on-insulator type structures within the furnace and causing the diffusion of oxygen atoms included in the silicon dioxide layers through the semiconductor layers and generating volatile products resulting from the reaction of the oxygen atoms with the semiconductor layers; and reacting the volatile products with traps located within a reactor and reducing a concentration gradient of the volatile products in a direction parallel to the front face of at least one of the semiconductor-on-insulator type structures; wherein the traps are included in a coating completely or partly covering an internal wall of the furnace; wherein reacting the volatile products with the traps located within the reactor comprises absorption of the volatile products by the traps; and wherein the traps comprise at least one material of the group consisting of titanium, tungsten, aluminum nitride, and alumina.

9. The method of claim 1, wherein the semiconductor layers of the semiconductor-on-insulator type structures comprise silicon.

10. The method of claim 1, wherein the semiconductor layers of the semiconductor-on-insulator type structures have a thickness greater than 100 nm.

11. The method of claim 10, wherein the semiconductor layers of the semiconductor-on-insulator type structures have a thickness greater than 200 nm.

12. The method of claim 11, wherein the semiconductor layers of the semiconductor-on-insulator type structures have a thickness greater than 300 nm.

13. The method of claim 1, wherein the silicon dioxide layers of the semiconductor-on-insulator type structures have a thickness of less than 50 nm.

14. The method of claim 1, wherein the silicon dioxide layers of the semiconductor-on-insulator type structures have a thickness of less than 25 nm.

15. The method of claim 1, wherein the silicon dioxide layers of the semiconductor-on-insulator type structures have a thickness of less than 15 nm.

16. The method of claim 1, wherein providing a non-oxidizing atmosphere within the furnace comprises providing at least one of argon and dihydrogen within the furnace.

17. The method of claim 1, wherein heating the semiconductor-on-insulator type structures within the furnace comprises maintaining a temperature of the furnace at a temperature between 900.degree. C. and 1300.degree. C.

18. The method of claim 1, wherein reacting the volatile products with traps located within the reactor comprises reacting dioxygen with trap substrates disposed in the furnace.

19. The method of claim 18, wherein the trap substrates are silicon substrates disposed on the support.

20. The method of claim 1, wherein the front face of the semiconductor-on-insulator type structure is a free face of the semiconductor layer.