setting a temperature of the reactor such that a rate of etching of the cleaved surface will be kinetically limited;

initiating a flow of gaseous etchant into the reactor; and

etching the cleaved surface.

5. The method of claim 4 wherein the etching step comprises removing at least some of the silicon layer of the structure.

6. The method of claim 4 wherein the gaseous etchant is a mix of hydrogen and hydrogen chloride.

7. The method of claim 4 wherein the temperature of the reactor is set between 900°C and 950°C.

8. The method of claim 7 wherein the temperature of the reactor is set at 950°C.

9. The method of claim 7 wherein the temperature of the reactor is set at 925°C.

10. The method of claim 4 further comprising stopping the flow of gaseous etchant once a ~~desired~~ first amount of the silicon layer of the cleaved surface is removed by the gaseous etchant.

11. The method of claim 10 further comprising performing an epitaxial deposition process on the structure after the flow of gaseous etchant has been stopped.

12. A method of processing a silicon-on-insulator structure comprising a handle wafer, a silicon layer, and

a dielectric layer between the handle wafer and the silicon layer, the silicon layer having a cleaved surface defining an outer surface of the structure, the method comprising the steps of:

inserting the structure into a reactor;

setting a temperature of the reactor such that a rate of deposition of silicon on the cleaved surface will be kinetically limited;

initiating a flow of deposition gas into the reactor; and

depositing silicon onto the cleaved surface of the structure.

13. The method of claim 12 wherein the deposition gas contains at least one of: monosilane, dichlorosilane, trichlorosilane, and tetrachlorosilane.

14. The method of claim 12 wherein the depositing step includes depositing silicon contained in the deposition gas onto the cleaved surface of the structure.

15. The method of claim 12 wherein the temperature of the reactor is set between 950°C and 1050°C when the deposition gas is trichlorosilane.

16. The method of claim 15 wherein the temperature of the reactor is set at 1000°C.

17. The method of claim 12 further comprising stopping the flow of deposition gas once a ~~desired~~ first thickness of silicon has been deposited onto the cleaved surface of the structure.