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Single step slicing ultra thin crystalline Silicon layers from Si wafers

A new technology to obtain ultra thin crystalline Silicon layers has been developed and patented. This innovative method allows to manufacture controllable thin film thickness using only a single step. Partners to further develop the system and/or to establish commercial agreements along with technical cooperation are sought.

The Challenge

Crystalline Silicon is of great importance in modern society since it has a variety of applications in the fields of electronics and photovoltaics, among others. Current methods for producing silicon wafers are not able to reduce the thickness below 100μm. To obtain thinner layers, various methods have been proposed but they are still under development. Present available technologies only allows the fabrication of a single layer. There is therefore a need to provide an improved process for obtaining thin layers of crystalline silicon be able to obtain a higher number of layers by applying a single manufacturing process starting with a single wafer.

The Technology

The presents technology allows to obtain, from a single Silicon wafer and in a single fabrication step, a stack of multiple thin films of crystalline Silicon with controllable thickness, in the range of ultra-thin layers (<40 μm). The technology is based in the reorganization of highly ordered porous silicon at high temperature under a non-oxidizing atmosphere. The seed Silicon wafer is patterned with a dense array of pores. Surface diffusion of pore walls at high temperature transform this cylindrical cavities into a set of thin c-Silicon films whose number and thickness is controlled by the proper definition of the initial pore modulation.

Innovative advantages

- Low cost fabrication.
- Single step. Not necessary to repeat everything from the very beginning to obtain a second layer.
- Thin film thickness controllable.
- Number of layers controllable.

Current stage of development

Successful fabrication of >10 thin films of crystalline Silicon has been accomplished in 3 cm^2 samples. Larger number of films is easily achievable. The extension of the presented technology up to 2 inches surface is ongoing.

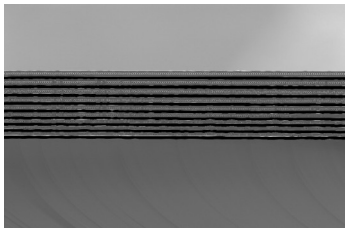
Applications and Target Market

This technology could be of interest to Silicon producers and wafer manufacturer.
3D integrated electronics. Low cost c-Silicon Solar Cells

Reference number

MKT2012/0131_I

Low cost process to obtain ultra thin Silicon layers



Cross section of Si wafer before exfoliation. 9 layers of 6-7 microns can be seen

2 microns thick crystalline Silicon layer

Business Opportunity
Technology available for licensing with technical cooperation

Patent Status
Priority application

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