Electroless porous silicon formation applied to fabrication of boron-silica-glass cantilevers - DTU Orbit (06/12/2018)

This work describes the characterization and optimization of anisotropic formation of porous silicon in large volumes (0.5-1 mm³) of silicon by an electroless wet etching technique. The main goal is to use porous silicon as a sacrificial volume for bulk micromachining processes, especially in cases where etching of the full wafer thickness is needed. The porous silicon volume is formed by a metal-assisted etching in a wet chemical solution composed of hydrogen peroxide (30%), hydrofluoric acid (40%) and ethanol. This paper focuses on optimizing the etching conditions in terms of maximizing the etching rate and reproducibility of the etching. In addition to that, a study of the morphology of the pore that is obtained by this technique is presented. The results from the characterization of the process are applied to the fabrication of boron-silica-glass cantilevers that serve as a platform for bio-chemical sensors. The porous silicon volume is formed in an early step of the fabrication process, allowing easy handling of the wafer during all of the micromachining processes in the process flow. In the final process step, the porous silicon is quickly etched by immersing the wafer in a KOH solution.

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