

## **Quartz micromachining by lithographic control of ion track etching**

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A micromachining process, using ion track etching in combination with lithographic patterning, is presented. The technique employs a substrate pre-irradiated with swift heavy ions and uses a conventional lithographic technique to control the access of a track-selective etching medium to the ion tracks. Experimental results show the possibility of generating high aspect ratio structures in virtually any direction in single crystalline quartz, which otherwise exhibits a strong "natural" anisotropy to conventional wet etching. In this way complex, three-dimensional quartz structures of 80  $\mu\text{m}$  height with vertical or pre-defined inclination angles of the walls were produced. The process can be applied to other, even highly radiation resistant, dielectric materials such as mica and organic polymers.