FABRICATION OF MICROSTRUCTURES USING SYNCHROTRON RADIATION

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Deep X-ray lithography is the first step of the well known LIGA process. With this process technique high aspect ratio microstructures are fabricated with critical dimensions in the submicron range and structural heights up to 1 mm. This is possible due to the high parallelity and the penetration depth of synchrotron radiation. First experiments have been done by Forschungszentrum Karlsruhe together with Syncrotrone Trieste at Elettra to show the possibilities and the advantage of this machine in the field of micro structure technology.

Beside these first results we will report on the process technology itself with special respect on requirements on the beam conditions to avoid secondary effects and thus, to improve the structure quality. We also present some examples of microstructures and micro systems which have been already fabricated at Forschungszentrum Karlsruhe. These examples will demonstrate the potential of this technology in micro mechanics (acceleration sensor), micro optics (micro optical devices for telecommunication, micro spectrometer) as well as in micro fluidics (micro pump, microvalve).