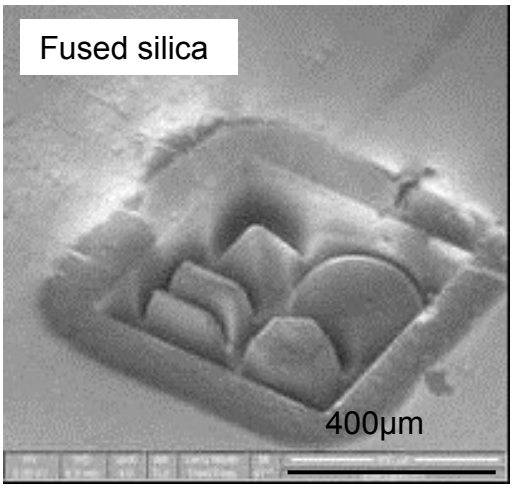
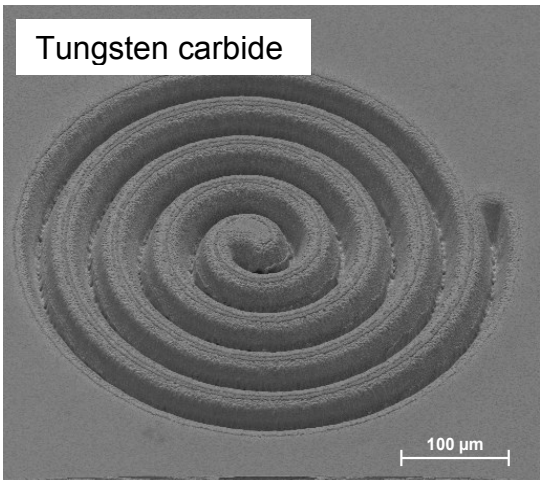
Laserinstitut
der Hochschule Mittweida

HOCHSCHULE MITTWEIDA
UNIVERSITY OF APPLIED SCIENCES

3D-Micromachining of materials using femtosecond, excimer and fluorine laser pulses





Complex 3D-microstructures can be produced at the laser institute of the University of Applied Sciences Mittweida in the surfaces of a variety of materials, including wide-band gap materials such as fused silica and other glasses, and metals by using femtosecond, excimer and fluorine laser pulses. For this three largely automated high-precision micromachining stations can be used, which are equipped with (1) a Ti: Sapphire-Laser with regenerative amplifier (station FS150-10 constructed by the 3D Micromac AG Chemnitz) operating at 780 nm wavelength with pulse duration of 130 fs, with (2) an excimer laser operating at 248 or 193 nm (Laser LPX 305 by Lambda Physik AG Göttingen) and (3) an fluorine laser operating at 157 nm (Laser LPF 220 by Lambda Physik AG Göttingen). While micromachining is performed in focus mode using the fs-laser station, the mask projection technique is used with the excimer and fluorine laser station.

Based on extensive investigations of the ablation behaviour of the various materials in dependence of process parameters, various complex microstructures consisting for example of semi-spheres, pyramids and grids and showing smooth walls and steep wall angles with resolutions down to a few micrometer were produced in quartz glass, Pyrex glass and metals such as copper and tungsten carbide.

Kontakt: Prof. G. Reiße, Prof. Dr. S. Weißmantel
University of Applied Sciences Mittweida
Laserinstitut der Hochschule Mittweida
Technikumplatz 17
D 09648 Mittweida

Tel: +49 3727 581449
Fax: +49 3727 581449
e-mail: greisse@htwm.de
steffen@htwm.de