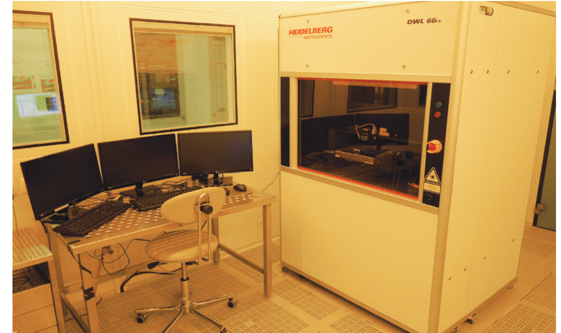
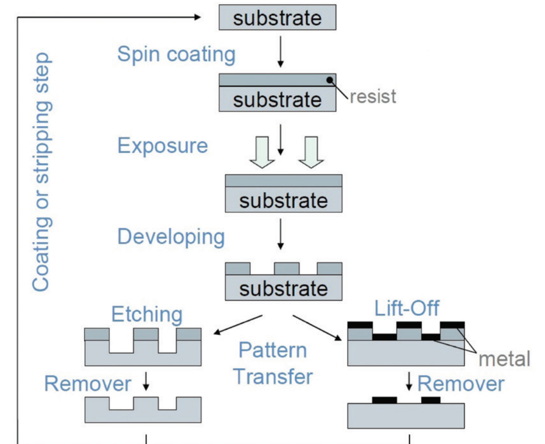
Heidelberg DWL66fs

UV Direct-Write Laser (DWL)

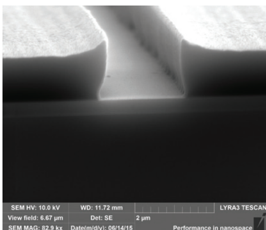
DESCRIPTION

DWL66FS is a patterning tool capable of writing structures with the dimension down to 1 μm on basically any flat substrate. It can be used in various research areas for fabrication of MEMS, BioMEMS, Microoptics, ASICs, Microfluidics, Sensors, CGHs, and all other applications that require microstructures. The instrument writes directly on the substrate (e.g. wafer), so no photomask is needed. The photomask can be fabricated using this instrument, and then used for mask aligner. The writing is done by exposing the photosensitive film on top of the substrate by UV diode laser of 405 nm wavelength. At the end the laser is passing through the writing head with the focal length of 4 mm, determining the instrument resolution of 1 μm. During operation a high resolution interferometer controls the position of the sample stage with high accuracy. This allows for performing overlay exposures very precisely. The DWL features two CCD cameras used for metrology and alignment purposes. Whole system is placed in laminar air flow box providing constant environmental conditions crucial for the exposure.

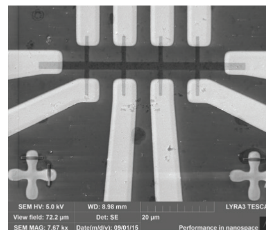




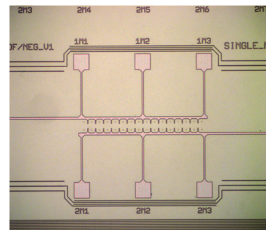
RESULTS



SEM image of AZ5214E resist profile after development.



Contacts for measurement of transport properties of shaped 2D materials - SEM image. Author: Miloš Hrabovský



Part of the single nanowire gas sensor array - optical micrograph. Author: Ondrej Chmela

SPECIFICATION

Substrates	From 25×25 mm up to 200×200 mm
Structures resolution	Down to 1 μm
Adress grid	Down to 50 nm
Write speed	10 mm²/min
Exposure mode	Raster, Special – 3D
Layout alignment	Camera system
Alignment accuracy	250 nm
Chamber	Climate
Auto focus	Air-gauge
Data input formats	DXF, CIF, GDS, Gerber, BMP, ASCII, STL

PRINCIPLE

DWL66FS is a UV-optical lithography tool. In the process, a substrate is coated with photosensitive polymer film called photoresist first. This is done on dedicated machine usually with spin-coating or spray-coating method. After thermal treatment, such substrate is put into, e.g., DWL system, where the photoresist film is exposed by UV light in controlled manner. In the following step called development, exposed areas are either removed from the film (positive photoresist used) or left in the film (negative photoresist used). The result is a resist mask on the substrate, which then undergoes etching, deposition, or doping, as required. Photoresist film is finally removed (stripped). These steps can be repeated many times to produce final device, e.g. microchip.

MORE INFO

Guarantor: Erik Pálesch (Erik.Palesch@ceitec.vutbr.cz)
Web: http://nano.ceitec.cz/uv-direct-write-laser-system-heidelberg-instruments-dwl-66-fs-dwl/