



Nanoscale Lithography



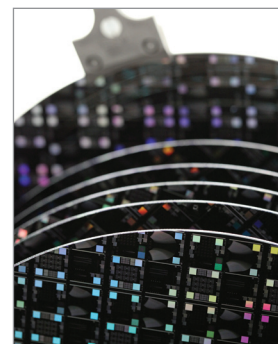
At DTU Danchip the central pieces of equipment for nanoscale lithography are a JOEL JBX-9500 Electron-beam writer, a Canon FPA 3000 EX4 Deep Ultraviolet Stepper tool and an EVG 520HE Nanoimprint Lithography tool.

The Electron-beam writer at Danchip can pattern up to 8" wafers with a resolution around 10 nm. In order to assure stable operation the tool is extensively screened from vibration and electromagnetic interference and placed in a class 10 clean-room with tight temperature and moisture control. The electron-beam writer has an acceleration voltage of 100 kV, a maximum scan speed of 100 MHz and can expose an area of 1mm x 1mm (exposure field) without stitching. These exposure fields can be stitched together with an accuracy below 10 nm.

The Deep Ultraviolet Stepper Tool significantly reduces the production price for nanostructured microchips. The machine is essentially a slide projector system, transferring patterns onto wafers with a resolution down to 220 nm with a throughput of more than 50 wafers (up to 8") per hour. The straight line resolution is around 160 nm. The exposure field is 22mm x 22mm in size, and the machine stitches fields with an accuracy below 40 nm. The machine thus permits making extremely complex structures in one single exposure step. This ensures high accuracy and yield at low prices of fabrication for complex micro and nanostructures.

Nanoimprint Lithography is a third technique, where an (in-house) fabricated master stamp is used to reproduce nanoscale structures in polymer coatings. The minimum resolution is around 50 nm. The imprint technique does put a limit to the design of the transferred pattern and the number of replicas, however.

Contact us for further information at sales@danchip.dtu.dk.



Nanolithography Equipment

JEOL-JBX9500 Electron beam writer (10 nm)

Canon FPA-3000 EX4 DUV Stepper (220 nm)

EVG 520HE Nanoimprint Lithography (50 nm)

Resists

ZEP520A
PMMA 950k
SU8
SAL601
NEB22
HSQ
KrF
UVN

Substrate Sizes

Single chips
2" (50 mm) - 8" (200 mm)