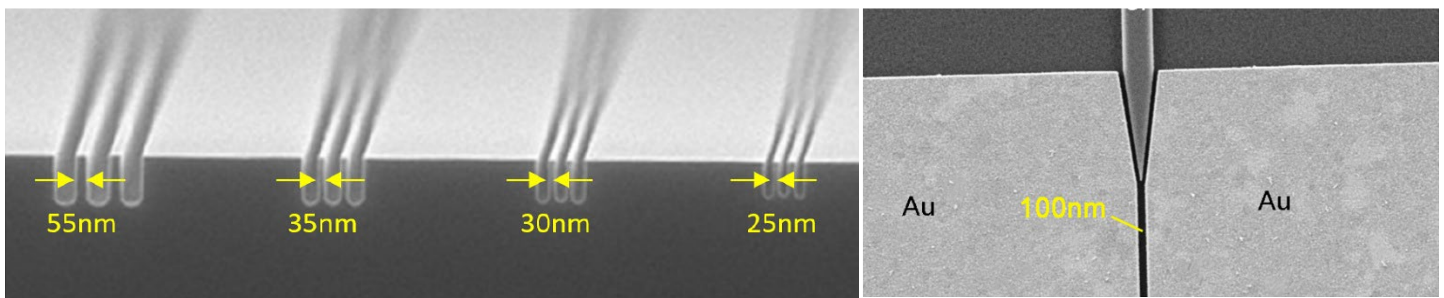

Electron Beam Lithography (EBL)

Features:

- High resolution lithography
- Structures with critical dimensions down to ~10 nm
- Highly accurate & maskless patterning
- High aspect ratio structures

EBL lithography description:

Electron Beam Lithography (EBL) is a powerful lithographic process that allows the users to transfer a structure pattern onto the surface of a substrate (e.g. SOI) by first scanning a thin layer of organic film (called resist) on the surface by a tightly focused and precisely controlled electron beam and then selectively removing the exposed or non-exposed regions with etching techniques. EBL allows for the patterning of very small features with dimensions from sub-micrometer down to a few nanometers. The EBL can be used in combination with DUV lithography for lower resolution parts of the designs.

Our EBL system:

SiPhotonIC runs the state-of-the-art E-beam writer **100kV JEOL JBX-9500FSZ EBL**. The system is equipped with a loader and several cassettes are available: e.g. 2'' wafer, 4'' wafer, 6'' wafer as well as several cassettes for chip. The smallest line widths obtained with this EBL system is around 10nm (CSAR resist) & 7nm (HSQ resist).

More information on the model can be found here: https://www.jeolusa.com/PRODUCTS/Photomask-Direct-Write-Lithography/Electron-Beam-Lithography/JBX-9500FS

EBL specifications:

Parameter	Notes	
Writing method	Spot beam, Vector scan, Step & repeat	
Accelerating voltage	100kV	
Beam size	4 to 200nm	
Scanning speed	Up to 100MHz	
Beam current	0.1nA to 60nA	
Max field size	1000µm x 1000µm	
Substrate sizes	Micro samples, 2''/4''/6'' wafers	
Resolution	50nm (standard resolution)	10-20nm (high resolution)
Current	6nA	0.2 to 2nA
Alignment precision	20nm	20nm
Resists	CSAR (pos), HSQ (neg)	Thin CSAR (pos), HSQ (neg)
Etching depth @ best resolution	350nm (standard resolution)	200nm (high resolution)

For design & ordering options, please refer to our *Prototyping Manual*.

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