Kavli Nanolab Delft
Enabling nanodevice fabrication

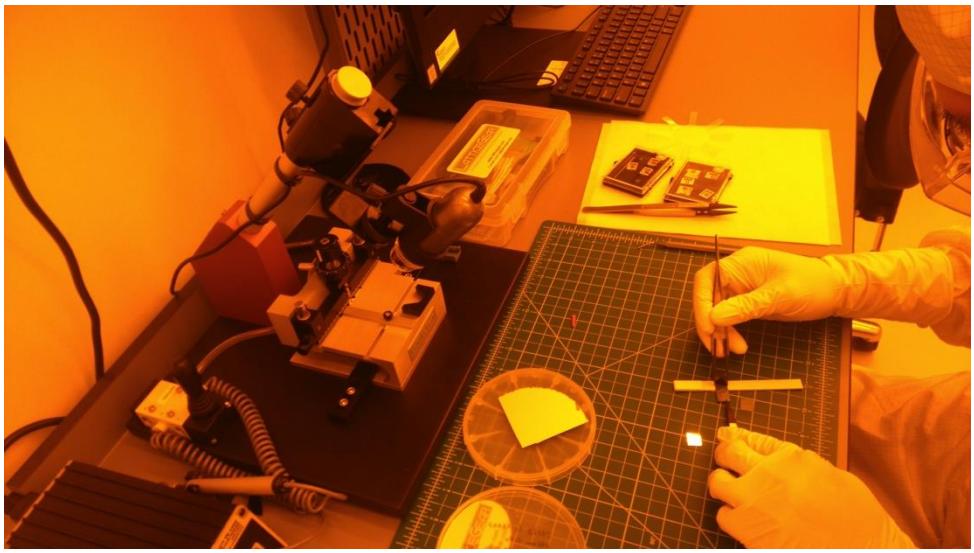
Dear cleanroom user,

This is the 18th edition of **Kavli Nanolab News**. In this issue you can find some general news on the cleanroom and about newly installed equipment.

Lattice Gear - scribing/cleaving

A new Lattice Gear Ax225 scribe and cleaving tool has been acquired. This set-up enables you to cut your samples along wafer crystal axes, which is beneficial if you have delicate samples and cannot use the Disco dicer. Compared to the conventional scribing tool this technique generates less particles. The tool makes a small indent with a diamond tip, followed by cleaving in one of the special cleaving tools.

Please contact Eugene Straver or Pauline Stevic for more information.



Oxford Instruments Estrellas for DRIE of Si

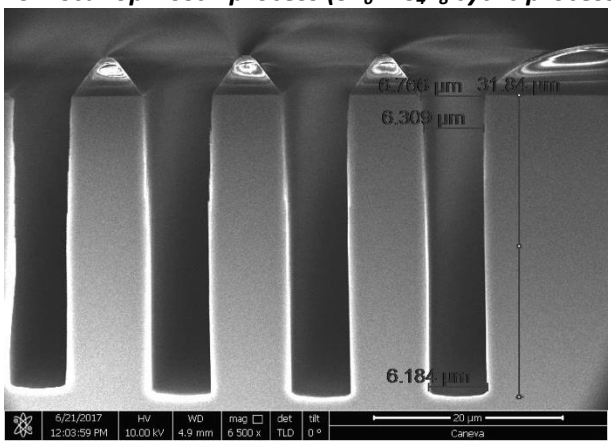
Deep reactive Ion Etching of Si is an important process at KN. In the new Oxford Instruments PlasmaPro 100 Estrellas tool both the Bosch process as well as the cryo process can be executed and switching between the two modes can be done automatically by the operator. Compared to our existing AMS etcher the performance of the Bosch processes in this new tool has been improved by showing higher etch rates (>18 um/min) or more precise etching with lower scalloping (<30 nm). Some typical etching results are shown below.

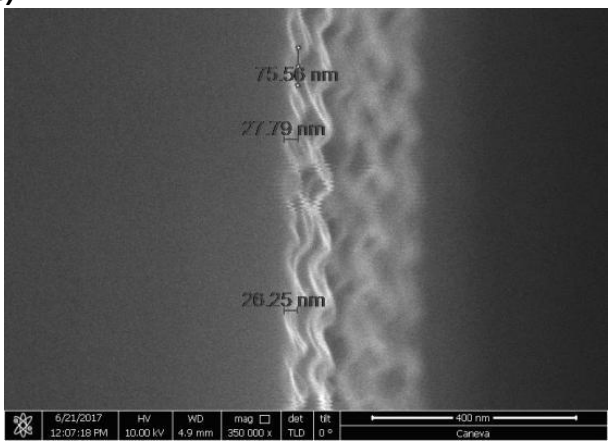
Please contact Marc Zuiddam or Charles de Boer for more information

Summary

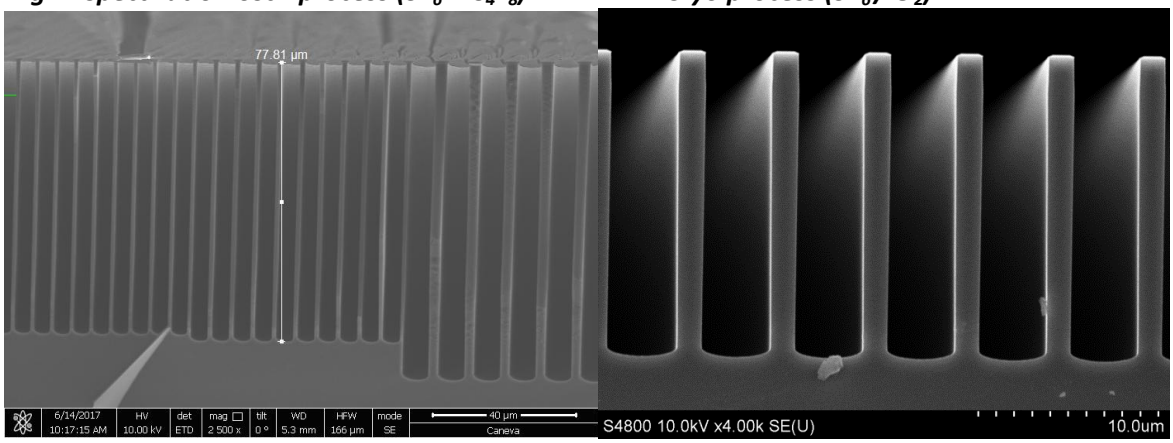
Parameter	Bosch Si etch				Cryo Si etch
	High rate	Smooth sidewalls	High aspect ratio	Through wafer (TSV)	
Feature size (µm)	Various	6	4	50	4
Aspect ratio	<4	5	19	10	4.4
Etch rate (µm/min)	>18	3.9	4.1	7.4	4.1
Selectivity	NM	NM	>40 (PR)	>180 (SiO_2)	>150 (SiO_2)
Scallops (nm)	NM	<30	<60 (top of trench)	<120	Smooth
Profile	NM	89.9°	90°±0.1°	90.2°	90.1°

Low scallop Bosch process (SF_6 – C_4F_8 cyclic process)





High Aspect ratio Bosch process ($SF_6 – C_4F_8$) ***Cryo process (SF_6/ O_2)***



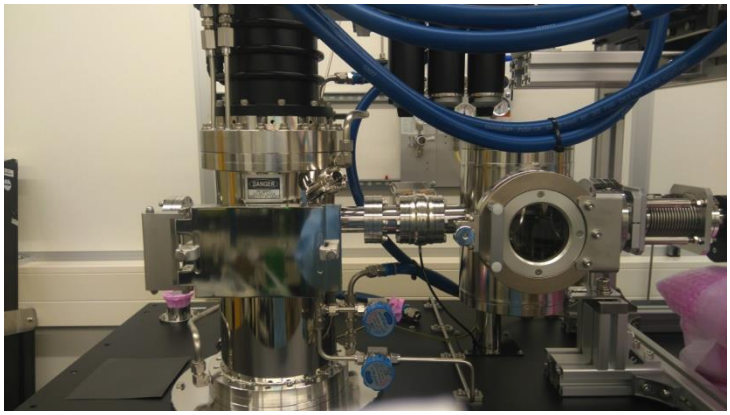
High temperature vacuum annealing furnace

A high temperature (1200 °C) vacuum annealing furnace is installed in P.00.350 (next to the ellipsometer). Its main function will be implantation damage healing of diamond. In case of ultraclean samples the furnace can be used for other purposes.

Please contact Eugene Straver or Pauline Stevic for more information.

Diamond CVD tool

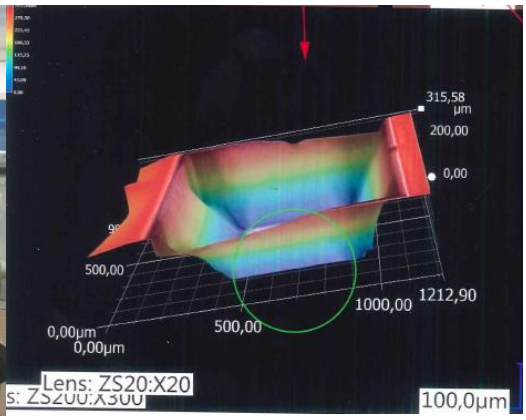
A microwave CVD tool to deposit intrinsic diamond films has arrived. The system is dedicated for QuTech and it is installed in room P.00.370 opposite to the AJA's tools.



Keyence 3D microscope

Together with ImPhys we invested in Keyence VHX-6000 digital microscope with 20-200x and 200-2000x zoom objectives. This microscope offers some interesting functions like 3D view and measurement, multi-angle observation, image stitching and real time measurement of dimensions. The microscope is installed in VLLAIR in the same room as the Helios FIB/SEM.

Please contact Roel Mattern (KN), Carel Heerkens (ImPhys) or Thim Zuidwijk (ImPhys) for more information



New KN employee

As of 15-11-2017 Pauline Stevic is a new employee working in the area of wet chemistry and optical lithography. In the course of next year she will also start to work on ALD.

III-V materials

We observe an increase in use of III-V (e.g. GaAS, InP) substrate material and also at TNO III-V materials are now used in thin film deposition processes. Therefore some new safety procedures will be implemented, like a new gowning procedure and a special protocol for working with III-V's. As for now the people who use III-V substrates should take care that breaking of samples can only be done under exhaust hood and that waste material must be deposited in the dedicated YELLOW containers.

Maintenance week VLL

The facility maintenance week will be in week 50. This means that the cleanroom will be closed for processing from 11-12-2017 07:00 till 15-12-2017 17:00.

Cleanroom introductions 2018

The KN year calendar is published on our website. Here you can find the schedule of cleanroom introductions of next year. The period of introductions is scheduled in a period of two consecutive weeks, mostly the first two weeks of each month. We hope this will make the introduction of new users more efficient.
https://www.tudelft.nl/en/faculty-of-applied-sciences/about-faculty/departments/quantum-nanoscience/kavli-nanolab-delft/new-users/