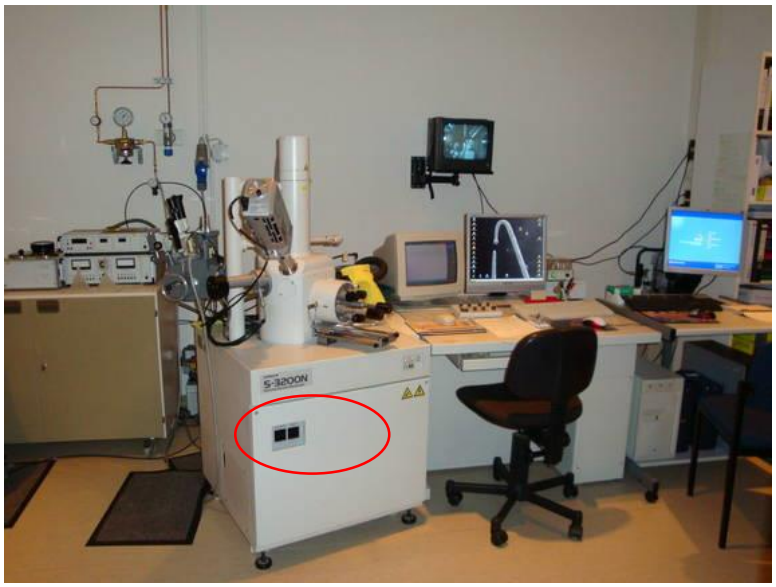
Hitachi S-3200N scanning electron microscope (SEM)



Starting the SEM

1. check the *Log Book*

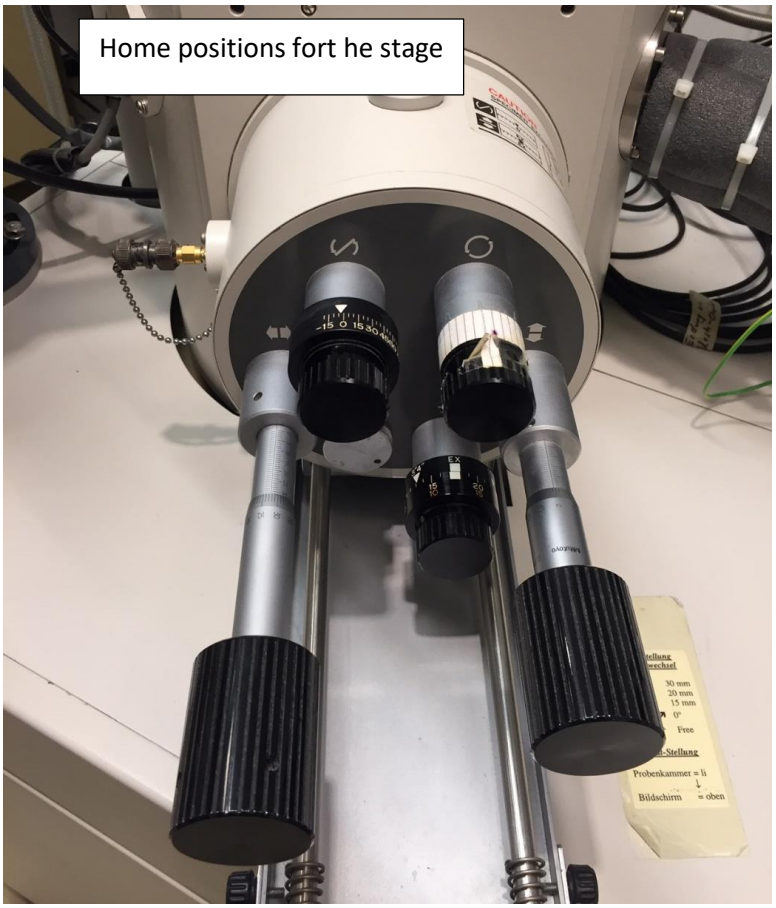
2. switch on *Water Valve*. It is on the back of the microscope on the wall

3. switch on *EVAC POWER* (left tumbler) on the microscope
4. switch on *DISPLAY* (right tumbler) on the microscope
5. switch *on IR camera* (control unit on the table) plus *TV* (on the wall behind the SEM)
6. wait 20 minutes for *High Voltage (HV)* on SEM

7. switch on middle PC
8. check that *BSE Robinson Detector* is out.

If the microscope is already on and you need to insert your sample:

1. Home sample position: x position “30”,
   y position “20”,
   z position “EX”,
   tilt position zero.
2. vent the probe chamber by pressing the *EVAC/AIR button* (the right button on the microscope), wait until the chamber opens
3. insert the sample, check that you press it tightly down to the bottom.
4. close the chamber and start pumping (press the *EVAC/AIR button* on the microscope)
5. hold the chamber door slightly for a moment



Imaging:

1. start *DIPS* software (**D**igital **I**mage **P**rocessing **S**oftware) and through it start the *DISS 5* acquisition software (**D**igital **I**mage **S**canning **S**oftware).
2. wait until the vacuum is reached and start *HV*.
3. in the SEM software: set up accelerated voltage to required: ↑↓ **HV**
4. set up beam *E.Beam*=>Beam current 1 (for normal SEM), Beam current 2 (for EDX)
5. set *AFS* (**A**uto **F**ilament **S**aturation; it will change contrast & brightness)
6. open Align menu and press *AGA* (**A**uto **G**un **A**lignment)
7. reduce the *Magnification* (on the small panel) to minimum
8. adjust *Brightness* and *Contrast* (on the small panel)
9. set the Focus (**W**orking **D**istance: WD) to 15mm using the Focus Knob (small panel)
10. then adjust *Z* up or down in order to see a sharp image
11. Choose aperture
12. choose *Alignment* (in the SEM software)
13. press *Aperture 1* to set up wobbling, set magnification to so you can see well: manually adjust two screws x and y on the microscope (see image) to get image the brightest and not wobbling

14. open the DISS 5 software, adjust Brightness and Contrast there on *Live Slow*
15. choose *ROI* and do astigmatism correction: find a small feature and try to reduce astigmatism.

16. take image: SLOW 1000, for saving set magnification, WD and voltage.

For EDX:

1. check that the BSE detector is out
2. start INCA software (login INCA, password INCA)
3. set WD=15 mm
4. set HV=20kV
5. choose Beam current 2
6. open aperture
7. switch IR camera off
8. set magnification in the INCA software corresponding to the SEM magnification (set it in Optionen, Mikroskopsteuerung)
9. choose working area, take a snapshot, go to mapping (if you need it) and start.
10. sample at least a minimum of 250000 counts or 25 frames

in the SEM Software:

the “A monitor” is normally used for SE-secondary electron detector

the “B monitor” is normally used for BSE –back scattered electron detector

When done:

1. turn HV off
2. choose the Home positions for x, y, and z
3. wait 5 minutes and then press EVAC-AIR to vent the chamber

If you are the last user per day:

1. after evacuation and sample removal, switch on vacuum again and wait until you reach HV
2. switch off the DISPLAY (right tumbler)
3. switch off EVAC-POWER (left tumbler)
4. switch off the IR camera and the TV
5. switch off the PC and the monitor
6. wait for 30 minutes and the close cooling water flow