**SEM SOP**

**Short Version**

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| Sample preparation | Step1: Set the sample on the sample holder. There are several sample holders depending on sample size and shape.  Step 2: Put the carbon tape on one end of the sample if sample is nonconductive.  Note: Be careful about sample size (to high sample can damage sensitive parts of the SEM) |
| User login and placing the sample holder at the SEM sample unit | Step1: Write basic data to the user book (Name, date, time, account number, etc)  Step2: Log in to the computer (Ctr+Alt+1 for the first screen and Ctrl+Alt+2 for the second screen)  Step3: Hit icon on the desktop for SEM software window starting  Step4: Put the gloves on  Step5: Push VENT button and hold for a few second. When the light stop flashing unit is ready.  Step6: Open sample unit (pull manually to open)  Step7: Set the prepared sample holder on its position at the sample unit.  Note: There is flat side of the sample holder-should be set forward during sample holder positioning. Set sample holder by one hand if possible  Step8: Check whether the sample holder is set correctly  Step9: Close the sample unit (manually- push forward to close). Hold the sample unit by one hand and push PUMP button and hold for a few seconds until you hear the sound of pumping.  Note: during setting the sample and closing the sample unit the HT button at SEM window is not active.  Note: Do not live any data at the desktop. Make sure that you have subfolder to storage your data. |
| Sample investigation | Step1: When HT button is active start your work  Step2: Set the sample to the right position to have good view of the area you want to observe.  Note: there are three ways to set the sample at the right position. Manually, with the screws at the SEM sample unit, with the buttons at the command table-joystick and by software (input X and Y coordinates). There is only one way to set Z coordinate manually by the screw at the SEM sample unit.  Note: Be very careful with Z direction moving.  Step3: Hit the SCAN2 button at the working window  Step4: After setting Focus the sample (focus by minimum magnification)  Note: Focus manually with the buttons at the command table (Focus + coarse = fast focusing). Focus can be done by using software buttons at the working window.  Step5: Set the spot size around 60 and Acc Volt. at 20keV  Step6: Set the brightness and contrast  Note: There three ways for setting, by using manual command at the command table, by buttons at the working window menu and automatic settings with ACB button.  Step7: Increase magnification to set the parameters for sample observation  Note: Always use higher magnification for setting parameter than one you want to work on. (for example, use 1000X if you want to work with 100X)  Step8: Focus the image  Step9: Use OL-WOBBLER command from tools menu to set objective aperture properly.  Note: correct manually with screws at the SEM sample unit  Step10: Correct stigmation with buttons from command cable  Note: Hit SCAN1 and use the same buttons as for contrast and brightness  Step11: Focus the image  Step12: decrease the magnification to your working magnification  Step13: Focus the image  Step14: Check contrast and brightness if necessary  Note: If you want to see picture at the small window and compare some pictures press right click and chose snap shot option or import picture from the folder |
| Working distance setting | Step1: Check the Z coordinate and working distance at the working window  Note: working distance is important for EDS analysis. Optimum working distance for EDS analysis is 12-14 mm  Note: BE CAREFUL WITD SETTING WORKING DISTANCE  Step2: Focus the image  Step3: Decrease the working distance (decrease Z value for few mm)  Step4: Focus the image  Step5: Check working distance  Repeat these steps until working distance reach 12-14 mm  Note: BE CAREFUL |
| Data saving | Step1: Hit SCAN3 and FREEZ  Step2: Hit save data from the menu  Step3: Open your Subfolder  Step4: Give the name to the picture and save it |
| Working with BSEI | Note: use this option if you have multiphase sample  Step1: From the menu SIGNAL at working window chose BSEI  Step2: Chose appropriate option Compo or Topo or Shadow, depending on what you want to investigate  Note: When you finish return SIGNAL at SEI |
| EDS Analysis | Note: Sample mast be flat and polished for this type of analysis  Step1: Go to screen 2 (Ctrl + Alt + 2)  Hit the icon for starting EDS software  Step3: open the sample image at the screen 2  Step4: Chose the point where you want to analyze the sample  Step5: Follow the diagram for completing action for EDS analysis  Step6: Chose the type of data from the template menu you want to have at the end report  Note: Deadtime must to be between 40 to 60 % for correct results |
| Shutting of  procedure | Step1: Set the minimum magnification  Tep2: Decrease Z at the minimum position  Step3: Focus the image  Step4: Hit the HT button  Step5: Put the gloves on  Step6: Hit the VENT button  Step7: Open the Sample unit  Step8: Take off the sample holder  Step9: Close the sample unit and PUMP  Step10: Close the software  Step11: Put the sample and sample holder at the right place |
| NOTE | If you have any comment about SEM or problem write it at the user book |