**VP-SEM Ice Instruction manual**

1. “AIR” instrument (few minutes)
2. Turn ON cold stage (red button on the box)
3. Remove specimen mount, put in cold stage with copper stub
4. Take reservoir out of the freezer and place it inside the chamber
5. Put in conditions (ie. VP-SEM mode, 25-150 Pa, Vacc 17 kV, 70 PB, BSE, Gain 3)
6. Close chamber and “EVAC”
7. Enter specimen parameters (+51 mm, +8 mm)
8. Turn ON chamber camera
9. Raise the stage in steps (10, then 6, hover over the STOP! Button)
10. Turn OFF camera (or else you won’t see anything)
11. Turn ON voltage (top left)
12. Adjust image with magnification, course/fine focus, brightness/contrast
13. On the cold stage panel, GOTO -40 °C to grow crystals
14. SAVE quick snapshots of what you’re taking pictures of
15. Take 3D images
16. To finish, adjust cold stage to +24 °C, ZOOM all the way out, “AIR” chamber, wipe off the copper stub, remove cold stage and put it in the back, take out reservoir, refill and freeze it, return the specimen mount, close chamber, set to SEM mode and “EVAC” the instrument
17. Turn OFF lights

**Taking 3D images**

1. Find a crystal with recognizable roughness at 200-500x
2. Try to get your WD to 10.0 +- 0.4 mm (three factors: focus, magnification, stage height)
3. Zoom in on the roughness so that it covers the entire image, then ABCC
4. In stage settings, use rotation to align roughness horizontally
   1. relative, eucentric, positive for clockwise, negative for counterclockwise
   2. try not to rotate over 90 in either direction, if you do, switch on the camera to see how much trouble you’re making inside the chamber
5. Make sure the black bar embedding is DISABLED (info is logged in txt files anyway)
6. Hit the 3D button, brightness will be fixed from now on
7. Adjust the “contrast” slider so that the histogram is centered
8. Adjust the quality (snapshots can work, sometimes you want 1280, anything more is risky)
9. Select the location to save the images, use BMP, name them according to system
10. Confirm and wait (don’t do anything on the computer during the capture time)
11. Once capturing finishes, use explorer to manually check your pictures for defects and re-take them if necessary (black bars, white bars, one picture entirely white, all pictures black due to gain…)
12. Hit “Run” in order to start seeing live again
13. If you wish to take more images, keep the dialog open and just change the destination and re-focus before every picture