| **7/27/2023** |  | | | |  |
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| Objective | Wrap up the experiments with some more runs at 90pa. After this, we’ll have enough data to mimic ice crystal life in clouds at pressure conditions of 30, 50, 70, and 90pa. Moving forward we can analyze the roughness under these conditions to strengthen a conclusion of how pressure and temperature affect ice crystal surface roughness. | | | |  |
| Accomplishment/  Reflection |  | | | |  |
| Cold stage size | | 51 mm | | |  |
| Cold stage height | | +8 mm | | |  |
| Distance of detector from stage  (5-10mm) | | 5 mm | | |  |
| Probe current (70-90) | | 70 | | |  |
| Accelerating voltage (Vacc) (12-17kV) | | 12 k/v | | |  |
|  | | | | |  |
| Time (Since start of trial) | Action/observation | Temperature | Pressure (25-150 Pa, 40 most common) | Working Distance  (3 factors: focus, mag, stage height)  Error message if not from 9-11 mm | Magnifi-  cation |
|  | Setting up for our first trial. |  |  |  |  |
| 0:00 | *Case 1.0:* Crystal located top central section of area. Good view of prismatic-pyramidal section and basal on top. Capturing calibration image at a lower temperature so the crystal is not growing too fast. **Note: crystal was still growing during imaging.** | -34.4 | 90 | 8.7 | x70 |
| 2:20 | *Case 1.1:* Some growth roughness becoming visible on prismatic facets. Hexagonal portions are forming and attaching onto the body of the crystal. **Note: crystal was still growing during imaging.** | -35.9 | 90 |  |  |
| 4:22 | *Case 1.2:* Visible roughness between prismatic facets. **Note: crystal was still growing during imaging.** | -34.4 | 90 |  | x55 |
| 6:19 | *Case 1.3:* Basal facet has shrunk significantly and is barely noticeable. **Note: crystal was still growing during imaging.** | -32.5 | 90 |  |  |
| 8:17 | *Case 1.4:* Crystal has seemed to flatten as it’s expanded. Not as much roughness yet as we would expect. **Note: crystal was still growing during imaging.** | -30.5 | 90 |  | x50 |
| 10:30 | *Case 1.5:* Some linear growth roughness is finally becoming visible on the front-facing prismatic facet. **Note: crystal was still growing during imaging.** | -28.6 | 90 |  |  |
| 12:19 | *Case 1.6:* Crystal has stopped growing. We are seeing some good roughness on the prismatic facets now, but mostly on the sideways facing ones. Crystal definitely appears to have flattened. | -26.9 | 90 |  |  |
| 14:15 | *Case 1.7:* Ablation starting to occur. Most noticeable in the pyramidal facet which is caving in. Crystal is also starting to shrink around the edges, seems to be returning to original shape | -25.0 | 90 |  |  |
| 16:15 | *Case 1.8:* Pressure has risen to 100, something to take note of. | -23.2 | 100 |  |  |
| 18:14 | *Case 1.9:* Left side of the crystal is starting to have the spaced out ablation roughness we expect to see. However, there is overall much less of the rigid, spaced out roughness than we’ve seen in crystals at lower pressures. | -23.2 | 100 |  |  |
|  | Ending trial. Resetting for another one. |  |  |  |  |
| 0:00 | *Case 2.0:* Crystal located on the left side of the stage. Prismatic facet facing up. Capturing calibration image at higher temp. **Note: crystal was still growing during imaging.** | -34.4 | 90 | 8.8 | x90 |
| 2:30 | *Case 2.1:* Lowering the temp after getting the first image. Jagged shapes appearing towards the top of the crystal. **Note: crystal was still growing during imaging.** | -36.0 |  |  | x80 |
| 4:30 | *Case 2.2:* Crystal is growing quite rapidly. The top of the crystal is still growing oddly shaped attachments. **Note: crystal was still growing during imaging.** | -34.4 | 90 |  | x70 |
| 6:40 | *Case 2.3:* Not much growth roughness on the primary prismatic facet yet, which follows the trend we’ve seen so far. **Note: crystal was still growing during imaging.** | -32.5 | 90 |  | x60 |
| 8:24 | *Case 2.4:* Basal facet seems to be pretty rounded, and also has not shrunk much which is surprising. However, lots of roughness forming on the oddly shaped attachments towards the top of the crystal. **Note: crystal was still growing during imaging.** | -30.5 | 90 |  |  |
| 10:19 | *Case 2.5:* Crystal just finished growing. Note that detectors B and C do not provide great images of the crystal. Growth roughness is finally becoming visible on the primary prismatic facet. | -28.6 | 90 |  |  |
| 12:13 | *Case 2.6:* Roughness on the primary prismatic is becoming more defined. | -26.5 | 90 |  |  |
| 14:15 | *Case 2.7:* **Note:** Pressure was 100 for detectors A and B, but lowered to 90 for C and C. | -25.0 | 95 |  |  |
| 16:21 | *Case 2.8:* Crystal is shrinking significantly. Ablation in full effect. Very late in the process, but ablation is becoming very visible, with some spaced out roughness on the primary prismatic facet. | -23.3 | 100 |  |  |
| 18:34 | *Case 2.9:* Capturing one last image just to have. Crystal has shrunk a lot at this point. | -26 | 80 |  |  |
|  | Resetting for one more trial at 30pa. |  |  |  |  |
| 0:00 | *Case 1.0:* Basal facing up, crystal located towards center of the stage. **Note: crystal was still growing during imaging.** | -40.0 | 30 | 9.2 | x180 |
| 2:15 | *Case 1.1:* Already some visible roughness on the beveled surface, which we did not see at all at higher pressures. **Note: crystal was still growing during imaging.** | -38.5 | 30 |  | x150 |
| 4:15 | *Case 1.2:* Pyramidal facets are starting to cave in. Crystal has finished growing. | -36.6 | 40 |  | x140 |
| 6:13 | *Case 1.3:* Visible roughness on the basal facet, which we have not noticed at higher pressures that much. | -34.8 | 40 |  |  |
| 8:16 | *Case 1.4:* Ablation starting to take shape. Rigid roughness forming on prismatic facets. We believe that the prismatic facet on the right side is actually the basal facet of another crystal that has attached onto this one, due to its roughness patterns. | -32.8 | 40 |  |  |
| 10:17 | *Case 1.5:* Great basal ablation roughness. This crystal will be great to analyze the basal roughness, since almost all of our other crystals will be used for prismatic roughness analysis. | -30.8 | 50 |  |  |
| 12:12 | *Case 1.6:* Capturing final image. Only the basal facet is left of the crystal at this point. **Image was canceled since the crystal evaporated halfway through.** | -30.8 |  |  |  |
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