| **7/18/2023** |  | | | |  |
| --- | --- | --- | --- | --- | --- |
| Objective | We are trying to simulate crystal life in cirrus clouds by raising the temperature at a constant rate to mimic a crystal falling within a cloud due to gravity. We are planning on replicating this trial for different pressure readings, simulating this phenomenon occurring in multiple cirrus clouds with different pressure conditions. | | | |  |
| 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) | | 85 | | |  |
| Accelerating voltage (Vacc) (12-17kV) | | 12 k/v | | |  |
|  | | | | |  |
| Time (Since start of trial) | Action/observation | Temperature | Pressure at start of imaging (25-150 Pa, 40 most common) | Working Distance  (3 factors: focus, mag, stage height)  Error message if not from 9-11 mm | Magnifi-  cation |
|  | Our first trial will be done at 30pa. We will start the temperature at -45°C and raise it 2°C every 2 minutes. |  |  |  |  |
| 0:00 | Capturing first image, found a crystal located in the middle of the coldstage (case 1.0). | -40.1 | 30 | 9.4 | x120 |
| 4:35 | Getting second image. Pressure raised slightly due to raising temperature. Some growth roughness on prismatic facets. Also some more sporadic roughness on beveled surface (case 1.1). | -36 | 40 |  |  |
| 6:42 | Getting third image (case 1.2). Ablation roughness is visible in the pyramidal facet. | -34 | 40 | 9.3 | x110 |
| 8:28 | Capturing fourth image (case 1.3). Note that the pressure changes as the temperature rises. Detector D seems like it is giving great images of the prismatic facet’s roughness. | -32 | 50 |  |  |
| 10:30 | Fifth image (case 1.4). Crystal is visibly shrinking down. | -30.8 | 50 |  |  |
| 12:30 | Another one (case 1.5). Pressure has risen a little more. Crystal is almost gone. Fabulous first run! | -29 | 60 |  |  |
| 14:24 | End of trial 1. |  |  |  |  |
|  | Running another trial with pressure set to 30pa. Lowering temperature to -40. |  |  |  |  |
| 0:00 | Raised the pressure to 40 for crystal growth, but lowered it back down to 30 after crystals formed. Located a crystal in the middle for our second trial. Imaging the calibration (case 2.0). | -38 | 40 | 8.9 | x170 |
| 2:20 | Second image (case 2.1). Growth roughness is becoming visible on the prismatic facets. | -38.3 | 30 |  |  |
| 4:30 | Third image (case 2.2). Crystal seems to be growing so so so slightly, which is odd. More defined roughness along the prismatic facets. Ablation roughness starting to occur (visible best in Detector C). | -36.4 | 40 |  |  |
| 6:25 | Fourth image (case 2.3). More visible roughness, definite ablation conditions occurring. Ablation visible with caving in on edges | -34.7 | 40 |  |  |
| 8:15 | Fifth image (case 2.4). Pressure rose to 50 during imaging. | -32.8 | 40 |  |  |
| 10:00 | Ending the trial with a snapshot (case 2.5). | -32 | 50 |  |  |
|  | Resetting for trial 3. Pressure will be set to 50pa this time. |  |  |  |  |
| 0:00 | Located another prismatic-up crystal away from the edge. This one has 2 other crystals growing nearby, so we will keep an eye on it to see if nearby crystal growth affects roughness when crystals come into contact with one another. (case 1.0). | -37.2 | 50 | 9.4 | x130 |
| 2:44 | Capturing the second image (case 1.1). | -36 |  |  |  |
|  | Cooler stopped working, so we decided to call it for now and disregard the crystal we were imaging. |  |  |  |  |
|  | Returning for our second run of the day. We will have our first run through be set for 30pa, then hopefully get a few for 50pa afterwards. |  |  |  |  |
| 0:00 | Found a crystal that is slanted between basal and prismatic facing up. Very promising for calibration(case 3.0). | -39.4 | 25 | 9.0 | x170 |
| 2:20 | Capturing second image (case 3.1). Slight roughness developing on the beveled surface. | -38.4 | 30 | 8.7 | x170 |
| 4:32 | Third image (case 3.2). Lots of roughness forming. | -36.6 | 40 |  |  |
| 6:58 | Fourth image. Lots of ablation signs all of a sudden, crystal is beginning to deform and shrink (case 3.3). | -34.7 | 40 | 9.1 | x250 |
| 8:45 | Fifth image. Crystal seems to be towards the end of the cycle, lots of jagged roughness (case 3.4). | -32.7 | 50 |  |  |
|  | Finished trial. Restarting for one more trial at 30pa. |  |  |  |  |
| 0:00 | Found a crystal that is slanted between prismatic and basal facing up. Imaging now (case 4.0). | -38.6 | 25 | 9.1 | x160 |
|  | Cooler keeps on dying on us, the temperature raised all the way to -29. Deciding to call it for the day due to that. |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |