

## How to change a sample with the Janis Cryofurnace and the High Temperature Stick:

### 1. Remove old sample:

- a. Disable alarm by clicking the “Alarm Enabled” button in the Lakeshore box on the dashboard (Fig 1).
- b. Ensure that the sample mount and VTI temperatures are between 100 and 350 K. (To speed cooling, 100 mbar of He may be added and Loop1 setpoint may be set to 100-250K.)
- c. Turn off all heaters by hitting the red “ALL OFF” button on the front of the LakeShore 336 controller, (Figure 3). The adjacent red lights for Control Outputs 1 & 2 should turn off.
- d. In the sample pit, unplug the 12-pin connector from the stick (Figure 2).
- e. Carefully unplug the two purple thermocouples from the stick.
- f. Start flowing He, by turning the three-way valve to point to the gas line on the left (Figure 4).
- g. Leaving He flowing, remove the stick flange clamps.
- h. Once the pressure on the gauge has reached approximately 900 mbar, carefully lift the sample stick, handling it by the black part, and hang it in the stick holder in the pit.
- i. Cover the hole with the blank and turn the three-way valve to vacuum on the right.  
**Warning: Various sections of the sample stick may be hot or cold. Wear thermal gloves if needed to protect from extreme temperatures.**
- j. Remove the passive heat shield (Figure 5) by backing out the four screw posts.
- k. Remove the active heat shield by removing the four screws. Be careful not to bend the stick.
- l. Scan the sample with the RadEyeG radiation monitor, remove from stick and place with its barcode tag in the appropriate beamline location, on the wooden bench in the RMA.

### 2. Load new sample:

- a. Use a heat gun and wipes to completely dry any condensation on the stick. Do not leave the heat gun focused on one spot for a long time, to avoid damaging the wires.
- b. Place the new sample onto the stick. Height from the bottom of the flange to the beam center should be 42.25 inches.
- c. Replace the active heat shield, aligning the marks. Replace the passive heat shield.
- d. Turn the three-way valve to He. Once the pressure on the gauge has reached approximately 900mbar, remove the blank, while continuing He flow.
- e. Carefully place the sample stick into the cryofurnace, aligning the marks.
- f. Turn the three-way valve to vacuum to the right.
- g. Replace and tighten the stick flange clamps.
- h. Once the pressure gauge is reading approximately 0 mbar, turn the three-way valve to He flow.
- i. Once the pressure gauge is reading approximately 900mbar, turn the three-way valve to vacuum.
- j. Repeat steps h&i two times.
- k. For very high temperature (600-800 K) operation only, leave the sample space under vacuum.
- l. For moderately high temperature (300-600K) operation only, leave the sample space with 100 mbar of He to the cryofurnace by turning the three-way valve vertical to isolate the sample space once the desired pressure is reached.
- m. For low-temperature ( $\leq 300$  K) operation only, leave the sample space with 200-300 mbar of He.
- n. Carefully reattach the two thermocouples to the sample stick, matching the marks and labels.
- o. Reattach the 12-pin plug to the sample stick.
- p. On the front of the LakeShore 336 panel, turn the VTI heater back on by pressing consecutively “A”, “Heater Range”, up arrow to select *High*, then “Enter”.
- q. Turn the sample heater back on by repeating step p, starting with button “C” instead of “A”.
- r. Re-enable alarm by clicking the “Alarm Disabled” button in the Lakeshore box on the dashboard (Fig 1).

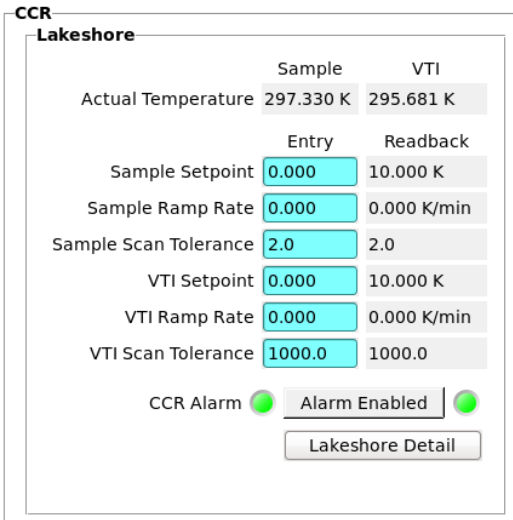


Figure 1. Lakeshore controls on the dashboard.

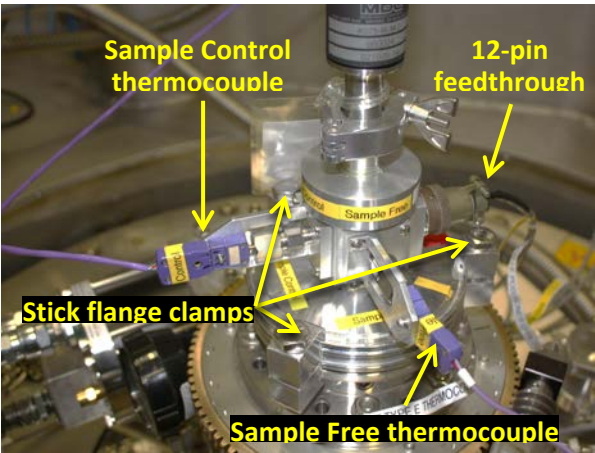


Figure 2. Sample stick connections



Figure 3. LakeShore336 controller

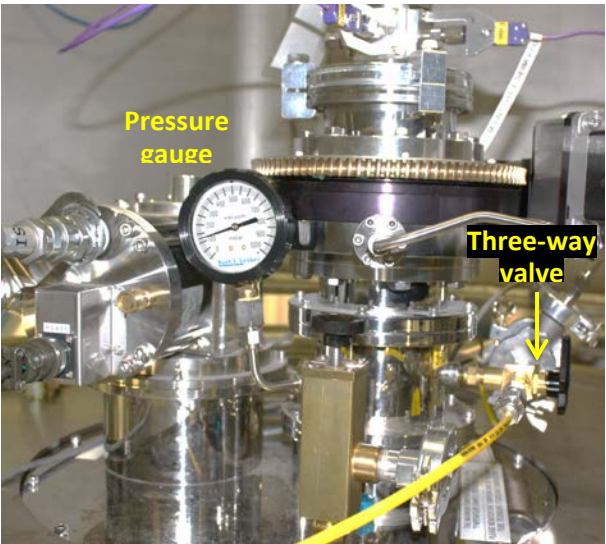


Figure 5. Pressure gauge and three-way valve

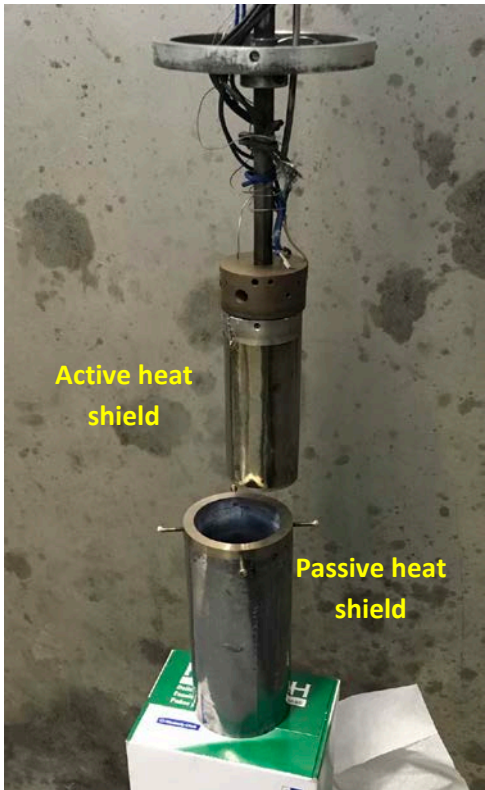


Figure 4. Sample stick and heat shields.