BL-11a MICAS Furnace Sample Change

How to change a sample with the MICAS furnace:

1. Prepare the system for a sample change.
   a. Disable alarm by clicking the "Alarm Enabled" button in the Lakeshore box on the dashboard (Figure 1).
   b. Set temperature setpoint to 0°C.
   c. Turn off power to the heating elements by pressing the E-stop on the furnace controller, as in Figure 2.
   d. Once the furnace is below 300°C, press the power button on the turbo pump controller to start it spinning down.
   e. You may close valve V-1 (vacuum), as in Fig. 3, to isolate the turbo pump from the roughing pump.

      Never have open the vent valve and vacuum valve at the same time, to prevent the vacuum pump from emptying the gas cylinder.

   f. After at least 15 minutes, check the turbo speed. If needed, once it is below 400 Hz, you may very slowly crack open valve V-2 (vent) slightly to bleed a little nitrogen into the turbo pump, which will help slow it down.

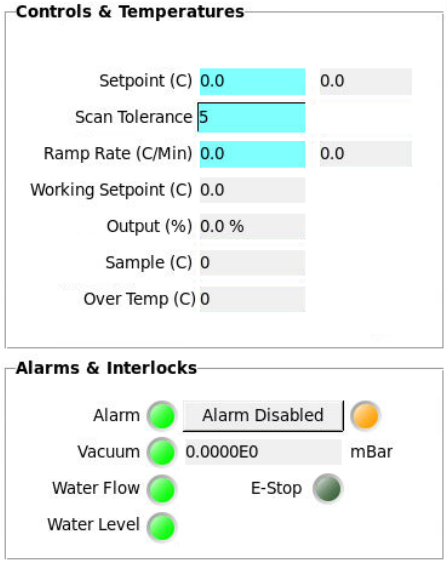

Figure 1. Micas controls on dashboard

2. Remove the previous sample.

   Furnace temperature must be 100°C or lower before removing sample stick to avoid oxidizing the vanadium heating elements.

   a. Once the turbo speed reaches 0 Hz, fully open V-2 (vent) to vent the furnace to atmospheric pressure. Avoid over-pressurizing the furnace.
   b. Remove the clamps holding the sample stick in place.
   c. Carefully disconnect both thermocouple leads on the sample stick.
   d. Leaving V-2 (vent) open, carefully remove the stick and hang from the stick holder in the sample pit.
   e. Place the blank over the sample stick port and close V-2 (vent).
   f. Scan the sample with RadEye G radiation monitor. If the monitor alarms, call the RCT (865-274-8658).

      Caution: Sample may be hot. Thermal gloves should be worn if needed.

   g. Unscrew sample from stick, as in Figure 4, and put it with its ITEMS barcode tag in the irradiated samples bin on the wood table in the Radiological Materials Area.
3. Load new sample.
   a. Screw new sample onto stick.
   b. Check that the sample height is correct, as measured from the bottom of the flange. The height to the beam position should be 87.2 cm.
   c. Open V-2 (vent) and remove blank from sample stick port.
   d. Carefully place stick into furnace, ensuring that the O-ring is in place and that the alignment marks match.
   e. Replace sample stick clamps and close V-2 (vent).
   f. Reconnect both thermocouple leads, being careful to match the orientation marks.
   g. Open V-1 (vacuum).
   h. Once the pressure, as seen on the furnace controller, is below 1 mbar, press the power button on the turbo pump controller to start spinning it up.
4. Prepare the system for heating.
   a. Once the pressure is below approximately 5e-4 mbar, the furnace is ready to heat.
   b. After verifying that the setpoint is 0°C, release the E-stop by twisting it clockwise.
   c. Re-enable alarm by clicking the "Alarm Disabled" button in the Lakeshore box on the dashboard (Fig 1).

Figure 2. MICAS furnace controller.

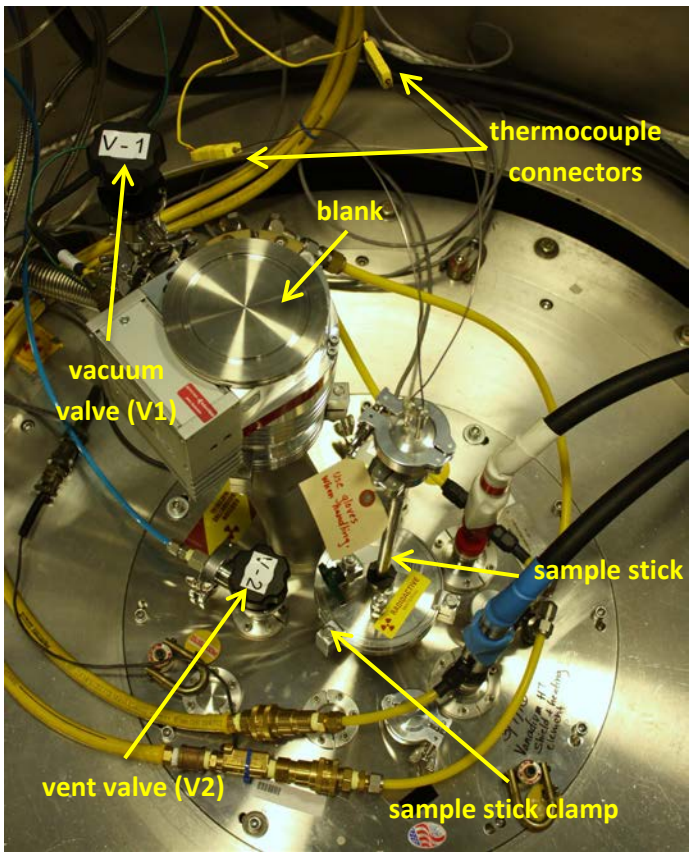

Figure 3. ILL furnace.

Figure 4. Sample can on stick.