

Switching Bruker GADDS System to SAXS

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1) Move Detector to 300mm mark

Actual detector distance will be 100mm more than mark indicates.

Default for GADDS XRD: 60mm (160mm)

Default for SAXS: 300mm (400mm)

For basic WAXS the 60mm position may be more appropriate.

- a. Drive the goniometer to 0° 2Theta, 0° Omega
- b. Remove pin at 310mm mark
- c. Loosen the detector using a 5mm Allen wrench. Do not remove completely.
- d. Slide detector past the pinhole at 310mm
- e. Replace pin at 310mm
- f. Slide detector to the pin, until it stops
- g. Tighten well

2) Mount Beamstop and Helium Chamber

Multiple helium chambers are available, but with the detector at the 300mm mark, there is little reason to use any but the largest one. The beamstop components are kept in a Tupperware on the metal shelves next to the GADDS system.

Caution: Beryllium: Use extreme caution when working around the beryllium detector face during these steps. It is best to avoid touching it at all. Beryllium dust can cause berylliosis, a potentially life-threatening condition. In addition, damage to the detector face would necessitate expensive repairs.

- a. Remove black face plate from detector. Face plate simply snaps on.
- b. Attach the beam stop mounting plate to the detector.
 - i. The pins on the plate should face out.
 - ii. Secure with 8 short star (Torx T10) screws.
 - iii. Attach it tightly enough to ensure positive helium pressure.
- c. Attach the beam stop to the mounting plate.
 - i. The hollow end should face the X-ray source.

- ii. Place the micrometers at front and top for easy access.
- iii. Attach it using the hollow hex screws and the ¼ inch socket driver (normally kept on metal shelf).
- iv. Attach it tightly enough to ensure positive helium pressure.
- d. Mount the helium chamber.
 - i. Mount the supply inlet on top.
 - ii. Attach it using the long screws with small O-rings, and a 9/64 inch Allen wrench.
 - iii. If the front O-ring is cracked, don't worry-- the mylar itself may be providing a sufficient seal.

3) Connect Helium Lines and Begin Purging the Chamber

- a. Connect Swagelok components of inlet line inside the radiation enclosure, using a ½ inch crescent wrench and an adjustable wrench. Place outlet line in a small beaker of water to monitor flow.
- b. Turn on gas tank, and adjust tank regulator pressure to 4-6 psi.
- c. Purge the chamber at maximum flow for 30 minutes. Continue to the next step while the chamber is purging.

4) Check Beamstop Alignment

- a. Mount the desired pinhole or monocalipillary optic.
 - i. If sample mount size permits, lock the optic in place using the small alignment screw in the bottom of the optic mount.
 - ii. If the sample mount is too big, change sample mounts or slide the optic backward until it fits.
 - iii. It is not recommended to remove the optic once it is mounted, as beam position may change.
- b. Set generator to full power (40 kV / 40 mA).
- c. Close the radiation enclosure. Use Collect → Add to scan for 2 seconds.
- d. Zoom in on the beam spot in the software. If necessary, adjust the Beamstop using the micrometers inside the enclosure. Repeat c) and d) until the beam is completely blocked.

5) Follow GADDS SAXS SOP for further instructions

- a. Calibrate detector distance and beam center using silver behenate
- b. Mount and align your sample, and collect data