Argonne NATIONAL LABORATORY

X-RAY SCIENCE DIVISION

CHEMISTRY AND MATERIALS SCIENCE GROUP

SECTOR ORIENTATION FOR
12-BM-B / 12-ID-B / 12-ID-C / 12-ID-D

BEAMLINE CONTACTS

12-BM-B
- Beamline: 2-0378
- Sungsik Lee: 2-7491
- Benjamin Reinhart: 2-7128
- https://12bm.xray.aps.anl.gov/

12-ID-B
- Beamline: 2-1712
- Xiaobing Zuo: 2-1553
- Byeongdu Lee: 2-0395
- https://12id.xray.aps.anl.gov/

12-ID-C
- Beamline: 2-2706
- Soenke Seifert: 2-0391

12-ID-D
- Beamline: 2-1812
- Hua Zhou: 2-7139

CMS Group Safety
- Alexis Quental: 2-2509

CMS Group Leader
- Byeongdu Lee: 2-0395

EMERGENCIES

For Urgent Assistance

- Call 911 from any ANL phone
- Call (630) 252-1911 from a cell or off-site phone

For Non-Emergencies

Contact the Floor Coordinator

- On-call FC Pager: 2-0101
- Local FC Office: 433-C001

Fire Safety

- In case of fire, leave the building via nearest exit and call 911.
- Fire extinguishers are located on posts by the experimental hall walkway between 12ID-B and 12ID-C.
- Do not use fire extinguishers unless properly trained.

Weather Safety

- Use caution walking to/from the building during inclement weather.
- Alert your primary contact about unresolved/dangerous conditions.
- Tornado shelters include men's/women's restrooms and the machine shop.

Remember to NOTIFY YOUR BEAMLINE CONTACT of any emergency, incident, or close call/near miss.

SAFETY FIRST & STOP WORK AUTHORITY

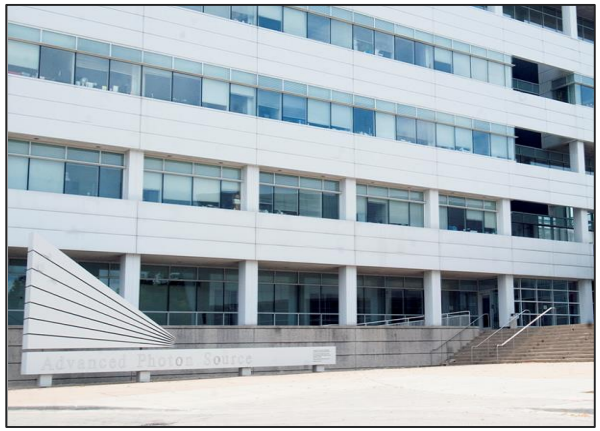
Safety First

- No experiment that runs at the APS is so important that it needs to be done without proper safety measures in place.
- It is important that all personnel (staff and users) feel safe while they are here.

Stop Work Authority

- If you see work or actions that appear unsafe, you have the authority and obligation to stop the work and bring the situation to the immediate attention of your local contact and/or floor coordinator.
- If you are asked to stop work – you must stop work!

USER INFORMATION



User badges must be worn at all times while on-site at Argonne.

- Register your user badge at the APS user office; hours are Monday through Friday 8AM until 5PM
- If you need site-access added to your badge prox-card, notify your primary beamline contact or visit the APS user office.
- If you take any photos while on-site, make sure your badge is removed or hidden from view.

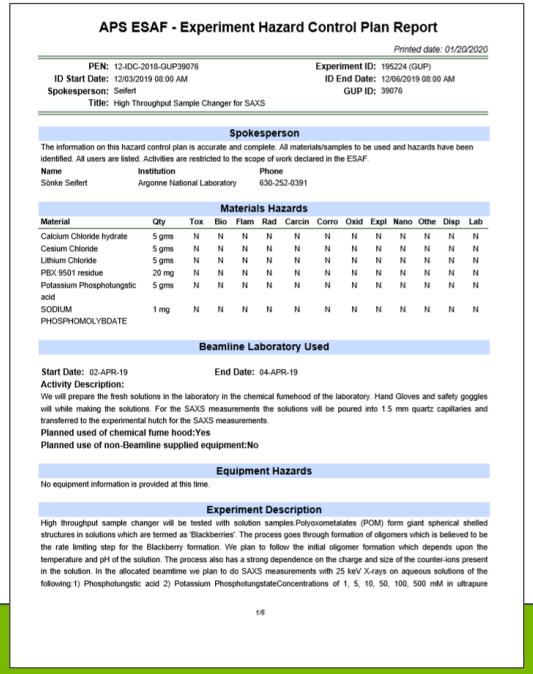
Tricycles are available for indoor transit and transport of general equipment and nonhazardous samples.

- Ride no faster than a brisk walking pace; backpedal or use hand brake to stop.
- Only one person is allowed on tricycle at a time.
- Tricycles are shared between sectors 11 & 12 and are labeled; do not take anyone else's tricycle.
- Return tricycle to the sector 11/12 area when you are finished.

EXPERIMENT SAFETY & OPERATION

Every experiment at the APS requires a current Experiment Safety Assessment Form (ESAF).

- Your ESAF must accurately define your intended work, including materials, activities, and hazards.
- During your experiment, do not stray from the work outlined in the ESAF.
- An experiment will not be allowed unless an up-to-date ESAF is completed, approved, and posted.



APS ESAF - Experiment Hazard Control Plan Report

Printed date: 01/20/2020

PEN: 12-IDC-2018-GUP39076 **Experiment ID:** 195224 (GUP)
ID Start Date: 12/03/2019 08.00 AM **ID End Date:** 12/06/2019 08.00 AM
Spokesperson: Seifert **GUP ID:** 39076
Title: High Throughput Sample Changer for SAXS

Spokesperson

The information on this hazard control plan is accurate and complete. All materials/samples to be used and hazards have been identified. All users are listed. Activities are restricted to the scope of work declared in the ESAF.

Name	Institution	Phone
Sönke Seifert	Argonne National Laboratory	630-252-0391

Materials Hazards

Material	Qty	Tox	Bio	Flam	Rad	Carcin	Corro	Oxid	Expl	Nano	Othe	Disp	Lab
Calcium Chloride hydrate	5 gms	N	N	N	N	N	N	N	N	N	N	N	N
Cesium Chloride	5 gms	N	N	N	N	N	N	N	N	N	N	N	N
Lithium Chloride	5 gms	N	N	N	N	N	N	N	N	N	N	N	N
PBX 9501 residue	20 mg	N	N	N	N	N	N	N	N	N	N	N	N
Potassium Phosphotungstic acid	5 gms	N	N	N	N	N	N	N	N	N	N	N	N
SODIUM PHOSPHOMOLYBDATE	1 mg	N	N	N	N	N	N	N	N	N	N	N	N

Beamline Laboratory Used

Start Date: 02-APR-19 **End Date:** 04-APR-19
Activity Description:
We will prepare the fresh solutions in the laboratory in the chemical fumehood of the laboratory. Hand Gloves and safety goggles will while making the solutions. For the SAXS measurements the solutions will be poured into 1.5 mm quartz capillaries and transferred to the experimental hutch for the SAXS measurements.
Planned used of chemical fume hood:Yes
Planned use of non-Beamline supplied equipment:No

Equipment Hazards

No equipment information is provided at this time.

Experiment Description

High throughput sample changer will be tested with solution samples.Polyoxometalates (POM) form giant spherical shelled structures in solutions which are termed as 'Blackberries'. The process goes through formation of oligomers which is believed to be the rate limiting step for the Blackberry formation. We plan to follow the initial oligomer formation which depends upon the temperature and pH of the solution. The process also has a strong dependence on the charge and size of the counter-ions present in the solution. In the allocated beamtime we plan to do SAXS measurements with 25 keV X-rays on aqueous solutions of the following:1) Phosphotungstic acid 2) Potassium PhosphotungstateConcentrations of 1, 5, 10, 50, 100, 500 mM in ultrapure

1/6

X-ray experiments are performed inside the experimental hutches.

- Hutch must be closed, locked, and secured with no one inside before beam is allowed into the station.
- Your primary beamline contact will show you the location of the search buttons in your experimental hutch.
- The search should be performed by one person.
- Note: 12-ID-C hutch must be secured before securing 12-ID-D station.

Eating/drinking are NOT ALLOWED inside hutches and enclosures.

Eating/drinking are allowed at the experimental control area outside of the hutch, but must be kept SEPARATE from chemicals and sample preparation areas.

SEARCH & SECURE PROCEDURE

Steps to close hutch door and allow beam into station:

- Ask other experimenters to LEAVE THE HUTCH.
- PRESS SEARCH BUTTONS in order, while making sure no one remains in hutch. If you forget which button to go to, look for the flashing light.
- After all buttons are pressed, EXIT HUTCH and go to outside panel.
- Watch the door to make sure no one enters as you HOLD THE GREEN ‘CLOSE’ BUTTON. Once the door is completely closed, you may let go.
- After 20 seconds, magnetic lock engages, and hutch is ready to take beam. Press SHUTTER OPEN at the panel or from the computer to allow beam in.

EMERGENCY BEAM STOP

Indications & instructions for use:

If someone begins to secure station before you are ready to leave, press Emergency Beam Stop button.

- This interrupts the securing procedure; storage ring is unaffected.
- Pull the Beam Stop button out to reset it.

If you become locked inside the hutch and the door closes, ***immediately*** press Emergency Beam Stop button.

- This will dump the beam to ensure your safety.
- To leave the hutch, press and hold door ‘OPEN’ button.
- If door does not automatically open, press ‘DOOR DISABLE’ then manually open door.
- Pull the Beam Stop button out to reset it.

Note: if the Beam Stop button is pressed, a search cannot be performed. If search lights are not flashing, check to ensure the Beam Stop button is pulled out.

LABORATORY SAFETY & CONDUCT

If your experiment requires use of the bench space, fume hood, or access to any of the following:

- 4°C refrigerator
- -15°C freezer
- 13MΩ DI water
- 18.3MΩ milliQ water
- Vortex mixer
- Shaker
- Sonicator
- Vacuum oven
- Furnace
- Hot water bath
- Analytical balances
- Centrifuges
- Heat/stir plates

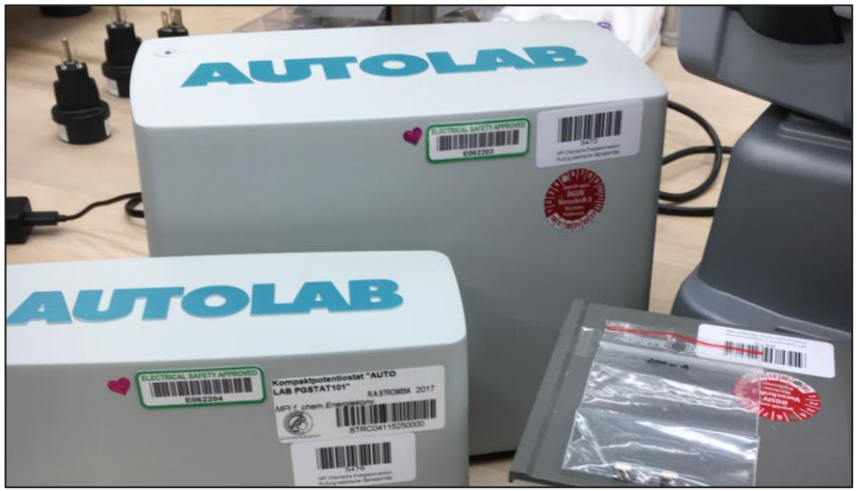
- Indicate ‘LAB USE’ on the ESAF and describe any sample preparation, handling, mounting, cleaning, or storage requirements in detail.
- Use of OPEN FLAMES (lighters, torches, etc.) requires a special permit.
- Ice and dry ice is also available at the APS. Notify your primary beamline contact, and they will help you retrieve it.
- If you require AFTER HOURS access to the lab, notify your primary beamline contact or visit the APS user office.
- If you are doing anything hazardous or with harsh chemicals, DO NOT WORK ALONE.

LABORATORY SAFETY & CONDUCT

Please note that the chemistry lab, the inner experimental hutch, and the outer station areas are under closed circuit video surveillance.

- EYE PROTECTION IS REQUIRED in the 433 E030 lab – safety glasses are located on the outside of both doors.
- An emergency eyewash station is located next to the lab freezer.
- Eating and drinking are NOT ALLOWED in the lab. Do not drink water from lab sink; domestic water is available in restrooms, break rooms, and at fountain.
- Our lab is a shared area. Be sure to FOLLOW POSTED SIGNS and LABEL ALL CONTAINERS AND HAZARDS associated with your setup.
- It is very important that you CLEAN UP your workspace at the end of your experiment. If you need to leave anything at the APS for any reason, please LET US KNOW.

ELECTRICAL SAFETY



General Electrical Safety

- Do not attempt any electrical work if you are not qualified or authorized.
- Beamline staff will assist you with retrieving and running any cables needed for your experiment.
- Any cords run on the floor must be secured in such a way as to prevent a trip hazard.
- Use of extension cords should be minimized; extension cords must not be connected in series.

Electrical Inspections

- If you plan to bring electrical equipment to Argonne National Laboratory, it must be included on the ESAF ahead of time.
- Non-commercial equipment, including modified commercially manufactured equipment, must be made available for inspection, testing, and certification by an ANL Designated Electrical Equipment Inspector (DEEI) before use.

COMPRESSED GAS SAFETY

Beamline staff will assist you with compressed gas cylinders. Cylinders delivered to the site will be in the 433/434 gas yard area.

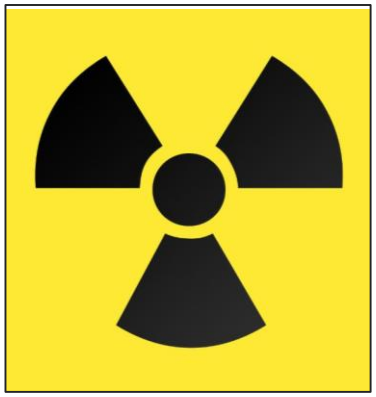
Proper Storage

- Cylinders must be restrained on their upper half and never left freestanding.
- Cylinders should be moved and stored with the valve cover cap screwed firmly into place. Do not store cylinders on carts.
- Clearly mark each empty cylinder with “Empty” printed on adhesive tape, affixed tags, or placard. Valves must be closed on empty cylinders.

Proper Setup

- Never tamper with the cylinders in any way.
- All equipment used with compressed gases must be made from materials compatible with the gas used.
- Use only regulators, gauges, valves, and manifolds that are designed for the particular pressures and gases involved.

SPECIAL CONDITIONS

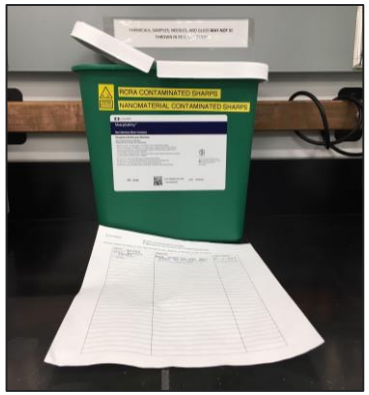


Radiation Safety

- Thermoluminescent dosimeters (TLDs) are required for users with radioactive samples.
- TLDs must remain on-site and should be placed in the dosimeter rack at building 433 entrance for readouts.
- Contact sector 12 staff *before* your experiment if you plan to use radioactive sealed sources.

Cryogenic Safety

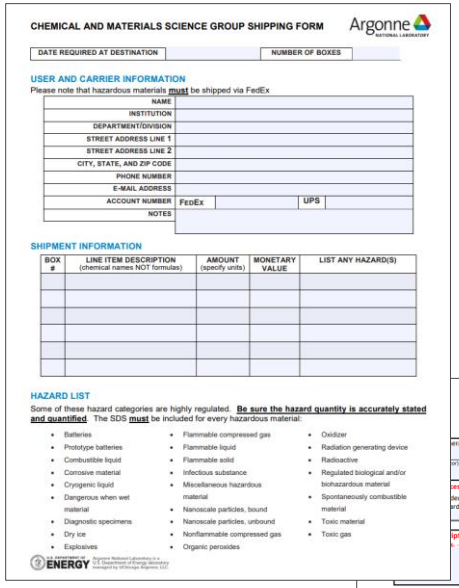
- Use of cryogenic liquids must be indicated on your ESAF before use.
- Proper PPE is always required:
  - safety glasses or goggles
  - loose-fitting insulating gloves when handling or in the proximity of someone handling cryogenic liquids
  - full-face shield when splashing or spraying may create a significant hazard.
- Sandals are not allowed anywhere near cryogenic liquids.



Sharps Safety

- The use of needles is not recommended. If you must use needles, please include the use on your ESAF.
- **Sharps cannot go in the regular trash**. The lab has a sharps disposal container behind the sink and a glass disposal container on the floor.
- Fill out log sheet when using sharps disposal container.

SHIPPING AND WASTE GENERATION



CHEMICAL AND MATERIALS SCIENCE GROUP SHIPPING FORM — Argonne NATIONAL LABORATORY

DATE REQUIRED AT DESTINATION | NUMBER OF BOXES

USER AND CARRIER INFORMATION

Please note that hazardous materials must be shipped via FedEx

NAME	
INSTITUTION	
DEPARTMENT/DIVISION	
STREET ADDRESS LINE 1	
STREET ADDRESS LINE 2	
CITY, STATE, AND ZIP CODE	
PHONE NUMBER	
E-MAIL ADDRESS	
ACCOUNT NUMBER	FedEx / UPS
NOTES	

SHIPMENT INFORMATION

BOX #	LINE ITEM DESCRIPTION (chemical names NOT formulas)	AMOUNT (specify units)	MONETARY VALUE	LIST ANY HAZARD(S)

HAZARD LIST

Some of these hazard categories are highly regulated. Be sure the hazard quantity is accurately stated and quantified. The SDS must be included for every hazardous material:

- Batteries
- Prototype batteries
- Combustible liquid
- Corrosive material
- Cryogenic liquid
- Dangerous when wet material
- Diagnostic specimens
- Dry ice
- Explosives
- Flammable compressed gas
- Flammable liquid
- Flammable solid
- Infectious substance
- Miscellaneous hazardous material
- Nanoscale particles, bound
- Nanoscale particles, unbound
- Nonflammable compressed gas
- Organic peroxides
- Oxidizer
- Radiation generating device
- Radioactive
- Regulated biological and/or biohazardous material
- Spontaneously combustible material
- Toxic material
- Toxic gas

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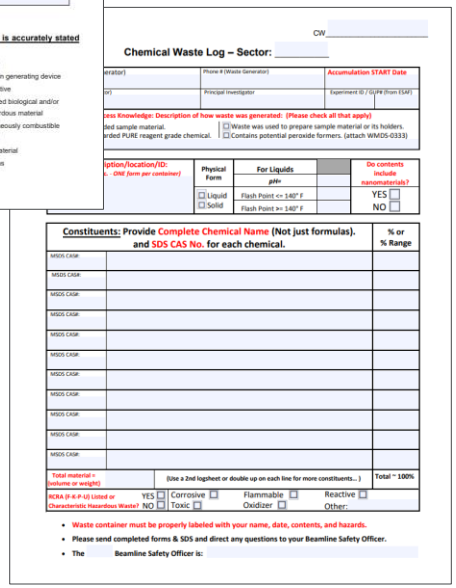

CW

Chemical Waste Log – Sector: _____

Generator	Phone # (Waste Generator)	Accumulation START Date
	Principal Investigator	Experiment ID / G.U.## (from ESAF)

Process Knowledge: Description of how waste was generated: [Please check all that apply]

☐ Waste was used to prepare sample material or its holders.
☐ Contains potential peroxide formers. (attach WMOS-0333)

Description/location/ID: (1 ONE form per container)

Physical Form	For Liquids		Do contents include nanomaterials?
	pH=		
☐ Liquid ☐ Solid	Flash Point <= 140° F		YES ☐
	Flash Point >= 140° F		NO ☐

Constituents: Provide Complete Chemical Name (Not just formulas). and SDS CAS No. for each chemical.	% or % Range
MSDS CAS#:	
MSDS CAS#:	
MSDS CAS#:	
MSDS CAS#:	
MSDS CAS#:	
MSDS CAS#:	
MSDS CAS#:	
MSDS CAS#:	
MSDS CAS#:	
MSDS CAS#:	
Total material = (volume or weight)	(Use a 2nd logsheet or double up on each line for more constituents...) Total ~ 100%

RCRA (F-K-P-U) Listed or Characteristic Hazardous Waste? YES ☐ NO ☐ Corrosive ☐ Toxic ☐ Flammable ☐ Oxidizer ☐ Reactive ☐ Other:

- Waste container must be properly labeled with your name, date, contents, and hazards.
- Please send completed forms & SDS and direct any questions to your Beamline Safety Officer.
- The Beamline Safety Officer is:

Shipping and waste disposal are processes that require procedures, paperwork, and approvals. Please notify your primary beamline contact as soon as possible if you plan to generate waste or need help with shipping anything back to your home institution.

- Shipping
  - https://12id.xray.aps.anl.gov/files/XSD-CMS-shipping-form.pdf
- Waste
  - Collect waste in a compatible container
  - Do not overfill; use multiple containers if needed
  - Complete one waste form for each container
  - https://www.aps.anl.gov/sites/default/files/APS-Uploads/Safety-and-Training/Safety/Hazardous-Materials/Chem-Waste-Log.pdf
- Send completed shipping/waste forms to Alexis at aquental@anl.gov

MISCELLANEOUS INFORMATION

- An APS user account can be established for your group to pay for APS stockroom purchases, chemicals, gases, glassware, supplies, shipping, machining, or any other miscellaneous charges.
  - For more information, visit: https://www.aps.anl.gov/Users-Information/Legal-Financial/Establish-a-User-Account

- The following acknowledgment statement must be included in all published reports of work conducted at the APS:

  "This research used resources of the Advanced Photon Source, a U.S. Department of Energy (DOE) Office of Science User Facility operated for the DOE Office of Science by Argonne National Laboratory under Contract No. DE-AC02-06CH11357."

- Appropriate acknowledgments of the resources provided by beamline staff, affiliated institutions, and funding agencies should also be included. Also mutually beneficial is a statement in the text noting the location(s) and designation(s) of beamlines (e.g., "...data collected at the X-ray Science Division beamlines at the Advanced Photon Source, Argonne National Laboratory").

SECTOR 12 ORIENTATION CREDIT

Click the link to get to the sector 12 orientation form:

https://forms.office.com/Pages/ResponsePage.aspx?id=haH8DPcl40mK53BNUybihX4Xs7NEeidFroddBEAby21UOEtUUVZCMVBDOTlCVzEwTkhCUlU0MFBVMyQlQCN0PWcu

THANK YOU FOR YOUR ATTENTION!!