

Operation Procedure Laboratories
Rooms U118, U124, 028, 031, 032, 033 / Building WLGA
Room A19.01 / Building WBGA

Location

WBGA / A19.01 & WLGA / U118, U124, 028, 031, 032, 033

PSI Organisation Unit: 3703

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Remark

Access to the laboratories is possible only after instruction by the organisation unit responsible / room responsible person.

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1. PSI directives and guidelines

1. Safety, Health Protection and Environmental Protection at PSI (“SGU directive”): AW-01-07-02.
2. Work safety and Health Protection at PSI: AW-96-19-176.
3. Safety analysis procedure for experiment: AW-96-09-03.
4. Chemistry Safety (Activities involving chemicals at PSI): PB-9670-291.
5. Nanomaterial Safety: AW-96-09-04.
6. Gas and Cryo Safety: PB-9670-324 and AW-96-16-05.
7. Biosafety: AW-96-14-02.
8. Radiation protection PSI: AW-96-18-01.
9. Risk assessment for experiments involving hazards: FO-9670-341.
10. Personal Protective Equipment: PB-9670-37.
11. Electrical Safety AW-93-05-02.
12. Fire & Emergency: AW-96-21-578.
13. PSI “Hausordnung”: AW-11-21-615.

See safety relevant information on the PSI webpage: <https://www.psi.ch/useroffice/safety-at-psi> and <https://intranet.psi.ch/Safety/WebHome>, and <https://intranet.psi.ch/en/safety/safety-for-new-employees>.

See Import Guidelines and Shipping Instructions on the PSI webpage: <https://www.psi.ch/useroffice/importshipping>.

See dangerous goods’ transport procedures on the PSI webpage: <https://www.psi.ch/asi/gefahrguttransporte>.

2. Scope of application

14. The Solid State Chemistry (SSC) group laboratories WBGA/A19.01 & WLGA/U118, U124, 028, 031, 032, and 033 are allocated for the SSC group members. In particular cases, laboratory can be used by associated group members.
15. The rooms and equipment there serve to prepare and characterise samples be investigated in-house.

3. Responsibilities and competences

16. The laboratory responsible person is in charge of:
 - Safety infrastructure (e.g. eyewash and shower, PPE, fume hood, chemicals' absorbers, etc.).
 - Correct labelling with safety signs and the access control.
 - Organization of maintenance, service, and repairs of the Solid state Chemistry Group's equipment including pumps and chillers.
 - Ordering of (if necessary) new tools and devices.
 - Supervision of proper labelling, handling and storage of chemicals ordered and/or delivered by PSI staff (after proper registration in the PSI Chemical Database).
 - Coordination of chemical waste disposing. Chemical waste disposal can be done once per month (1st Wednesday of the month).
 - Work coordination of the co-responsible persons.
17. The laboratory co-responsible person is in charge of:
 - Basic, general consumables (e.g. gloves, Al-foil, paper, pipets, sample containers etc.).
 - Basic chemicals (e.g. ethanol, acetone, demi water, etc.).
 - Control of proper indication and labelling of user workplaces, removing unlabelled samples and chemicals to a temporary storage or waste bin.
 - Ordering and changing of gas cylinders.
 - Supervision of proper functioning of the glove-box and its purification system.
 - Instructing users to follow the "**Operation procedure Laboratories WBGA/A19.01 & WLGA/U118, U124, 028, 031, 032, 033**".
 - Instructing users how to use sharps (e.g. needles, broken scalpels, broken glass etc.) disposal container.
 - Instructing users how to use the fume hood and other equipment being in the laboratory e.g. centrifuge, press etc.
18. The laboratory user is in charge for:
 - Informing the laboratory (co-)responsible person if some consumables have to be ordered or some devices have to be repaired.
 - Organizing maintenance, service, and repairs of user's equipment.
19. Maintenance of laboratory infrastructure (ventilation, electricity, water etc.) is provided from the service groups from LOG department of PSI.

20. It is expected that long-term associated group' users bring their own PPE (e.g. Lab coats, safety glasses, mask).
21. It is expected that long-term associated group' users bring all specific equipment, tools, materials, and consumables. If users have a special request, they have to contact the laboratory responsible / Organisation Unit responsible in advance.
22. The users' advisors (supervisors, line managers, PI) are responsible for a safe working procedures and instruction of all team members involved in the experiment.
23. PSI Safety supporting persons are:
 - a. Safety Officer: Winfried Rendler 2677
 - b. Radiation protection expert: Lisa Pedrazzi 4603
 - c. Chemical safety: Patrick Kissel 5633
 - d. Biosafety: Philipp Berger 4728
 - e. Fire protection: Martin Bednarzik 2520
 - f. PSI work safety delegate in case of pregnancy and breastfeeding: Winfried Rendler 2677

4. Hazards

Major hazards in rooms WBGA/A19.01 and WLGA/ U118, U124, 028, 031, 032, 033 are:

24. *Stubbing* by bad order, obstructed traffic routes, cables, etc.
25. *Fall* by not-properly use of steps, ladders, etc.
26. *Cuts and squeezing*: during mechanical sample preparation (saws, scalpels, knives, scissors, screw drivers, press, etc.).
27. *Cold burns* by liquid nitrogen.
28. *Burns* by flame, furnace, hot plates, drying cabinet, soldering iron.
29. *Fire- and explosion risk*: inflammable organic solvents, fire load in presence of ignition sources, high-pressure apparatuses.
30. *Etching burns* by acids, bases (alkaline fluids) and etching gases.
31. *Acute toxic and dangerous substances (e.g. elements and their compounds unclassified by MSDS) – of hazard category / group 1 – (e.g. hydrofluoric acid (HF), Beryllium (Be), Arsenic (As), Osmium (Os), Mercury (Hg), Thallium (Tl) etc.) **permission of the Organisation Unit responsible person.*** Risk assessment “*handling hazardous substances in the lab*” (FO-9670-341) has to be performed in advance. Afterwards, **contact** with **experts** are necessary.
32. *Irritation* of respiratory track by evaporation of organic solvents and aerosols.
33. *Environment protection*: release of contaminated liquids and gases into aquatic system and air.
34. *Suffocation* by replacement of oxygen in a room by dry ice, liquid / gaseous nitrogen, argon, helium.
35. *Biohazard: preparation of biological samples.* WBGA/A19.01 & WLGA/U118, U124, 028, 031, 032, 033 are chemistry and physics laboratories. Any activities with biomaterials is forbidden and requires **permission of the Organisation Unit responsible person.** Afterwards, **contact** with **experts** are necessary.

36. *Ionizing Radiation*: by instruments (diffractometers and spectrometer at WLGA/031, 033) **requires contact experts** in advance. Work with radioactive specimens in WBGA/A19.01 & WLGA/U118, U124, 028, 031, 032, 033 laboratories is **strictly forbidden**.

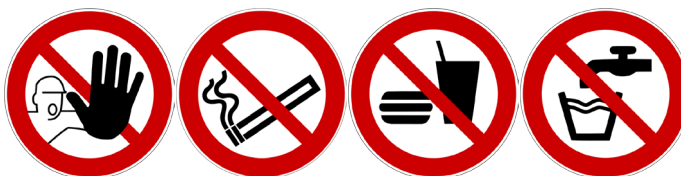
37. *High pressure* (mechanical and hydrostatic presses, high-pressure apparatuses, hydrothermal setups).



5. Actions / Lab rules

General procedures

38. Any unauthorized persons are not allowed to be in the lab.
39. Smoking, eating, drinking, and chewing in the lab is forbidden.
40. Food storage in the lab freezer and fridge is forbidden.
41. Use of tap water for food and beverage preparation is forbidden.
42. Dishwashing and drying of kitchenware and tableware in the laboratory is prohibited.
43. Any loose hair must be tied back. Dangling jewellery, ties etc. must be removed.



44. Users have to know the following information/rules before starting the corresponding work:
 - a. Hazards, transport, storage, handling, usage, control, return and disposal of materials which users use (solids, liquids, aerosols, cryogenics, gases, etc.).
 - b. Location of fire extinguishing equipment, emergency shower, eyewash, first aid kit, chemical absorbers, and biosafety (if available) setup.
 - c. Location and use of industrial steps and ladders.-Use of office steps is strictly forbidden.
45. It is mandatory to wear the following personal protective equipment (PPE): lab coat and safety glasses (contact lenses are forbidden), if health is affected suitable gloves and dust (gas) mask. When respiratory devices are necessary, there is intrinsically a potential leakage of hazardous material into the surrounding atmosphere. In such a situation it is important to take additional safety measures like planning of room occupancy, information of co-workers, signalling potential dangers and be aware that surfaces outside a fume hood may be contaminated (by powders, aerosols etc.). Therefore, experiments that require dust

(gas) mask **have to be discussed** with the **Organisation Unit responsible person**, laboratory responsible and **PSI safety experts** in advance.



46. Contaminated gloves must be removed, when touching a pen, watch, phone, door, computers, books etc.
47. It is mandatory to wear closed-toed, flat-soled shoes.
48. Wear long pants, skirts, or dresses etc.
49. Every glove-box's user has to sign the separate list next to the glove box lock.
50. Every chemical process conducted in reactor (furnace / crystal growth setup) has to be recorded by user in the separate list (both, electronic and properly placed hardcopy).
51. The user's workspace has to be marked. All users' materials have to be stored in the proper storage boxes labelled with the completed form (user's name, phone number, sample description, time range of the experiment - start and end date, and if indicated, with GHS-pictograms).
52. Work with open flame, hot plates and hazardous materials; especially with volatile materials (toxic solids, aerosols (generated by ultrasound and centrifugations), biohazards, nanoparticles, organic solvents, strong acids and alkaline solutions) have to be carried out in the fume hood. Fume hood's sash has to be closed as much as possible to work properly. The fume hood's sash must be closed completely when fume hood is not used. Use of open flame and hot plates in the lab increase explosion risk. All flammable materials have to be removed from the working area, during the work with open flames!
53. All lab work carried out with chemicals has to follow the rules of good chemical practice.
54. All lab work carried out with biology samples (if permitted) have to follow the rules of good microbiological practice. This includes disinfection, sterilization and waste disposal of all tools and items as well as the workplace after having finished the experiments.
55. Each user is urged to leave the lab clean and well ordered.

Specific hazards and related actions

56. *Suffocation hazard*: When working with helium, nitrogen, argon and liquid nitrogen.
Actions: Oxygen sensors and intervention plan.
57. All chemicals intended to enter to the lab room have to be declared and recorded in the PSI Chemical Database.
58. Users must inform the room responsible person when bringing hazardous materials into the lab room (MSDS has to be attached). Upon Organisation Unit responsible or room responsible person request, user has to perform risk assessment "*handling hazardous substances in the lab*" accordingly to the FO-9670-341.
59. Just necessary amounts of chemicals to conduct the chemical experiments are allowed. Containers with basic liquid chemicals e.g. inflammable solvents (acetone, methanol,

ethanol, isopropanol, etc.), acids (HCl, H₂SO₄, H₃PO₄, HNO₃, etc.) have to be stored in the spill tray under the fume-hood. The rules of storage chemicals together have to be followed.

60. Any *EX-protected* refrigerator is not available in the laboratories WBGA/A19.01 & WLGA/U118, U124, 028, 031, 032, and 033. Therefore, storage of the materials, which have to be stored cool to exclude ignition source, is forbidden.
61. For *needle disposal* use properly the special needle collecting box.
62. Label all chemicals containers sufficiently (QR-code, user's name, phone number, date, unambiguous name of substance (verifiable abbreviation) and solvent, concentrations) and, if indicated, with GHS-pictograms. Insufficiently labelled containers will be removed immediately and disposed without further notice by the room responsible persons.
63. All users' samples, materials and consumables brought by the users have to be removed after the end of the experiment. If some samples stay in the laboratory, they have to be clearly labelled (Name, Institution, chemical formula, duration of storage).
64. All chemicals have to be disposed according to PSI rules when they are no longer required.

6. Access control

65. Access of all individuals is controlled by the "Interflex" system. The personal data are kept confidential according to the legal provisions. Given access can be denied by the room responsible person in case of immediate danger and according to point 11 of this operation procedure.

7. Alone working

66. Generally working alone with flammable substances and chemicals is not allowed (PB-9670-348). If such work will be done the advisor must be informed. The person working alone and his/her manager have to be aware of the dangers associated with working alone. The advisors have to agree by signing the "Note on the dangers of working alone" form (FO-9670-346). Advisor has to take actions to ensure safe working according to PSI regulations and department / laboratory / group specific rules.

8. Actions in case of emergency, First aid

67. In case of fire or emergency (e.g. intoxication), follow the steps outlined in the operation procedures.
68. Users are instructed on this procedure by the room responsible person or by the Organisation Unit responsible person or by a designated representative. Training specific for this room could be organized if necessary with recorded participations.
69. All specific actions in the case of emergency for the entire building WBGA or WLGA have to be followed.
70. If specific hazards have been identified, take actions according to the propositions defined in PSI operation procedures.

Always:

71. Keep in mind: Self-protection first!

72. Alert SIZ: Tel. **3333**

73. **Rescue**

74. **Take first** actions according the specific instructions predefined in the operation procedures (acute toxic compounds (toxins, HF, gases, Be) inflammable and suffocation gases, etc.).

75. Chemical contamination: Remove contaminated clothes; clean the skin (gently!) with water. Decontamination will be determined by the action forces.

9. **Trainings and booking the equipment**

76. All users have to be sufficiently informed on occurring hazards in rooms WBGA/A19.01 & WLGA/U118, U124, 028, 031, 032, 033 the appropriate actions in routine operation and in cases of emergency. The Organisation Unit responsible person, room responsible person and advisor (supervisor, PI) are accountable for this.

77. All responsible persons involved have to acquire the appropriate knowledge, which enables them to fulfil their function by participating in appropriate education and instruction courses. The advisors are accountable for initiating and control.

78. In case of additional hazards (acute toxic substances, laser, non-ionizing radiation) the room responsible person will inform his/her supervisor and initiates a hazard assessment and adapts this procedure accordingly.

79. Booking of the equipment can be done by the group members only. Samples to be synthesized/processed/treated/measured have to be declared in advance.

10. **Disposal of materials and maintenance works**

Disposal:

80. The PSI concept for recycling and disposal has to be followed.

81. Users are obliged to use minimal amounts of chemicals to reduce waste.

82. Waste must be strictly separated.

83. Disposing of chemicals has to be done properly using the available containers for acid, organic solvent and water solution wastes. All other chemicals/samples can be disposed in the "chemical/sample waste tray" in closed containers with a label indicating the contents and if indicated, with GHS-pictograms.

84. Chemicals: Disposal of chemicals out of the lab will be organized by the room responsible person. Intermediate storage, especially of organic solvents, and transport to disposal at chemical waste at collecting station West has to be performed according to the PSI regulations.

85. The amount of the produced waste has to be reasonable. If sample preparation requires a large volume of solvent, the user has to discuss this in advance with the laboratory responsible or Organisation Unit responsible person.

Reporting deficits:

86. Defect devices and deficits of room infrastructures have to be reported to the room responsible person who will initiate appropriate actions.

11. Sanctions

87. Disregard of these directions will result, even without remanding, in immediate cancellation of access to rooms WBGA/A19.01 & WLGA/U118, U124, 028, 031, 032, and 033. This process will be initiated by the room responsible and reported to the organisation unit responsible, the lab head, and the safety officer of PSI.

12. Appendix

88. Herewith I confirm that I have read and fully understood this „operation procedure“. I agree to be bound by PSI facilities' safety regulations applicable during my stay related to my activities at PSI.

Name: _____

Date:

Signature: