Lab policy of the nano.lab

September 21, 2023

Lab policy for the nanostructure laboratory (nano.lab) of the University of Konstanz' physics and chemistry department, including the laboratories P824 and P831 as well as all satellite labs.

1 Preamble

This lab policy is mandatory and must be obeyed by all users of the nano.lab. The heads of the nano.lab (lab manager and spokesperson) in consultation with the steering committee (board members and safety supervisory personnel) can make changes to the lab policy.

2 General safety regulations

Most important: Do not endanger yourself or others. Get familiar with instruments, hazardous materials and waste disposal before starting to work. If in doubt, ask. The nano.lab staff is always ready to help you.

Facilities installed for safety reasons must not be disabled. Passage ways, doors, emergency exit windows and the emergency exit balcony must not be blocked at any instant. Obvious defficiencies of the lab facilities have to reported to the lab manager immediately. Malfunctions of the of the technical facilities of the building[1] have to be reported to the Leitwarte (Tel 2699) as well.

In case of gas or fire alarm, users have to exit the lab immediately without hesitation leaving everything behind. They are urged to inform others on their way out.

3 Lab organization

3.1 Lab access

Only persons with a valid safety briefing are allowed to access the lab. Online renewal of this safety briefing on a yearly basis via ILIAS is mandatory. Users will be prompted to confirm the completion of the ILIAS module on appropriate terms. Misinformation or misconduct regarding completion of safety briefings of any kind will lead to lab suspension and may imply further accompanying measures.

Lab access via personal key is an implemented safety measure. It is prohibited to open lab entrance doors for others. A user can be held accountable in case of an accident with an unauthorized person he/she let in.

[1] ventilation, heating, electrics, water and sewage

Persons without a valid safety briefing, so-called visitors, may enter the lab only when accompanied by an instructed person, a so-called supervisor. Supervisors are authorized nano.lab users with at least a completed masters degree in physics or chemistry.[2] The supervisor takes all responsibilities for the visitors, especially regarding personal safety of the visitors. The visitors are compelled to obey all instructions given by the supervisor.

The buddy system is advised in the nano.lab. The buddy system requires that a minimum of two people be inside the nano.lab at all times, both of whom need to be authorized users.

3.2 Accidents

Every accident has to be reported to the lab manager. In case of physical injury, users also have to notify the safety supervisory personnel of the nano.lab and report an accident notification to the University's occupational safety engineers.

3.3 Lab suspension and reprimands

Lab suspension measures may be assessed adequate for severe or recurring misconduct, i. e., a violation of the lab policy and its attachments, in particular with regard to safety briefings.

Disregarding or circumventing any temporary lab suspension or endangering others substantially may lead to permanent lab expulsion.

These measures are expressed by the lab manager or the safety supervisory personnel. Their extent is not negotiable.

In case of a severe or recurring misconduct, the nano.lab personnel reserves the right to file an official reprimand with the HR department which may enter the user's personnel file.

3.4 Tidiness and cleaning

The lab has to be kept tidy and clean at all times. Users are compelled to clean up their workspace directly after they are done working. It is mandatory to leave all workspaces clean, dry, and organized. Users are advised to kindly remind others to clean up after themselves if they are leaving a mess.

Removal of anything from the nano.lab that has not been introduced earlier by the user him/herself is strictly prohibited.

3.5 Clothing

Sturdy closed footwear and long trousers are mandatory. Users always have to dress properly using a cleanroom lab coat, shoe covers, bouffant cap, and personal protective equipment such as gloves and goggles as required for the individual experiment.

Users are urged to refill the common materials such as gloves and wipes when emptying them.

3.6 Food and beverages

Eating and drinking or carrying along food and beverages is prohibited.

[2] Bachelor or Master students are not allowed to introduce visitors.

4 Access to equipment

4.1 Training

Users are allowed to operate nano.lab equipment only after device specific training and corresponding clearance by authorized nano.lab personnel. Users are advised to contact the lab manager to obtain information about authorized instructors for the desired equipment. It is mandatory to strictly follow the demonstrated operation procedures. Users are not allowed to train other users themselves without explicit permission by the lab manager or the safety supervisory personnel.[3]

4.2 Operating instructions

Operating instructions yield detailed information about individual hazards related to equipment, devices and chemical substances. They have to be respected and obeyed. The operating instructions of all setups and equipment in the nano.lab are considered attachments to this lab policy.

4.3 Reservations

PPMS registration is mandatory for all nano.lab users. The PPMS booking database can be accessed by nano.lab users via Shibboleth authentication using the users University of Konstanz credentials. A circulation of the login data is not allowed. Users have to inform the lab manager at the end of their contract or if their affiliation within the workgroup changes, so as to their PPMS account and their nano.lab access can be adjusted or revoked.

Autonomous booking of equipment is possible using the personal user account and only after having successfully completed the training sessions on the respective instrument (see **??**). Booking on behalf of others is not allowed. If an instrument has a PPMS booking option, booking this instrument prior to use is mandatory.

If a user does not show for his/her time slot within a grace period of 15 min after the booked starting time, any other user is allowed to claim this time slot and any of this user's consecutive time slots for his own work. Users are also requested to schedule enough time for all procedures they need to perform such as not to encroach on the next user's time slot. This includes all pre-and post-cleaning of the tools, where applicable. Users are advised to allow for adequate time between process steps to accommodate difficulties.

The user-specific booking data is read out and analyzed by nano.lab personnel to monitor usage of equipment, generate usage statistics and account for the yearly user fee. The use of these data for other purposes, as well as the dissemination to third parties is explicitly excluded. By using the PPMS booking database the user expresses his/her explicit consent to these conditions.

4.4 Settings and changes of systems

Users are forbidden to change general settings of systems. Any changes need to be approved by the lab manager or specifically authorized personnel. Only authorized personnel is allowed to perform permanent changes and to repair equipment.

[3] Note that this implies that PhD students are not allowed to train Master or Bachelor students without prior permission at all, not even with regard to minor tasks such as spin coating.

4.5 Lab books

If there is a lab book associated with an experiment or setup, it is mandatory that users make an entry before they start working. They also should take down possible difficulties related to the equipment which arose during the experiment.

4.6 Samples

Samples and their contents are potentially hazardous. Accumulation of samples inside the nano.lab is not allowed. Samples have to be removed from the nano.lab after completion of the related works. Disposal of samples via any waste container in the nano.lab is prohibited.

This procedure also holds in case of sample characterization or preparation on behalf of others.

5 Hazardous materials

5.1 General regulations

Introducing personal hazardous materials into the nano.lab is strictly prohibited. Non-compliance will result in lab suspension. Samples which are designated for lab works in the nano.lab are excluded and may be introduced temporarily for the duration of the work.

To ensure the safety of an unborn or breast fed child, pregnant and breast feeding women are forbidden to enter the wetlab P831. Furthermore, they are not allowed to work with the reactive ion etching systems. Access to other equipment needs to be clarified in accordance with the user's PI by consulting the University's occupational safety engineers.

5.2 Permitted and disallowed procedures

The scope of this lab policy covers the cleaning of samples or tools with acetone, isopropanol or ethanol, by use of an ultrasonic bath if required. Any work beyond this is explicitly prohibited. Especially, users without further briefing are not allowed to access the cabinets for hazardous materials, the fridge and their contents.[4] Users who would like to access the cabinets for hazardous materials, e. g., to employ lithographic techniques, are compelled to attend a designated safety briefing in person and to work along the according attachment to this lab policy. Further information can be requested from the safety supervisory personnel.

To clean samples and tools, users are only allowed to use the wash bottles which are already located in the flowboxes. Cleaning procedures have to be overseen throughout. Workplaces must not be left unattended.

Removing hazardous materials from the nano.lab is prohibited.

Demands by another user to leave the nano.lab due to a contamination of a hazardous material have to be obeyed.

5.3 Flowboxes

Users have to perform all works employing hazardous materials under a fully operating flowbox with ventilation switched to level II. The lid has to be closed as much as possible, i. e., the upper sector needs to be deployed, ensuring that the face stays safely behind the lid to avoid

[4] Note that this implies, that users operating solely within this lab policy are neither allowed to refill wash bottles nor to empty the small waste container for halogen-free solvents.

inhalation. Using flowbox areas of 100% ventilation is mandatory. The door of the wetlab has to be closed during the operation of a flowbox.

Flowboxes have to be kept clean. After finishing work, users are compelled to tidy up all working material, including not only hazardous materials but additional equipment such as beakers as well.

Flowboxes are not intended for storage. Only the lab internal wash bottles filled with ethanol, isopropanol and acetone with a content of 0.5 L for daily use are allowed to remain there permanently. The wash bottles have to be removed during an experiment with intense heat dissipation.

Users are not allowed to use equipment of others.

5.4 Personal protective equipment

Prior to usage users have to check their personal protective equipment for integrity. Damaged protective equipment has to be replaced.

5.4.1 Gloves

Touching door handles with gloves on is prohibited. Gloves may be contaminated and therefor also contaminate the door handle.

Full contact with ethanol, isopropanol or acetone
Full contact with ethanol, isopropanol or acetone is prohibited.

Splash contact with ethanol, isopropanol or acetone
For protection in case of splash contact with ethanol, isopropanol or acetone, it is mandatory to wear proper gloves according to the material's safety data sheet and its operating instruction. Users are advised to wear nitrile rubber gloves with a thickness of at least 0.3 mm in case of ethanol and isopropanol, e. g., KCL Camatril® 730, and butyl rubber gloves with a thickness of at least 0.3 mm in case of acetone, e. g., KCL Butoject® 897. Both types of gloves are provided by the nano.lab in several sizes. They are reusable. They must not be disposed of after use.

Users are urged to wear disposable nitrile gloves or cotton gloves below reusable gloves to avoid contamination.

It is explicitly stated that disposable nitrile gloves with a thickness of merely 0.11 mm do not provide adequate protection against ethanol, isopropanol or acetone.

It is mandatory to change gloves on a regular basis as deemed necessary and to avoid unnecessary exposure.

Solid hazardous materials
Wearing disposable nitrile gloves when handling solid hazardous materials is mandatory.

5.4.2 Safety goggles

Users are compelled to wear safety goggles at all times when working with hazardous materials. A limited amount of safety goggles is provided by the nanolab. Users are encouraged to bring and wear their own safety goggles if these are in compliance with EN 166 (frame) and EN 170 (glasses). To check for compliance see inner face of the favored goggle.

5.4.3 Lab coat

Cleanroom lab coats provided by the nano.lab are appropriate for any kind of work with hazardous materials excluding work with HF. Wearing a lab coat in suitable size is mandatory.

5.5 Gases

Users are not allowed to introduce gas bottles into the nano.lab. Any modification of the existing gas lines or gas hookups by the user is strictly prohibited. The gas installation must not be altered or manipulated in any way.

6 Waste disposal

6.1 Acetone, isopropanol und ethanol

Dispose of acetone, isopropanol and ethanol left over from cleaning in the waste container for halogen-free solvents. Residues of samples or other solid contents have to filtered and disposed of separately.

6.2 (Excessive) spillage of acetone, isopropanol or ethanol

Spillage of acetone, isopropanol and ethanol has to be cleaned up with a cleaning cloth or wipes immediately. Users are compelled to dry wet wipes completely under a flow box before disposal. Desiccation has to be overseen throughout. Users must not leave wet wipes under a flow box unattended.

If a user does not feel capable of cleaning up excessive spillage oneself, he/she has to secure the contaminated area and call the lab manager or safety supervisory personnel. Users are also compelled to call the lab manager or safety supervisory personnel if they discover spillage of unknown kind.

6.3 Samples

Personal samples must not be disposed of in any waste container the nano.lab, but need to be disposed of properly by the user on his/her own responsibility in the group he/she belongs to.

6.4 Wipes and nitrile gloves

Wet wipes have to be dried completely under a flow box before disposal. Desiccation has to be overseen throughout. Users must not leave wet wipes under a flow box unattended. Dispose of dried wipes in the waste container for residual waste. Users MUST NOT throw these wipes into the waste container for contaminated wipes as they were only in touch with acetone, isopropanol or ethanol and therefor are not contaminated in a critical way.

Do likewise with used nitrile gloves, i. e., dispose of nitrile gloves in the waste container for residual waste. Users MUST NOT throw used nitrile gloves into the waste container for contaminated plastic waste since they are not substantially contaminated.

6.5 Borosilicate glass (German: Hartglas)

Cullets of borosilicate glass, e. g., stemming from broken beakers may be disposed of in the provided waste container for borosilicate glass.

6.6 Soda–lime glass (German: Weichglas)

Cullets of soda–lime glass and further sharp items have to be disposed of properly on the users on responsibility outside the nanolab. The nanolab does not provide waste containers for soda–lime glass.

7 First aid

Particular first aid measures in case of physical injury are regulated in the operating instruction of each individual device. When handling hazardous materials and if not stated otherwise in an operating instruction of a hazardous material, the following emergency measures have to be taken:

- P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
- P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P301 + P330 + P331 and P310: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call poison center (0–0761 19240), doctor (0–112) and internal emergency line (2222).
- In case of burns or scalds: Immediately remove clothing drenched or tainted with hot substances. Cool afflicted body parts for at least 10 min under cool running water.

8 Fire protection and fire alarm

The nano.lab is subject to the University's fire protection policy. Escape and rescue plans can be found on every floor, typically located near the elevator or first aid equipment. It is every user's responsibility to be familiar with these routes.

8.1 Alarms, announcements via floor speaker and evacuation

In case of fire alarms and a respective announcement via a floor speaker, users are compelled to leave the building immediately along the designated escape routes and head for the assembly point. They are advised to gather with their co-workers and to assert that nobody is missing.

8.2 Fire in the nano.lab

Never endanger yourself!

If possible, users should try to extinguish the fire with an appropriate fire extinguisher. Users must not use water if a fire extinguisher is at hand. In general, water is not suited to extinguish a lab fire. Users should try to pull electric plugs and close gas lines, if applicable.

If a user does not feel capable of extinguishing the fire him/herself, he/she is urged to warn persons nearby, activate the nearest fire alarm box and call Leitwarte (Tel 2222).

In any case, users must inform the lab manager and the safety supervisory personnel immediately.

9 Acknowledgement of nano.lab in publications

The use of nano.lab instruments or custom software solutions for image or data acquisition or data analysis has to be acknowledged in the appropriate way in every publication, which contains images and/or data recorded at the nano.lab. An exemplary phrasing would be:

We acknowledge the use of the experimental equipment and the expert support concerning its usage and data analysis provided by the Nanostructure Laboratory at the University of Konstanz.

Publications encompass, but are not limited to scientific papers, Bachelor-, Master- or doctoral theses as well as contributions to conferences. If required, nano.lab staff may be asked to read and review the sections describing the experimental methods in drafts of scientific papers, to ensure a correct description of methods and equipment. After publication nano.lab users are requested to provide a pdf-file of the paper for the facility's records.