

## OPERATING INSTRUCTIONS

*This document defines the rules and safety procedures for the access to this laboratory and the usage of equipments here available.*

### **LABORATORY LOCATION:**

*UniMoRe FIM Dept., Physics Building, Ground Floor Room MO-17-00-036*

### **RESPONSIBILITY**

- R.S.P.P. CNR – Istituto Nanoscienze : Dr. Milena Toselli
- Laboratory Responsible (Preposto): Dr. Paola Luches

### **ACCESS RULES**

Two categories of people can access the laboratory :

- GUEST
- USER

**GUEST** is not allowed to operate on the equipments and must always be guided by authorized personnel (**USER**) . **GUEST** has to respect the general safety and conduct rules of the Lab as presented in this Manual (pag. 2) .

**USER** may operate on the equipments. **USER** could be a CNR employee, a collaborator with fixed-term contracts, a CNR associated, or a PhD student who has completed the “General Training Course on Prevention and Safety at Work”. **USERS** are requested to complete also the training module about chemical hazard.

**USER** permission is granted by the Responsible of the Laboratory who evaluates the applicant’s background knowledge and organizes a specific training about the safety procedures and the working methods to adopt with the equipment and/or the substances in the Laboratory.

**USERS** and **GUESTS** may ask the **Workers Health and Safety Representative (RLS)**, Dr. Andrea Bertoni, for assistance in case they perceive any hazard-related issue not properly managed by the Laboratory Responsible.

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## **GENERAL SAFETY AND CONDUCT RULES**

*USERS* and *GUESTS* must comply with the following general rules of prevention and security. Please note that non-observance of safety regulations involves, in addition to the penalties of law, taking disciplinary action against the defaulters.

### **IT IS IMPORTANT**

- To memorize the location of access and exit ways
- To check the safety signs
- To locate the first aid box and the placement of individual (DPI) and collective (DPC) safety devices
- To locate the containers for waste disposal
- To promptly inform the Responsible of the Laboratory of any irregular situation in the operation of the instruments
- To collaborate with the Responsible of the Laboratory and with other users, in order to maintain the efficiency of the security system

### **IT IS MANDATORY**

- To carefully read the machine handbook and to strictly follow the given specific rules.
- Before using any chemicals, to acquire information about their characteristics by way of safety data sheets, risk phrases and safety advice, and to follow instructions for their handling, storage and disposal.
- To keep electrical equipments as far away as possible from sources of moisture and/or flammable solvent vapors
- To always use protection devices (DPI and DPC) as indicated by the procedures. Keep them carefully, do not damage or remove them
- To dispose of all processing waste in dedicated containers
- To observe the existing prevention and safety laboratory regulations, and to closely follow the provisions issued by the Responsible
- In case of alarm, to leave the laboratory according to the evacuation procedures envisaged in case of emergency

### **IT IS FORBIDDEN**

- To work alone in the lab, especially beyond the standard working hours
- to take and preserve food and drink inside the laboratory
- To use electrical equipment not compliant with CE regulation
- To carry out operations for which one has not been authorized and/or trained by the Responsible of the laboratory

# Laboratory SESAMO B

## **RULES FOR THE PECULIAR USAGE OF INSTRUMENTS IN THE LABORATORY**

The laboratory hosts a ultra-high vacuum apparatus equipped with:

- ionic and mechanical pumps
- X-ray source
- UV source
- electron analyzers
- electron guns
- ion gun
- evaporators
- scanning tunnelling microscope

For details on switching on/off procedures of the individual instruments please refer to the specific instruction manuals, located in the cabinets at the right and left of the laboratory entrance.

Mechanical vacuum pumps used in laboratories may represent mechanical hazards, associated with the moving parts, and chemical hazards, associated with the possibility of contaminating the pump oil with volatile substances and subsequently releasing them into the lab. They present also fire hazards, when pumps malfunction or overheat and ignite nearby flammable or combustible materials.

Follow these guidelines for safe pump operation:

- do not place pumps in an enclosed, unventilated cabinet allowing heat and exhaust to build up
- do not operate pumps near containers of flammable chemicals, flammable chemical wastes, or combustible materials such as paper or cardboard
- always close the valve between the vacuum vessel and the mechanical pump before shutting off the pump to avoid sucking vacuum oil into the system

Always read the material safety data sheets or other references before using a material as a substrate, as evaporation material or as reacting gas. Follow the indicated procedures to manipulate the specific material. If powdered materials are used and when venting and operating on the evaporation chamber, use one of the masks located in the cabinet at the left of the laboratory entrance. In general always refer to the material safety data sheets for information on the type of protective clothing required for the particular work you are performing.

Chemical procedures for sample preparation and/or cleaning processes using solvents (acetone , methanol etc.) are strictly forbidden in the SESAMO B laboratory. Procedures of this kind must be performed using the dedicated chemical hood (Ground floor, Room n. ....)

Properly ground all electrical equipment. If sparks are noticed while plugging or unplugging equipment or if the power cord feels hot, do not use the equipment until it can be serviced by an electrician. Do not run electrical cords along the floor where they will be a tripping hazard and be subject to wear. If a cord must be run along the floor, protect it with a cord cover. Do not plug too many items into a single outlet. Use maximum one multiple socket for each power outlet. Do not

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connect multiple sockets in a series. Do not use extension cords for permanent wiring.

Before switching on the X-ray source, make sure that the lead cover is installed on the opposite window. Never remove the lead cover when the X-ray source is working.

The use of high pressure pure and ultrapure gases is necessary for the research done in SESAMO B laboratory. The laboratory temporarily hosts two high pressure bottles, while waiting for the build up of suitable external gas lines. The laboratory hosts two pressure bottles containing:

- nitrogen
- oxygen

The nitrogen bottle is securely fixed to a wall, while the smaller oxygen bottle is fixed to a rigid support. Connect any other pressure cylinder introduced in the laboratory to the wall or to a fixed rigid support, to prevent them from falling over and damaging the valve, injuring people or damaging instrumentation.

Always use the appropriate regulator on a cylinder. Do not attempt to adapt or modify a regulator to fit a cylinder it was not designed for. Regulators are designed to fit only specific cylinder valves to avoid improper use. Frequently inspect regulators, pressure relief devices, valves, cylinder connections, and hose lines frequently for damage. Close the main cylinder valve whenever the cylinder is not in use.

When moving cylinders (full or empty) always remove regulators and use the safety cap to protect the valve. Always use the dedicated trolleys, located at the mechanical workshop) to move cylinders. Keep the cylinder in an upright position during transportation. Never roll a cylinder.

To use the pressure bottles:

- make sure that the gas pressure reducer is well mounted and closed
- make sure that the gas line is connected to the instrument
- open the gas faucet and regulate the exit pressure using the reducer
- close the pressure reducer and the gas faucet after use

In case of internal emergency, for example if a fire develops in the laboratory, disconnect the power to the apparatus using the switchboard at the right to the entrance of laboratory SESAMO A.

### ***PROTECTION DEVICES IN THE LABORATORY***

List of individual protection devices present in the laboratory in the cabinet at the left of the entrance.

- masks
- disposable nitrile gloves

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### *EVACUATION PROCEDURES IN THE EVENT OF AN EMERGENCY*

In case of emergency and warning, users and/or guests attending the laboratories must respect the following procedures:

1. Keep calm
2. Proceed in an orderly way in order to leave the building by following the shortest route indicated by relevant signs, and gather at the meeting point
3. Do not use elevators
4. Only if the situation allows it, before walking away and in the shortest time possible, safely store any materials and equipments.
5. Do not perform any operation for which you have not been previously trained.
6. Do not reenter the building until you are told to do so by the Director or Safety coordinator.