Rules and Regulations for the Use of the Geochemistry Clean Room – ISTerre

CLEAN ROOM MANAGERS

- Alexandra Gourlan
- Sylvain Campillo
- Sabine Sentenac

Geochemistry Team – ISTerre
Telephones: in the entrance to the clean room airlock

PREAMBLE

This charter describes the rules governing operations, hygiene, safety and good scientific practice applicable to the ISTerre geochemistry clean room, the adjoining room and the ICP room. These rules are essential to ensure the safety of personnel, control contamination and guarantee the scientific quality of the analyses carried out.

After reading this document, **all persons** (permanent and non-permanent staff, doctoral students, post-doctoral students, interns, authorised visitors) must sign the **moral commitment** and send it to Sylvain Campillo. This commitment is a condition of access to the facilities and/or analytical equipment.

In the event of a breach of health and safety rules, the user may have their access to the laboratory withdrawn after consultation with the managers.

⚠️ **Please note:** a service order form must be completed and sent to **Sylvain Campillo** before the analyses begin..

GENERAL RULES (APPLICABLE TO ALL ROOMS)

The following rules apply to all users of the geochemistry rooms.

- Graphite pencils (wooden pencils, paper, etc.) are strictly prohibited in clean rooms.
- Mobile phones must be carried in pockets and never left on workbenches.
- Computers are prohibited.
- Clothing that sheds fibres (wool, fleece) is prohibited.
- No powder weighing in clean rooms (weighing is permitted under very specific conditions in ICPs rooms and with the authorisation of those in charge).
- Collective cleaning of the rooms on Friday afternoons.

1. DESCRIPTION OF THE FACILITIES

1.1 Clean room – Traces Area

The 'Traces' clean room is dedicated to the chemical preparation of samples for major element and trace element analyses, as well as certain isotopic preparations.

It is equipped with: - evaporation boxes with hot plates; - a fume cupboard dedicated to acid handling; - a mineralisation microwave; - specific acid dispensers; - a liquid weighing scale under a fume cupboard; - an acid distiller; - a centrifuge; - a Junior consumables washer; - acid waste collection containers.

👉 **No acid handling is permitted outside the fume cupboard.**

The distillation of acids and the handling of HF are strictly reserved for authorised personnel.

1.2 Clean room – Isotopie space

The Isotopy Room is exclusively dedicated to isotopic separations using columns.

- Laminar flow hoods are reserved for Savillex separations and drying.
- Hot plates under filtered air are exclusively dedicated to isotopic preparations.
- Access may be restricted if separation is in progress.
- As the ultrapure water dispenser is shared, all entries must be validated by the user currently handling it.

1.3 Annex room

Non-clean room adjacent to the clean room, intended for: - storage of equipment and consumables; - drying of desiccant; - microwave-related equipment; - partial storage of distilled acids; calcination for LOI measurements.

⚠️ This room **is not a chemical handling room.**

- PPE must be worn.
- Cleanroom coats, clogs and gloves must not be used there.
- All equipment entering the cleanroom (and ICP rooms) must be **cleaned**.

❌ Interdiction formelle d'utiliser l'étuve pour les bombes Parr.

1.4 Salle des ICPs

Salle dédiée aux analyses élémentaires sur les ICP-MS (Traces, U-traces et Isotopie) et ICP-OES (Majeurs).

Salle est également dédiée aux pesées de poudres mais uniquement pour les préparations en salle blanche (ou pour analyse sur Picarro)

- Strict prohibition on using the oven for Parr bombs.

- Powders must be agglomerated with a few drops of ultrapure water before transfer to the clean room.
- Containers must be kept clean during transfers.

👉 **Specific charter to be signed in order to access the ICPs room**

2. OPERATING RULES AND SHARED USE

2.0 Scope of application – responsibilities

- Cleanroom managers (designated permanent staff) are responsible for organisation, overall safety and access authorisation..
- Non-responsible users (doctoral students, postdoctoral researchers, interns, authorised visitors) are subject to specific restrictions detailed below

2.1 Access and traffic

- Clean room: maximum of **3 people at a time**.
- Annex room: maximum **2 persons**.

🔴 **Users: -** mandatory registration in the clean room attendance register/laboratory logbook (date, time, room used, type of handling); - access subject to prior approval by a manager.

Those responsible for the room are not required to systematically record entries in the register but remain responsible for ensuring that all accesses can be traced.

Before entering, ask for permission from those already present.

2.2 Sas d'entrée – procédure obligatoire

- Leave outdoor shoes at the entrance.
- Never place dirty shoes on the separation bench.
- Change clothes exclusively in the airlock.
- Do not mix outdoor clothing with lab coats.
- Fibre clothing is not allowed in the airlock.
- Put the hairnet in the airlock.
- Only put gloves on in the clean room.
- Clogs must remain in the airlock on the clean room side.
- Remove your gown in the airlock on the clean room side without dragging it on the floor.Tout objet posé au sol (cahier, téléphone, boîtes de transport…) doit être nettoyé avant entrée en salle blanche.

2.3 Cleanliness – a fundamental rule

Clean rooms are extremely sensitive to particle contamination..

- Avoid unnecessary movements.
- Never clutter up the workbenches.
- Always clean workbenches and equipment after use.
- Tidy up immediately after use.
- Never leave an experiment unfinished.

👉 **Golden Rule: THINK CLEAN AND SAFETY**

2.4 Prohibition of working alone (SAFETY PRIORITY)

🔴 **Users other than managers only: -** Working alone is strictly prohibited in all geochemistry rooms. - At least one other authorised person must be present in the area during any chemical handling. - This rule applies even more strictly when handling concentrated acids, HF and using the microwave.

Room managers may occasionally waive this rule at their own discretion, in accordance with the regulatory framework, except for the handling of HF..

3. HYGIENE AND SAFETY

3.1 Personal protective equipment

- Lab coats and goggles must be worn throughout the laboratory.
- Gloves must be worn when handling any materials.
- Legs must be covered and socks must be worn.

👉 🔴 **Earphones and headphones are not allowed so that CVC and fire alarms can be heard**

3.2 Chemical products

Before any use of a non-routine product: - consultation of SDS (INRS, suppliers); - prior study of toxicity and reactivity; - validation by the scientific manager and a technical manager.

3.3 Waste

- Use exclusively the dedicated containers.
- Comply with filling instructions.
- Record validity dates of containers and caps.
- Refer to ISTerre internal information: waste management.

3.4 Accidents, incidents, and equipment malfunctions

- Any accident, incident, or near-miss must be immediately reported to a manager.
- Any **equipment malfunction** (fume hood, microwave, chiller, power supply, balance, alarm, ventilation) requires **immediate cessation of use of the equipment concerned**.
- Immediate evacuation of the laboratory upon audible and visual alarm signaling extraction equipment malfunction.
- Equipment may only be put back into service after validation by a manager.
- Mobile phone mandatory in pocket (no landline available in the room).
- Consult posted instructions.
- Call emergency services immediately if necessary.

SOS Doctor: 04 38 70 17 01
On-call pharmacy: 04 76 63 42 55

- **Always** inform the managers.

4. HYDROFLUORIC ACID (HF) – STRICT RULES

👉 **Only authorized, trained, and medically approved personnel may handle HF.**

Mandatory work in pairs. Dedicated fume hood required. HF-specific waste stream.

4.1 Training and authorizations

- **Mandatory training:** Any personnel handling HF, or likely to assist in its handling, must complete:

    1. enhanced chemical safety training organized by the University Health & Safety Department;.
    2. job-specific training including safety instructions, PPE, waste management, and emergency procedures.
- **Medical examination:** A prior visit with the occupational physician is mandatory before any HF handling
- **Non-permanent staff** : Any HF handling by non-permanent staff (interns excluded) requires a derogation request to management, in accordance with Article D4154-1 of the French Labor Code.
- **Authorization to handle:**
    - Only trained permanent staff, post-doctoral researchers, and PhD students holding certification are authorized to handle HF, and always in the presence of another trained person.
    - They must follow the biennial training organized by the Health & Safety Department. Registration is carried out via their supervisor and the laboratory administrative staff. Handling is authorized after validation and signature by the unit director of Annex 2 (Nominative Authorization Form for fixed-term contracts pursuant to Article D415)

- **Clean room:** All users are informed of HF risks. Only permanent staff, post-doctoral researchers, and PhD students fulfilling all requirements are authorized to handle this reagent.
- **Accidental spill:** Unauthorized persons must not intervene, but evacuate the laboratory, secure the entrance, and promptly alert the managers.
- **Spill kits:**
  - one specific HF kit (white box);
  - one kit for other reagents
  - NB: no vermiculite for HF; powdered calcite is authorized.

4.2 Personal protective equipment (PPE)

- Side-opening lab coat, double gloves (nitrile + neoprene), sleeve protectors, face shield (EN 166 standard), and acid-resistant mask.
- Half-mask with specific B2 E2 P3 cartridge available in the cabinet opposite the laboratory entrance for intervention in case of spill or projection. Regularly check cartridge expiration dates and store them protected from contaminants in a sealed bag.

4.3 Good handling practices

- Add reagents slowly and wait for reaction stabilization. Open containers with the opening directed toward the back of the fume hood.
- Always work in the presence of another person, who does not handle HF but can intervene quickly in case of accident.
- Handle HF only under the dedicated fume hood (right).

4.4 Storage

- HF bottles are stored in the ventilated cabinet under the left fume hood.
- The bottle connected to the vacuum pump is stored under a bell jar in the left fume hood. The acid is used in the right fume hood.

4.5 Waste management

- All solids contaminated with HF (wipes, gloves, empty bottles, etc.) must be disposed of through a specific waste stream.
- Contaminated products must be left to dry at the back of the fume hood with clear identification “HF”.
- Once dry, they must be deposited in the white “Impact Environnement” bucket located in the cabinet under the right fume hood. **Never use the standard trash bin.**

4.6 First aid

- Safety showers are located outside the clean room. Regularly check their operation.
- Calcium gluconate is available in the airlock first-aid cabinet and in the dedicated HF cabinet near the laboratory entrance. Check expiration dates.
- It is recommended that personnel regularly handling HF have a calcium gluconate kit at home.

Contents of the HF cupboard:

- Calcium gluconate
- Eye rinse solutions (no gluconate in eyes without medical advice)
- General and HF-specific first-aid kits
- HF safety data sheet
- Specific cartridge masks and acid-resistant masks
- Gloves
- HF spill kit (white box) and kit for other reagents
- Calcite for HF neutralization
- Trash bags

In case of HF accident:

- Rinse immediately with water.
- Apply calcium gluconate to the skin (not in the eyes without medical advice).
- For eyes, rinse for at least 15 minutes and consult a physician.
- Call emergency number 15 in all cases.

👉 **Golden rule:**

WHATEVER YOUR EXPERIENCE, DO NOT PLACE YOURSELF ABOVE SAFETY RULES.
CONFIDENCE AND HABIT ARE THE FIRST ENEMIES OF SAFETY.
ANTICIPATE, ANTICIPATE, ANTICIPATE!

5. STORAGE – SAMPLES AND EQUIPMENT

- Mandatory labeling (name, date, contents, concentration).
- Any poorly labeled sample may be disposed of without notice.
- Temporary storage areas are assigned.
- Equipment entrusted is under the responsibility of the user.

At the end of stay: emptying, cleaning, and validation by the managers.

6. ORDERS AND CONSUMABLES

- Anticipate orders.
- Report any stock shortage.
- Check existing stock before any order or order request.
- No exchange of equipment or reagents between the clean room (and ICP rooms) and other laboratories without authorization (contamination risk).

7. SCIENTIFIC ACKNOWLEDGEMENT

Publications, oral communications, and posters:

- mandatory co-authorship in case of major contribution by technical staff;
- nominative acknowledgments in case of minor contribution.

8. COMMITMENT

Signing the commitment certificate conditions access to rooms and equipment. Failure to comply with the charter may result in suspension of access.

STATEMENT OF COMMITMENT

I, the undersigned ……,

present at the ISTERRE laboratory and using the **geochemistry clean room** for the period from …… / …… / …… to …… / …… / ……, in the capacity of ……,

certify that I have read the guidelines for the use of the ISTERRE geochemistry clean room and all its safety instructions, and **undertake to comply with them**.

I also undertake to handle hydrofluoric acid only:

- after having completed the required specific training,

- for PhD students and post-doctoral researchers, after having received job-specific training and obtained written nominative authorization from the Unit Director, in accordance with the form provided for in Article D4154-1 of the French Labor Code.

I acknowledge that keys (passes, laboratory keys, badges, etc.), analyses, and laboratory notebooks are the property of the laboratory, and undertake **to return them upon my definitive departure**. For external users, a **copy of the data must be made before return**.

For safety reasons, working alone is strictly prohibited, and work on weekends and public holidays is not permitted.

Mandatory working conditions in the laboratory require wearing:

Lab coat, gloves, hair cover, safety glasses, leg-covering clothing, and socks.

Contact details:

Name – Surname:

Phone number:

E-mail:

Emergency contact person:

Done at ……, on ……

Signature:

Note: This certificate must be signed and submitted to Sylvain Campillo (preferably in digital format) **before the start of any experimentation in the clean rooms**.

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APPENDIX 1 – USER CHECKLIST BEFORE / DURING / AFTER HANDLING

This checklist is **mandatory for all users**. It aims to ensure safety, cleanliness, and traceability of operations.

A. BEFORE ENTERING THE CLEAN ROOM

☐ I have valid authorization to access the clean room.

☐ I have registered in the presence log (non-manager users).

☐ I have read the specific rules for the room and reagents used.

☐ I am wearing appropriate clothing: legs covered, socks, fiber-free clothing.

☐ I have removed watches, jewelry, and unnecessary accessories.

☐ My mobile phone is present and stored in my pocket.

☐ I have all necessary equipment to avoid unnecessary trips.

B. ENTRY INTO THE AIRLOCK

☐ I have removed my outdoor shoes.

☐ I change only in the airlock.

☐ I put on the hair cover in the airlock.

☐ I put on the clean room lab coat.

☐ No object placed on the floor enters the clean room without prior cleaning.

C. BEFORE STARTING HANDLING

☐ Another authorized person is present (no working alone).

☐ I have identified the appropriate fume hood / evaporation box / HFL.

☐ SDS for the products used are known and accessible.

☐ Required PPE is worn (gloves, glasses, specific protection if necessary).

☐ Containers, bottles, and boxes are clean and properly labeled.

☐ Appropriate waste containers are available and not full.

D. DURING HANDLING

☐ I work exclusively under a fume hood for any acid handling.

☐ I limit movements and do not overload benches.

☐ I immediately close containers after use and do not carry them by the cap.

☐ I do not use unauthorized or unvalidated equipment.

☐ I continuously monitor ongoing reactions.

☐ In case of doubt, I stop handling and inform a manager.

E. SPECIFIC CASE – HYDROFLUORIC ACID (HF)

☐ I am authorized, trained, and medically fit to handle HF.

☐ I work in pairs with a trained person.

☐ I use exclusively the dedicated HF fume hood.

☐ HF-specific PPE is worn (double gloves, face shield, sleeve protectors, acid mask, apron).

☐ Calcium gluconate is available and not expired..

F. END OF HANDLING (DAILY)

☐ All containers are closed, labeled, and stored.

☐ Benches and equipment are cleaned (alcohol / ultrapure water).

☐ Waste is disposed of via appropriate waste streams.

☐ No unnecessary samples remain on benches.

☐ Used equipment (hot plate, microwave, fume hood) is turned off and secured..

G. BEFORE LEAVING THE ROOM

☐ I have removed my gloves.

☐ I have removed the lab coat before leaving the airlock.

☐ I have put my outdoor shoes back on.

☐ I have reported any incident, anomaly, or lack of consumables..

👉 I wash my hands after leaving the airlock

ESSENTIAL REMINDER
In case of accident, exposure, or malfunction: **STOP – SECURE – ALERT**.