

Factsheet

Proper Disposal of Piranha solution

Piranha solution

Piranha solution – also known as piranha etch – is a mixture of concentrated sulfuric acid and concentrated hydrogen peroxide (most commonly in a ratio of 3:1 or 5:1). Besides being highly toxic and etching, it is extremely energetic and reacts exothermic which may result in an explosion if not handled carefully. Piranha solution should only be used when there are no other alternatives.

Standard operation procedure for the disposal of Piranha solution

General remarks

- Always wear adequate personal protective equipment (PPE): acid resistant gloves, safety goggles, face shield, lab coat and solid, closed shoes.
- Never work alone.
- Always work under a fume hood while diluting and neutralizing Piranha solution for disposal. Label the fume hood as follows: «WARNING – Piranha Solution in Use»

Dilution of Piranha solution

- Leave the Piranha solution to cool down (no more bubbling visible) for at least 24 hours before diluting and neutralizing it.
- Dilution process: better to use ice / ice water instead of water, to keep any possible exothermic reaction down.
 - To dilute the solution, apply at least 5-fold dilution (e.g. for 100 ml Piranha solution use 500 ml ice water).
 - Fill the ice into a clean glass beaker (big enough to accommodate the diluted solution and the base needed for neutralization) and place it in a suitable container (e.g. a crystallizing dish) on a magnetic stirrer. Add a stirring bar and install a thermometer reaching into the ice.
 - Add the Piranha solution very slowly to the ice while stirring.
 - Monitor the temperature closely: It should not exceed 50 °C.

Neutralization of Piranha solution

- Prepare a 1M KOH or NaOH solution for the neutralization.
- Get pH paper or a pH meter ready.
- After the dilution process is completed, add 1M KOH / NaOH solution very slowly to the diluted Piranha solution until a neutral pH value is reached.
 - Monitor the pH value constantly.
 - Monitor the temperature closely. It should not exceed 50 C.
- Leave the solution stirring in the fume hood overnight, thus, allowing it to reach ambient temperature and fully degas.

- Transfer the diluted, neutralized and fully degassed solution into a HD-PE canister provided by ETH's hazardous waste disposal facilities.
- Label the canister as «For Piranha Solution Disposal ONLY – Do not add other acids»
- Make sure the Piranha waste canister is closed tightly when transporting it to a hazardous waste disposal facility.

What to do if in spite of all safety measures taken something goes wrong?

- Immediately inform the Emergency Desk
From internal lines: **888**
From external lines or mobile phones: **+41 44 342 11 88**

Remain as calm as possible, speak slowly and report the following:

- **Where?** Place where the incident occurred (building, floor, room no., lift etc.)
- **What?** Nature of incident (what kind of help is required?)
- **Who?** Name and phone no. of the caller
- **When?** When the incident took place
- **How many?** No. of people affected
- **What else?** Additional information that might be important for the intervention

Follow the instructions of the Emergency Desk. Await the return call of the SGU specialists and follow their instructions.

Disposal

Attended hazardous waste disposal facilities are situated in the Zentrum, building CNB, and at Hönggerberg, buildings HCI and HPL.

At other ETH locations, e.g. Lindau/Eschikon, AgroVet Strickhof, Schwerzenbach, and Technopark, the collection of hazardous waste must be registered in advance via sgu-sonderabfall@ethz.ch or via online form «[Inquiry Hazardous Waste Disposal](#)».

Opening times of ETH's hazardous waste facilities are available on the website of SSHE and via the added QR code.



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