



Aqua Regia Safety Sheet

About

Aqua Regia is a mixture of Hydrochloric acid and Nitric acid, usually in a ratio of 3:1, and is used to remove organic components from glass or to dissolve certain metals. The mixing procedure is an exothermic reaction that can generate significant heat. Do NOT use Aqua Regia unless it is necessary. Ensure that all personnel are fully trained on the laboratory specific SOP prior to using Aqua Regia.

Preparation

You MUST create and train all employees in your specific Standard Operation Procedure (SOP) for this process.

- 1- Use a fumehood and do not leave unattended.
- 2- Always work with the smallest quantity possible. (Preferably 20 ml or less)
- 3- Use only glassware, as aqua regia will melt some plastics. Ensure all glassware is clean prior to use.
- 4- **Always** add the nitric acid to the hydrochloric acid and add slowly.
- 5- **Always** mix the solution in an uncluttered fumehood and wear the appropriate PPE.
- 6- Be aware that the solution will generate significant heat. Solution can degrade and create toxic gases
- 7- **NEVER** add organics to aqua regia, it could cause an explosion.
- 8- **NEVER** cap an active solution of aqua regia.

PPE

Face shield and safety glasses

Acid apron

Rubber/neoprene gloves- Nitrile is not sufficient.

Closed toed shoes

Lab coat

Emergency response

(An appropriate spill kit should be on hand) Always contact ESH 5-2918 for spills of Aqua regia

For inhalation- Move the affected person to an area with fresh, uncontaminated air. Seek medical attention.

For skin contact- Immediately rinse the affected area with large amounts of water for at least 15 min as the Aqua Regia may cause skin burns. Seek medical attention.

For eye contact- Irrigate the eye for at least 30 minutes keeping the eyelids open during irrigation. Seek medical attention.

For exposure over large area- Remove individual from the contaminated area and placed under a safety shower while 9-1-1 is contacted. All contaminated clothing should be removed immediately with appropriate gloves and safely discarded. Spills should be neutralized with an acid neutralizer before cleanup. **DO NOT** use paper towels, rags, or other organic material to absorb a spill as they may spontaneously ignite.

Storage and disposal

Due to its hazards and reactivity, Aqua regia should be created for each use and not stored.

Leave hot aqua regia solution in an open (or preferably vented) glass container, within a fumehood until cool.

Ensure bottle is clearly labeled with appropriate name and date created.

After the material has cooled, the spent solution should be slowly neutralized in a clean oversized container with either a sodium bicarbonate or sodium hydroxide solution, and then turned into ESH as waste.

If the neutralized solution is contaminated with heavy metals (i.e., silver, chromium), inform ESH prior to pick up.

Contact ESH at 5-2918 or esh@umbc.edu to dispose of properly labeled and containerized Aqua Regia.

Always try to use less hazardous alternatives whenever possible.