



BAUSCH CHEMICALS

AQUA REGIA

NITROHYDROCHLORIC ACID - $\text{Cl}_3\text{H}_4\text{NO}_3$

DANGER - DEADLY VAPORS - DO NOT INHALE

DO NOT STORE

PREPARE AND USE ONLY UNDER LABORATORY CHEMICAL FUME HOOD - ALWAYS WEAR FULL CLOTHING WITH ADEQUATE EYE, FACE, & HAND PROTECTION



SAFETY, PRECAUTIONS, AND STORAGE (from MSDS)

[Nitrohydrochloric Acid MSDS](#)

Overview

Aqua regia (Latin for "Royal Water") is a solution of nitrohydrochloric acid. The optimal solution is comprised of a 3:1 mixture of 38% hydrochloric acid and 70% nitric acid, respectively. It is commonly used to remove noble metals such as gold, platinum and palladium from substrates, particularly in microfabrications and microelectronics labs. Glassware may also be washed with aqua regia to remove organic compounds only in trace amounts. Aqua regia solutions are extremely corrosive and may result in explosion or skin burns if not handled with extreme caution.

DO NOT STORE AQUA REGIA. Aqua regia quickly loses its effectiveness due to the rapid oxidation of its reactive components. Mix a fresh solution for each use. Excess

solutions should be neutralized with sodium bicarbonate and disposed via the drain, followed by flushing with copious amounts of water.

Be aware that pressure can build up in a short amount of time sufficient to burst the container, even from a very small volume of aqua regia. **Prepare it, use it, and destroy any excess** in the hood in which it was prepared. Only prepare the amount of aqua regia you need for immediate use. Never store aqua regia and never put it in a closed vessel, since evolved gases will build pressure and cause an explosion.

Emergency Procedures

In case of skin contact: May cause skin burns. Flush the skin with copious amounts of water for at least 15 minutes. Seek medical attention.

In case of eye contact: Aqua Regia is corrosive and irritating to the eyes. Flush contaminated eye(s) immediately with copious quantities of water for at least 15 minutes. Seek medical attention immediately.

In case of inhalation: May irritate the respiratory tract. Conscious persons should be assisted to an area with fresh, uncontaminated air. Seek medical attention in the event of respiratory irritation, cough, or tightness in the chest. Symptoms may be delayed.

In case of ingestion: Not a likely route of exposure.

In case of accident, if you feel unwell seek medical advice immediately.

24 Hour Emergency: Chemtrec 800-424-9300

Handling

- Always use borosilicate glass (e.g. Pyrex) containers. Aqua regia will melt some plastics and corrode most metals
- Never store aqua regia solutions. Mix up only what you need, then destroy after each use
- Mix the solution in a fume hood with the sash between you and the solution. Wear chemical splash goggles, faceshield, labcoat and appropriate gloves
- When preparing an aqua regia solution, always add the nitric acid to the hydrochloric acid slowly.

- Dissolving metals in aqua regia releases toxic gases, always work with aqua regia in a fumehood
- Aqua regia solution is very energetic and potentially explosive. It is very likely to become hot, more than 100° C. Handle with care
- Adding any acids or bases to aqua regia or spraying it with water will produce an exothermic reaction. Mixing aqua regia with organic compounds may cause an explosion
- Leave hot aqua regia solution in an open vessel until cool
- Never store aqua regia in a closed container. It will oxidize over time to form toxic nitrosyl chloride, nitrogen dioxide and chlorine gases. These gases will pressurize the container, and likely cause an explosion

Disposal

After the material has cooled, the spent solution should be neutralized with sodium bicarbonate and disposed via the drain, followed by flushing with copious amounts of water. If the solution is contaminated with heavy metals (i.e. silver, chromium), the neutralized solution should be collected as hazardous waste.

AVOID INHALATION, CONTACT

Aqua Regia vapors and fumes are irritating to the respiratory system. Inhalation of high concentrations of Aqua Regia vapor must be reported immediately. Delaying treatment can result in pulmonary edema and even death. Do not work with Aqua Regia indoors except under a fume hood. Do not inhale fumes. Use a supplied-air respirator, such as an SCBA respirator at all times when working with Aqua Regia

AVOID SKIN CONTACT: Aqua Regia can severely burn the eyes and skin. Wear protective gloves resistant to Aqua Regia, such as blue nitrile gloves. Wear an impervious apron or smock and long sleeves

USE EYE PROTECTION: Wear eye protection, such as polyethylene goggles or a polyethylene face shield to protect from splashing, it being advisable to wear both goggles and a face shield

Bausch Chemicals

Material Safety Data Sheet

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