AQUA REGIA

Hazard Description

Aqua Regia is a highly corrosive, fuming yellow liquid prepared by slowly mixing one volume of concentrated nitric acid with three volumes of concentrated hydrochloric acid.

Prior to Working with Aqua Regia

- Complete a research-specific laboratory risk assessment.
- Ensure that a standard operating procedure (SOP) is created, posted, trained, and approved by the supervisor on the process.
- Ensure that all required materials are available in case of a spill or emergency, and for waste collection.

Handling

- Always use an open glass container. Aqua Regia will melt some plastics and corrode most metals.
- Never store Aqua Regia solutions. Mix up only what you need, then destroy it after each use. Aqua Regia will oxidize over time to form toxic nitrosyl chloride, nitrogen dioxide, and chlorine gases. This will pressurize a container, likely causing an explosion.
- Mix the solution in a hood with the sash between you and the solution. Wear chemical splash goggles, a face shield, a lab coat, and appropriate gloves.
- When preparing the Aqua Regia solution, always add nitric acid to the hydrochloric acid slowly.
- Dissolving metals in Aqua Regia releases toxic gases, always work with aqua regia in a fume hood.
- Aqua Regia solution is very energetic and potentially explosive. It is very likely to become hot, more than 100^{o}C. Handle with care.
- Adding any acids or bases to Aqua Regia or spraying it with water will accelerate the exothermic reaction.
- Leave the hot Aqua Regia solution in an open container until cool.
- Mixing Aqua Regia with organic compounds may cause an explosion.
- For small spills, follow regular spill procedures.

Emergency Procedures

Always review the SDS of the purchased product for manufacturer-specific recommendations. Look at SDS for other modes of exposure.

Contacts **Emergency: 911** UW Special Constables: 519-888-4911 or ext. 22222 Poison Control: 1-800-268-9017 Whenever 911 is called, if possible, UW Special Constables should also be informed to make them aware of the emergency on campus and allow them to support as needed. Ask them to meet the paramedics and direct them to the incident location.	
Inhalation	▪ Remove the individual from the contaminated area ▪ Call 911 for transport to the hospital ▪ Corrosive substances may cause severe lung damage if inhaled ▪ Perform CPR and artificial respiration if necessary
Skin Contact	▪ Call 911 for transport to the hospital ▪ Remove contaminated clothing and quickly but gently wipe material off skin ▪ Flush with water
Eye Contact	▪ Call 911 for transport to the hospital ▪ Flush eyes using an eyewash station for a minimum of 15 minutes

Storage

Do not store Aqua Regia. Aqua Regia quickly loses its effectiveness due to the oxidation of its reactive components. Mix a fresh solution for each use. Excess solutions should be neutralized with sodium bicarbonate and disposed of via the drain, followed by flushing with copious amounts of water.

Hazardous Waste

- Must be disposed of as per the University's Hazardous Waste Standard.
- Be aware of what acids can be mixed. Piranha solutions (sulfuric acid/peroxide mix), as well as Aqua Regia (nitric acid/hydrochloric acid mix), are highly aggressive, off-gassing solutions. These cannot be brought to the ESF and need to be neutralized in-house. An SOP giving neutralization instructions must be created prior to the use of Aqua Regia. If there are other contaminants remaining (e.g., heavy metals) then the neutralized solution needs to be brought to the waste facility.