

FACT SHEET

Piranha Solution

Background

Piranha is a solution made up of 70% fuming H₂SO₄ and 30% concentrated H₂O₂ (30%). It is used as a glass cleaner in the manufacture of electronics. It is extremely deleterious to skin or eyes. Contact will result in burns.

Reactivity

Sulfuric acid and peroxide mixtures are extremely exothermic. When added to one another significant off gassing occurs and in some situations can result in the reaction vessel overflowing. Off-gassing may continue for up the 24 to 36 hours after mixed. If a holding container is sealed during this time it will over-pressurize and explode. Even after 36 hours the solution can be unstable. Sulfuric acid and peroxide tend to stratify and when the container is moved or agitated heating and off-gassing will again occur.

The solution is also very reactive with organics. If containers are contaminated or a spill occurs and mixing with organic material occurs, it can cause an explosion.

History

UK Environmental Management (EM) has had a Piranha waste container explode in their facility after housing it for three days. The cause could not be determined but the container was either contaminated or had not been mixed well. In either case, transport added enough energy to cause more off-gassing and over-pressurize the container.

EHS pursued several ideas to allow Piranha to be used safely in the labs. Neutralization turned out not to be feasible. The amount of neutralizer needed became exorbitant in amount or cost. Other universities were contacted that reported using Piranha. Those EHS departments were found not to have considered the incompatibility of the waste constituents. Another university reported that they allow the solution to be aspirated down the drain with large quantities of water. UK can not perform this operation due to local restriction stated in the waste water permit.

Summary

Standard Operating Procedures (SOPs) have been developed by OHS and the College of Engineering to work with Piranha Solution safely. Lab coat, safety glasses and chemical use approved latex gloves or vinyl gloves should be used when working with Piranha. If quantities increase a rubber apron and chemical goggles shall be used.

Obtain a copy of the SOPs and submit any changes necessary for specific operations to OH & S. Strictly following these procedures will help ensure the health and safety of faculty, staff and students at the University of Kentucky.

Questions or suggestions are welcome. Please contact EM at 7-3825 or Occupational Health and Safety at 7-3242.