EHS Laboratory Hazard Alert

February 6, 2015

Nitric Acid Waste Collection

Over the years, a number of laboratory incidents have been reported that involved the mixing of waste nitric acid and organic solvents, particularly ethanol, isopropanol and acetone. On Monday, February 2, 2015, an explosion occurred in the Chemistry Building at Texas Tech University. Preliminary information indicates that waste nitric acid was added to 4-Liter bottle that had been rinsed with acetone. A similar incident occurred at the University of Rochester, resulting in minor injuries to three students and property damage to a laboratory. For a discussion of comparable accidents, see the following links:

http://cenblog.org/the-safety-zone/2011/10/another-explosion-at-texas-tech-and-a-fire-at-ucla/

http://www.dailyillini.com/news/campus/article_135e7a28-4d91-11e3-99cf-0019bb30f31a.html

Nitric acid is a strong oxidizing agent even in dilute solution. Its reaction with simple alcohols generates carbon dioxide and nitric oxides that can pressurize and burst a waste collection bottle. Nitric acid reacts violently with most organics resulting in heat, gas or fire. In a sealed container, the pressure would increase due to the expanding gas. Never mix nitric acid with organic materials (especially in a sealed container) unless the reaction has been thoroughly investigated. Do not store nitric acid in the same cabinet as organic solvents or organic acids such as acetic acid.

A limited exception is freshly-generated mixtures (such as acids and organics from an experimental procedure) that may generate gas pressure sufficient to burst a tightly sealed bottle. Use commercially available vent caps or keep the lids loose until sufficient time passes to complete the reactions, and then tightly close the lids. Until all reactions are completed, the contents of the bottle are not waste, but are instead the last step of the chemical procedure.

Remember these precautions:

1. Chemical containers should be triple rinsed, thoroughly emptied, and dried before being used for waste accumulation.
2. Select an appropriate waste container, for example, an empty 2.5 L nitric acid bottle, preferably one with plastic safety-coating.
3. Clearly label the bottle "Waste Nitric Acid" before adding any waste.
4. Clearly label all containers of chemical waste with the waste constituents before adding any waste.
5. Assure that all members of the laboratory are familiar with hazardous waste procedures and understand that **NO** organics should be mixed with the nitric acid.
6. Wear safety goggles, lab coat and gloves when handling chemicals that may present a splash hazard or have the potential for violent release.
7. Wear safety glasses while in the laboratory, even while performing non-laboratory work.