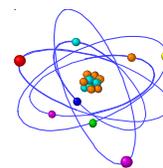


LABORATORY SAFETY FACT SHEET #25



TIME-SENSITIVE CHEMICALS



Some chemicals can undergo slow reaction while in storage to form other materials which are inherently unstable and prone to violent decomposition, i.e. time-sensitive chemicals. An example of this occurred at UCSB in 7/05 when an old lecture bottle cylinder of anhydrous hydrogen fluoride spontaneously exploded; fortunately no one was injured. It is therefore important to understand what these materials are and how to properly manage them. The most commonly recognized time-sensitive chemicals include the following:

Gases: Vendors recommend that corrosive gases (acids/bases) be consumed or disposed of within 2 years. This can be due to two reasons: Some acids slowly buildup dangerous pressures of hydrogen gas due to a reaction of the corrosive with the cylinder walls; or the corrosive will attack the internal or external metal fittings of the cylinder resulting in leaks, or frozen valves.

Examples:

- Hydrogen fluoride, anhydrous (hydrogen pressure buildup and cylinder corrosion)
- Hydrogen bromide, anhydrous (hydrogen pressure buildup and cylinder corrosion)
- Hydrogen sulfide, anhydrous (anecdotal reports of pressure buildup)
- Hydrogen cyanide, anhydrous (violent polymerization can occur)
- Hydrogen chloride, anhydrous (corrosion of fittings and cylinder)

Solids/Liquids: For a good overview of these hazards see the article at:

<http://dx.doi.org/doi:10.1016/j.chs.2004.05.017> Note that organic solvents which form **peroxides (e.g. ethers)** are the most common materials in this category and can be found in most campus labs. The other classes of materials addressed in the article are: multi-nitro compounds (e.g. picric acid); chloroform; formic acid; alkali metals; metal fulminates; and heavy metal acetylides.

It should also be noted that there is a difference between a time-sensitive chemical and a shock-sensitive chemical (not addressed here). The former can become the latter, but there are shock-sensitive chemicals that are always so and do not require time to develop. However, these will rarely be found in campus labs, except possibly in Chemistry.

MANAGEMENT OF TIME-SENSITIVE CHEMICALS

For a review of good management practices, also see the article noted above.

However, the most fundamental management tasks are to:

- a. know what you have in stock
- b. date materials that are time-sensitive
- c. purge them regularly

For further information contact the EH&S Laboratory Safety Specialist at x-4899