UCLA Department of Chemistry and Biochemistry *Chemical Safety Office/ EH&S*

Safety Notes

Newsletter #3 **November 1996**

FIRE AT UNIVERSITY OF TEXAS, AUSTIN

Improper Quenching of Sodium

C&E News reported on the fire at the University of Texas, Austin in its October 28, 1996 issue. (Vol. 74, No. 44, p. 10-11). A fire occurred in a Chemistry Lab at UT, Austin on Sunday, October 19, 1996 at 9:30 a.m. Fortunately, no one was injured. The fire destroyed one lab, heavily damaged two adjacent labs, and caused the shutdown of the labs of six faculty members in whole or in part. The fire resulted in staggering losses, estimated at $300,000 for damage to the chemistry building and inestimable loss of current lab notebooks and archival research records. A private contractor is removing the chemicals from the labs. The cost is high, since many chemical containers had their labels destroyed or obscured, and all the material must be treated as hazardous waste.

WHAT CAUSED THE FIRE?

The fire started when a postdoctoral fellow tried to dispose of sodium metal. (Sodium is a reactive metal that can spark fires when exposed to water). He followed basic safety precautions by exposing the metal to alcohol. Unaware that the decomposition was incomplete, he poured the material down the sink. The residual metal caught fire and ignited solvent mixtures stored near the sink. A solvent bottle stored in the sink, filled with acetone, broke and caused the fire to spread rapidly. The fire was a six alarm fire with half of the city of Austin on -duty fire fighters extinguishing the flame in a six hour period. The Vice President for Research estimated the cost of repair to be upwards of half a million dollars.

Other conditions in the lab undoubtedly contributed to the fire. According to the Austin fire department, poor housekeeping of chemicals in the lab contributed to the spread of the fire. They also faulted unlabeled containers and improperly stored flammable chemicals.

COULD THIS HAPPEN HERE?

The answer is YES, it could! There are many research labs that treat reactive metals from solvent stills, and other applications, as well. The procedures used are not always uniform. Some groups use isopropyl alcohol, some use t-butyl alcohol, some use ethanol. There are a couple of ways to deal with reactive metals. First and easiest, is to dispose of them as hazardous waste. DO NOT TREAT! Make sure that there is a protective coating of mineral oil covering the reactive metal, fill out a Hazardous Waste Identification Tag, and bring it to the Chemical Safety Office (Room 2104, Molecular Sciences). Reactive metals are disposed of as hazardous waste and shipped to treatment facilities in the U.S.

Alternately, many research groups quench solvent stills on a regular basis. Strategies for quenching spent desiccants differ from compound to compound, but there is a general trend. Always start off with a mild quenching agent and gradually progress to more potent agents. The following is a safe procedure for quenching of still pots.

Quenching the still pot:

1. Always quench in a fume hood.

2. Remove any potentially flammable materials from the immediate area.

3. Begin the procedure by allowing the still pot to cool to room temperature, then cool it in an ice bath.

4. For the drying agents typically used (calcium hydride, sodium, sodium/ benzophenone), start the quenching procedure by slowly adding isopropanol to a well stirred pot. Gas will evolve during this process.

5. When the gas evolution has stopped, slowly progress to ethanol, then eventually to methanol.

6. Let stand in the fume hood for several hours to ensure complete quenching.

7. Dispose of as hazardous waste.

Remember that quenching a still pot can be a delicate business, particularly if the still has not been properly maintained. The potential for fire and explosion is high. If you have never quenched a still before, it is essential that you work with someone who is experienced in this area. Do not attempt to quench a still pot if you are alone in the lab.

Reactive Metal Wastes

Some lab groups have procedures for disposing of small amounts of reactive metal wastes such as sodium, potassium, and sodium hydride. While the procedures may vary by lab group, the general procedure is the same as used for quenching still pots. Start by adding a mild quenching agent (t-butyl alcohol) and gradually progress to more potent agents (isopropyl alcohol, ethanol). Let the reaction mixture stand in the fume hood for several hours or better, overnight. When the reactive metal has completely reacted, check the pH and adjust as necessary. The mixture still has to be disposed of as hazardous waste because it is a flammable liquid.

Two good reference books on this topic are:

Linn, G., Sansone, E., Destruction of Hazardous Chemicals in the Laboratory; Wiley: New York, 1990.

National Research Council, Committee on Prudent Practices for Handling, Storage, and Disposal in the Laboratory. Prudent Practices in the Laboratory: Handling and Disposal of Chemicals; National Academy Press: Washington D.C., 1995

Remember, it is easier and safer to dispose of reactive metals as Hazardous Waste! Just cover the metal with dry mineral oil and fill out a Hazardous Waste Identification Tag. Bring the Hazardous Waste to the Chemical Safety Office at Molecular Sciences 2104. Phone (20)6-3661.

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