UCI Environmental Health & Safety

Lessons Learned

Water Reactive Chemical Fire

October 2024

What Happened?
On October 7, 2024, around 2:30 pm, a graduate student researcher in a laboratory on campus was preparing to transport a bottle containing approximately 50 grams of solid Lithium Aluminum Hydride (LAH) from his lab space on the third floor to a storage room in the basement of the building. LAH is a chemical that reacts with water, known as a water reactive, and can cause the formation of hydrogen gas, which is highly flammable. The graduate student researcher was wearing a fire-resistant (FR) lab coat, nitrile gloves and safety glasses, and removed the container from the chemical fume hood and placed it on the countertop next to the hood. He then went to pick up a bottle carrier located on the ground, and when he turned around to grab the bottle carrier, the glass bottle containing the LAH was knocked down to the floor. The container shattered on the floor and a flame shot up right in front of the graduate student researcher. The graduate student researcher utilized an ABC fire extinguisher within reach and put the fire out. The fire alarm was set off and the building was evacuated.

Direct Cause:
The container with the LAH was knocked to the floor, shattered, and released a fine powder of the compound. This compound reacted with moisture in the air, and released hydrogen gas, causing a fire.

Root Cause of the Incident:
The transport of the container was not properly planned out. The bottle carrier was improperly placed on the ground and as a result, the graduate student researcher's body movement caused the bottle to be knocked to the ground.

Primary factors that contributed to the incident:
The graduate student was not aware that the School of Physical Sciences has a day box for the task of safe transport of very reactive chemicals. The transport box (or the bottle carrier) should have been on the same level, the benchtop, as the compound to make the transfer in and out of the safe carrier as hazard free as possible.

What steps can be taken to prevent this type of incident from occurring again:

- Establish a standard operating procedure for the proper transport of reactive chemicals (i.e., pyrophorics, water reactive chemicals, organic peroxides.) Discuss it during your lab's group meeting (training) and have every researcher in the lab read and sign it.
- Check the bottle that needs to be transported for any sign of aging, either the chemical itself, or the container.
- Have a day box and a cart ready for the transport before the containers(s) of reactive chemicals is/are grabbed.
- Communicate to another person in the lab and let them know that you are preparing to transport a very reactive chemical from one lab space to another.
- Keep the smallest amount of reactive chemicals in your lab so the maximum allowable quantities for the different hazard classes are not exceeded.

For more information or assistance, please contact EHS at (949) 824-6200 or at safety@uci.edu.