Safety Alert
Muffle Oven Fire

University of Victoria | Occupational Health, Safety and Environment

INCIDENT DATE: January 2025
SUBJECT: Muffle oven fire

BACKGROUND:

On January 17, 2025, an undergraduate student was attempting to use a muffle oven to determine ash weight of a sample. There was no one else in the laboratory. The muffle oven is stored within a fume hood and the oven was set at its maximum temperature of 550 °C. The student opened the muffle oven door, inserted their samples and immediately a flash flame protruded from the door and the top of the oven vent. The student then closed the door and exited the lab to seek help from another student down the hallway. When they returned, the fire from the vent ceased and extinguished itself. The student turned the oven off to let it cool and reported the incident to their supervisor.

INJURIES

No injuries; however potential for serious injuries and damage was high.

EQUIPMENT DAMAGE

The muffle oven and fume hood were not damaged.

IMMEDIATE CAUSE

The student inserted the samples when the oven was up to full 550 °C temperature instead of inserting the samples first, and then bringing the oven to temperature, resulting in the samples self-igniting and a subsequent flash flame. A flash flame fire occurred because the samples within had not completely mineralized to ash.

LEARNING OUTCOMES

The basic root causes that lead to the incident is inadequate training & orientation and lack of work procedures or processes. The muffle oven is located in a shared laboratory and is used between various researchers. There was no records management on who can use or is trained on using the muffle oven. The student from this incident had not been given proper instruction on using the muffle oven from their supervisor nor the lab responsible for the muffle oven. In addition, there was lack of oversight in ensuring the student had completed any general lab safety training or orientation through OHSE safety courses or lab specific training by their supervisor/PI prior to commencing work in a lab. Even though the incident occurred during business hours, the undergraduate student was working alone with equipment that has high risk to cause fires. There was no senior group member that was readily available or in the vicinity to assist with an inexperienced student researcher. Undergraduate researchers should never work alone outside of business hours. In times during business hours, there were no working alone restrictions of high-risk work for undergraduate researchers and there was no plan in place student in the event of an incident.

RECOMMENDATIONS TO PREVENT RECURRENCE

- Ensure researchers have completed basic laboratory safety training and as well as lab specific training/orientation before working in a laboratory
- Train and orient researchers on proper handling of lab equipment prior to use.
- Supervisors must review experiments and methodology with student researchers prior to commencing work.
- Prohibit undergraduate student researchers from working alone in the laboratory
- Develop policies and procedures for shared laboratories.

More information for laboratory supervisor responsibilities:
https://www.uvic.ca/ohse/research/laboratory/laboratory-supervisors/index.php

More information on working alone
https://www.uvic.ca/ohse/research/laboratory/laboratory-supervisors/index.php

More information on research & lab safety training:
https://www.uvic.ca/ohse/training/research-safety/index.php

More information on fire emergency procedures:
https://www.uvic.ca/services/emergency/emergency-procedures/fire/index.php

More information of hazard and risk assessments
https://www.uvic.ca/ohse/assets/docs/laboratory/hazard-risk-assessment_template.pdf