

Safety Alert

Household equipment fire



University
of Victoria

Occupational Health,
Safety and Environment

INCIDENT DATE: August 2024

SUBJECT: Household equipment fire

BACKGROUND:

On August 20, 2024 at around noon, a lab worker was reusing molecular sieves by rinsing with acetone in a glass crystallizing dish and then placed the dish in a toaster oven to dry. A few moments later another lab worker noticed a faint burning odour and followed the smell to the toaster oven. Through the oven door, they observed smouldering molecular sieves in the glass dish. They stood to the side and opened the oven door, whereupon the molecular sieves caught fire. The toaster oven door was closed immediately and the electrical power was quickly turned off. However, the fire continued and the flames began to extend above the top of the toaster oven. The lab manager present grabbed the nearest fire extinguisher and successfully extinguished the fire.

INJURIES

Lab workers in the lab at the time of the fire were uninjured and were able to extinguish the fire with a Class C fire extinguisher.

EQUIPMENT DAMAGE

The toaster oven and lab bench were not damaged. The molecular sieves were disposed with hazardous waste once cooled



IMMEDIATE CAUSE

The molecular sieves caught on fire because acetone, a flammable solvent, ignited due to the close proximity of the hot element and high elevated temperature of the oven. The lowest setting of the toaster oven is 95 °C, it resides on the laboratory bench top and is mainly used for drying residual water from vials and activating dry molecular sieves. There exists a laboratory drying oven in the room meant for laboratory purposes but was out of service. The toaster oven is made by Black and Decker and according to the manufacturer it is intended for household use only.

LEARNING OUTCOMES

There are two factors that lead to the fire, (a) a flammable solvent was placed in a hot oven and (b) a toaster oven meant for household use was being used for laboratory work.

- a) Glassware or equipment that is rinsed with a flammable solvent (such as acetone or ethanol) should not be immediately placed in a hot environment. Glassware/equipment should be air dried first before placing in an oven to dry.
- b) The toaster oven is designed for home use for food preparation and not laboratory use. Drying ovens are designed for precise and controlled drying or heating applications versus toaster or convention ovens designed for household use. Differences include maximum temperatures, temperature precision, air flow, corrosion resistant & durable oven materials and location of heating filaments.

Some equipment that is intended for household use only can be useful (and economical) tools for the laboratory workplace. It is recommended departments create a policy around the types of household equipment that should not be used in laboratories. If research groups insist on using a particular household device, develop risk assessment, requirements and process they need to follow in order to safely use the equipment in the laboratory.

RECOMMENDATIONS TO PREVENT RECURRENCE

- Avoid reusing molecular sieves
- Ensure glassware or materials that are washed with flammable solvents are air dried before placing in the oven
- Do not place plastic/flammable items inside a drying oven set at high temperatures
- Limit the use of equipment intended by manufacturers for household use only to be used in the laboratory
- Establish a lab or departmental policy around household equipment use in laboratories
 - Establish criteria and hazard assessment that prohibit certain household equipment
 - Establish a process for researchers to follow to obtain permission to use particular household equipment

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