



INTRODUCTION

The purpose of this document is to address the importance of preparedness when confronted with a lithium metal or lithium ion battery fire.

ROLES

University community members (staff and students) are responsible for knowing:

- Location of fire extinguishers
- Location of fire alarm pull stations

In the event of a fire alarm or at the direction of EH&S, Security Personnel, or Building Manager, all faculty, staff and students must evacuate their work or study areas and if reasonably able to do so while evacuating, shut down any operation or equipment which might become a hazard if unattended.

Teaching personnel, supervisors, and others who have groups of people under their direction are responsible for ensuring orderly evacuation in the event of a fire or fire alarm.

Anyone who works with lithium ion batteries or with elemental lithium should reference [Lithium Battery Safety and Handling Guideline](#) for further information of responsibilities and procedures.

LITHIUM ION BATTERIES

DESCRIPTION:

Lithium ion batteries are used in a wide array of devices that are used on a daily basis. Some of the most common devices where these batteries are used are cell phones, laptops, tablets, and electric cars. Rechargeable lithium ion cells utilize lithium ions that are interposed into graphite, lithium metal oxides and/or lithium salts. There is no elemental lithium in a lithium ion battery. This means that they are much more stable than non-rechargeable lithium batteries which contain the element lithium. However, lithium ion can still pose a threat if not treated properly.

STORAGE:

Lithium ion battery fire risk can be managed effectively by properly storing the batteries. A few methods of storage to practice are:

- Store batteries at room temperature between 40 and 80 degrees F
- Do not expose battery pack to direct sunlight (heat) for extended periods
- When feasible, do not leave a battery charging unattended in the event that the battery is damaged and can become unstable, thus overheating.
- Store batteries separately from anything hazardous, such as explosives, combustibles, or any other highly flammable material.

CAUSES OF FIRE:

- Over-charging (usually with older battery models that lack a power shut off sensor)
- Energetic-type failures (the battery releasing stored energy rapidly creating heat and venting gases that can potentially ignite)
- Improper storage of lithium ion batteries (sunlight exposure, extreme heat)

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- Failure to dispose of the battery after the expiration date or when the battery is no longer functioning properly (batteries tend to lose their structural integrity once past their prime)

PROPER EXTINGUISHING:

- Let the fire department fight fires
- University employees should not use a fire extinguisher unless formerly trained in the proper operation of an extinguisher
 - If formally trained, you may use a standard ABC fire extinguisher or water to put out a lithium ion battery fire.

ORGANIC AND INORGANIC ELEMENTAL LITHIUM BATTERIES

DESCRIPTION:

Lithium metal is a soft, silver-white metal belonging to the alkali metal group of chemical elements. It is the lightest metal and the least dense solid element. Like all alkali metals, lithium is highly reactive and flammable.

Lithium batteries, or primary batteries, are single use and incapable of recharge. They contain lithium metal which is highly combustible. Common applications include military use, medical applications, and certain consumer electronics.

CAUSES OF FIRE:

- Water and liquid substances
- Battery failures
- Attempting to charge a non-rechargeable battery
- Improper storage of batteries
- Heat sources
- Flammables

STORAGE:

- Lithium batteries should be stored away from direct sunlight
- Storage temperatures of lithium batteries is optimal between 40 - 80 degrees F
- Away from water sources
- Store batteries separately from anything hazardous, such as explosives, combustibles, or any other highly flammable material.
- Storage areas should not be subject to elevated temperatures, sources of open flame, or spark-generating equipment

PROPER EXTINGUISHING:

- Let the fire department fight fires
- University employees should not use a fire extinguisher unless formerly trained in the proper operation of an extinguisher
- Only Class D fire extinguishers that contain a copper powder are approved for combating a lithium fire
- **DO NOT USE WATER OR ANY OTHER TYPE OF EXTINGUISHER BECAUSE ORGANIC & INORGANIC LITHIUM METAL FIRES REACT HIGHLY WITH WATER AND COMBUSTIBLE SUBSTANCES**

FURTHER INFORMATION

- For more detail regarding lithium batteries, reference [Lithium Battery Safety and Handling Guideline](#)