

Lithium Ion Battery Safety

Lithium Ion Battery Uses

Lithium ion batteries store a large amount of energy in a small amount of space due to their high energy density. They are used as power sources for many types of electronics, including battery packs, e-bikes, e-scooters, phones, laptops, tablets, drones, and power tools. **If these batteries are mishandled or mismanaged, they can become damaged, leading to swelling, off-gassing, fire, and/or an explosion.**



Why are Lithium-Ion Batteries a Risk?

Lithium ion batteries are a risk because of their high energy density and their possibility to become damaged when dropped, which may lead to internal short circuits and thermal runaway. Thermal runaway occurs when battery damage produces heat, causing the battery temperature to rise followed by venting then possibly a flame. This venting contains flammable and toxic chemical gasses, often before a flame appears. Thermal runaway results in extremely high temperatures and observable violent cell venting, smoke, and fire, presenting a major hazard to people in the immediate vicinity and the surrounding area, such as a building room or vehicle.

Signs of a Problem

Stop using or charging a lithium ion battery if you notice any of the following issues:

- Unusual smells or odor: burning smell and/or electrical burning odor
- Too much heat / overheating / hot to the touch; Discoloration
- Physical changes: change in color/shape (bulging/swelling), leaking, loose wires
- Functionality changes: Unusual noises, reduced capacity or voltage drop
- Damage, such as dropping, that may lead to any of the preceding conditions



FIRE: If a battery begins to ignite, move combustible materials away, evacuate, then immediately call 911

Safety Tips

- Only purchase or use devices that are listed by a qualified testing laboratory like Underwriter Laboratories (UL).
- Always follow the manufacturer's charging instructions. Only use the charger and charging cord that came with the device. If you are using a replacement, ensure it's power ratings match that of the device.
- Discontinue charging the device or device battery after it is fully charged. Some devices may have insufficient overcharging protections that can lead to the battery catching fire.
- Avoid leaving charging devices unattended. Always unplug if you must leave the room.
- Always place charging devices on a hard surface like a desk, table, or counter. Store batteries away from anything that can catch fire, such as bedding, paperwork, or flammable liquids. These actions will reduce the spread of a fire, if one occurs.
- Never block egress or fire exit doors by parking, storing, or charging e-bikes and/or e-scooters in front of them.
- Keep batteries at room temperature/away from heat sources/direct sunlight. Do not charge below 32°F (0°C)/above 105°F (40°C).
- Check if your lithium battery or product containing a lithium battery was recalled by going here: <https://www.cpsc.gov/Recalls>

Disposal

- **ALWAYS tape the battery terminals or the entire lithium ion battery with clear packing tape.** This prevents opposing battery terminals from coming into contact with one another, which may lead to overheating and a fire.
- Do NOT place used batteries in or near trash containers or dumpsters because of the likelihood of accidental illegal disposal. Lithium ion batteries contain hazardous chemicals, so they must be recycled.
- State law limits the storage of spent/used and unwanted batteries to one year of accumulation, so the University must send spent/used and unwanted batteries for recycling before exceeding this one year time limit.
- Nearly every building on campus has a brown, rectangular battery collection bin located in departmental offices. The list of battery collection locations are found on *Battery Collection Location spreadsheet* available here: <https://docs.google.com/spreadsheets/d/1xlmFPPN5tdUDI9UBXlunr9vUYcmhZEtQi-fz3wLTLA4/edit?gid=1143694451#gid=1143694451>
- The University ensures collection bins stored at the locations listed on the Battery Collection Location spreadsheet are emptied annually to ensure batteries are sent for recycling prior to exceeding the 1-year accumulation limit.

