Lithium-Ion & Lithium-Polymer Batteries

Mindfulness Minute: Incorporate safety into your workflow by considering the hazards associated with the use, charging, and storage of lithium-ion and lithium-polymer batteries.

Lithium-ion (Li-ion) and lithium-polymer (LiPo) batteries are becoming more common in everyday electronics as well as laboratory equipment. Compared to traditional battery technology, Li-ion/LiPo batteries charge faster, last longer, and have higher power density (up to 100x more). While these batteries provide an effective and efficient source of power, there is potential for overheating, catching on fire, and even explosion especially when they are damaged or improperly used, charged, or stored.

Li-ion/LiPo Battery Fire Hazards

Electric bike Li-ion fire while charging

- **Call 9-1-1 immediately in the event of a Li-ion/LiPo battery fire.**
- Li-ion/LiPo battery fire hazards are associated with high energy density and flammable, organic electrolytes.
- Multiple cells in proximity allow for a potential chain reaction that spreads to adjacent cells.
- Potential hazardous by-products: toxic gases, flammable by-products, flying debris, and sustained burning of electrolyte and battery casing.
- Major causes of Li-ion/LiPo battery fires are physical damage, electrical abuse (overcharging, using the wrong charger or power supply, etc), temperature abuse, or manufacturer defect in control circuitry.
- Warning signs for a fire include the battery/device: becoming hot, swelling/bulging, leaking, hissing/cracking/popping sounds, or producing smoke/odors.

Purchasing:

- Purchase from reputable manufacturers and vendors. Avoid “low price, low quality” batteries.
- Purchase devices certified by a nationally recognized testing laboratory like Underwriters Laboratories.
- Check for recalls prior to purchasing and on existing inventory.

Using, Charging, and Storing:

- Follow manufacturers’ instructions.
- Only use the charger that came with the device/battery.
- Never leave Li-ion/LiPo batteries unattended while charging. Remove from power once fully charged.
- Pick a safe place to charge the battery. Remove combustible materials from the area. Charge away from an exit or route of egress. Utilize charging pouches to contain any fire during charging.
- Regularly inspect batteries for damage.
- Use, store, and charge in a cool, dry place and keep out of direct sunlight.

Disposal:

If the battery is undamaged, contact UT Recycling (865-974-3480) E-Waste disposal directions. If the battery is damaged or showing signs of potential fire, contact EHS (865-974-5084) for disposal directions.

Normal and swollen LiPo battery

References:

OSHA Factsheet Lithium-ion Battery Safety:
https://www.osha.gov/sites/default/files/publications/OSHA4480.pdf

Preventing Fire and/or Explosion Injury from Small and Wearable Lithium Battery Powered Devices:
https://www.osha.gov/sites/default/files/publications/shib011819.pdf

Lithium-Ion Battery: A Consumer Safety Guide:
https://www.dhses.ny.gov/system/files/documents/2024/07/li_batteryconsumersafetyguide.pdf