Lithium-ion Frequently Asked Questions

1. **Why are lithium-ion batteries flammable?**

Lithium-ion batteries store a lot of energy in a small amount of space. When that energy is released in an uncontrolled manner, it generates heat, which can turn certain internal battery components into flammable and toxic gases.

2. **How do fires from lithium-ion batteries start?**

Lithium-ion battery fires happen for a variety of reasons, such as physical damage (e.g., the battery is penetrated, or crushed, or exposed to water), electrical damage (e.g., overcharging or using charging equipment not designed for the battery), exposure to extreme temperatures, and product defects.

3. **What are some unique dangers of lithium-ion battery fires?**

Heat, smoke, the release of toxic gases, and the potential for explosions are the dangers associated with lithium-ion battery fires.

4. **What are some safety tips for buying, charging, storing, and using lithium-ion batteries in devices like laptops, phones, tools, and more?**

- Purchase batteries that are only listed by a nationally recognized testing laboratory and labeled accordingly.
- Stop charging a battery once it is full.
- Use charging equipment that is only compatible with your device. To be safe, use only the charging equipment that is supplied with your device.
- Stop using your device if the battery shows signs of damage, such as an unusual odor, excessive heat, popping sounds, swelling, or change in color.
- Have all repairs performed by a qualified professional.

5. **Where is the safest place to charge batteries in e-bikes and electric vehicles?**

When it comes to e-bikes, e-scooters, and electric vehicles, the safest place to charge these devices is outdoors away from any structure or enclosure and not in direct sunlight. Do not charge a battery when either the charger or the battery is damaged. Do not store batteries in extremely hot or cold locations or in an area that blocks the only exit out of to a room. And do not attempt to modify the battery or charger.

6. **Once the batteries catch fire and water is applied to them, does it make the fire worse because lithium in the presence of water creates combustible hydrogen?**

Firefighters should use water to fight a lithium-ion battery fire. Water works just fine as a fire extinguishing medium since the lithium inside of these batteries are a lithium salt electrolyte and not pure lithium metal. Confusion on this topic stems from the fact that pure lithium (like what you see in the table of elements) is highly reactive with water, while lithium salts are non-reactive with water.

7. **How should lithium-ion batteries be disposed of?**

Lithium-ion batteries and the devices that contain them should not go in household garbage or recycling bins. They can cause fires during transport or at landfills and recyclers. Instead, lithium-ion batteries should be taken to separate recycling or household hazardous waste collection points. Many stores that sell large quantities of lithium-ion batteries will have a recycling program where you can return the batteries there. Your local waste management or recycling center should be able to take lithium-ion batteries as well. Contact https://call2recycle.org/ to find a recycling center near you.

8. **What should I do if the weather forecast predicts severe flooding in my area?**

If there is a potential for flooding where you live, disconnect all lithium-ion battery–powered devices and, if possible, move them to an area that is not likely to flood. Don’t store batteries near evacuation pathways, windows, doors, or sleeping areas.

9. **What do I do if the batteries in my smaller electronic devices (e.g., laptops, power tools, etc.) have been exposed to floodwaters in my home?**

Disconnect the devices from their charging stations that have potentially been exposed to water, place them in a non-combustible container, and store them outside of the building. Contact the local fire department and the manufacturer of the device for recommendations for safe handling of the product and safe disposal. Do not attempt to charge a lithium-ion battery that has been submerged in water or shows signs of damage; do not try to open or repair a submerged or damaged battery.

10. **How do I correctly dispose of lithium-ion battery–powered devices that have been damaged by water?**

Do not put lithium-ion batteries in trash or recycling bins. Contact your local fire department, local waste department, or product manufacturer for guidance on the correct way to dispose of the device and batteries.