



Lithium-ion issues

The flip side of being an energy powerhouse



Headline-grabbing reports of exploding headphones, hoverboards, laptops and e-cigarettes parade across our consciousness in a seemingly unconnected din. So frequently do these reports occur that only the most sensational incidents are deemed worthy of our attention.

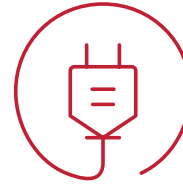
But as investigators review individual occurrences, a common thread reveals several different factors surrounding these events. Lithium-ion batteries and thermal runaway, a chain reaction which can be fueled by the batteries' nature, remain at the center of each explosion, injury or, on the rare occasion, death, but the cause is varied.

Here are several conditions that contribute to thermal runaway:



Device misuse

Life's mishaps can damage the device's interior design. Actions such as the repeated dropping of a device over time, leaving a device in a hot car or setting it in bedding, can cause the battery to overheat, and can lead to thermal runaway. Lithium-ion batteries that have been exposed to stresses may function normally but be damaged internally. Think of it in terms of your brain — stresses such as heat exhaustion and repeated hits can irreparably damage structure and functioning.



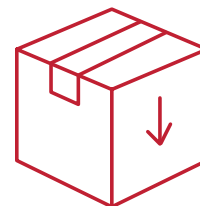
Non-certified batteries, chargers and other contributors

Lithium-ion technology is generally safe when quality battery manufacturers take exhaustive steps to minimize design flaws, vet material suppliers and control quality of production. Manufacturers of battery powered products can then use established protocols to integrate those batteries safely into their products. However, some companies and consumers continue to purchase and use non-branded and non-tested batteries, cables and, as if often the case with consumers, chargers.



Design flaws

Because consumers crave higher-capacity batteries in smaller packages at lower prices, there will continue to be more chances for problems with devices and products. The energy density of lithium-ion cells has doubled since 1991 as battery manufacturers pack more active material into a device. Pressure from the surrounding hardware can cause damage to the electrodes or separator. Manufacturing methods become more critical as cells become denser.



Production flaws

The presence of microscopic metallic particles could come into contact with parts of a lithium-ion battery cell, leading to a short circuit within the cell. Cells with ultra-thin separators are more susceptible to impurities than ones with enough space between the cell's protective pouch and the electrodes inside. Complex assembly techniques make the elimination of all metallic dust almost impossible. ☹

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