

Phillips' Designers Guide: Notes From The Napkin

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Rechargeable lithium ion batteries are fast becoming the power source of choice among makers of many consumer, automotive, medical and defense products. Lightweight and long lasting, lithium ion batteries hold two to four times the energy of their rechargeable nickel- and lead-acid-based counterparts however the high-energy density of lithium ion batteries is not without risk.

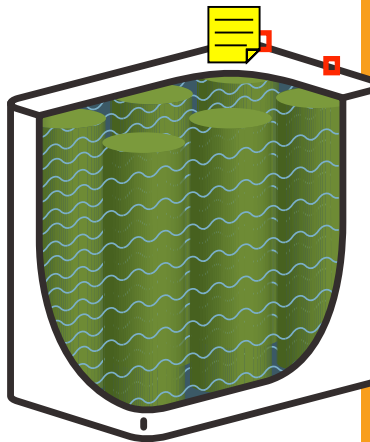


Challenges:

Protections built in to lithium ion batteries help maintain their safety during normal use. It's when abnormalities occur—such as manufacturing defects, excessive temperature elevation, and penetration by outside materials—that lithium ion batteries can become hazardous. In fact, if enough microscopic metal particles converge within the cell, an electrical short can develop, resulting in the elevation of the battery's temperature to dangerous levels. This can lead to thermal runaway, and cause the battery to ignite or explode.

Solution:

An innovation designed by Phillips makes it possible for short-circuited lithium-ion batteries to smolder and extinguish, rather than ignite and explode under catastrophic cell failure. Phillips Plastics researched, evaluated and tested lithium ion cell technology and determined how to minimize its combustibility under catastrophic cell failure. The two-tiered solution consists of a casing that surrounds the lithium-ion battery cells and a fluid (blue waves at right) that surrounds the cells (green cylinders at right). When penetrated, the casing self-seals the opening limiting oxygen to the cells, so resulting flames can't propagate. The fluid serves to help disperse the heat from the individual cell to a much larger surrounding area. As a result, it prevents the initially affected cell(s) from reaching a temperature capable of triggering thermal runaway and subsequent fire and explosion.



Safety First Across Markets, Applications

Lithium-ion battery safety remains a top priority for a number of applications across markets. Examples of markets include:

Automotive: hybrid electric vehicles, electric vehicles

Consumer: cell phones, MP3 players, digital cameras, PCs, power tools, remote-control toys

Defense: battlefield electronics used by dismounted soldiers

Medical: portable monitoring devices, automated external defibrillator

Aviation: aircraft power, drones

Built-in lithium-ion battery manufacturing precautions have proven to dramatically reduce risks to property and lives. Still, there is ample opportunity for manufacturers to enhance the overall safety of lithium-ion batteries when major short circuits occur. Read the entire story at: www.phillipsplastics.com, keyword search:

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