

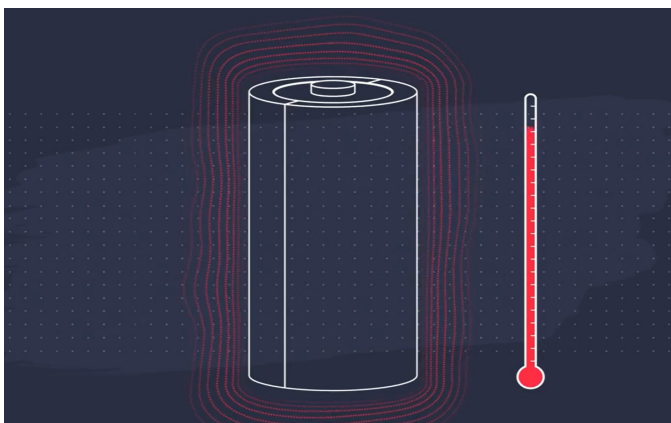
What is thermal runaway?

One of the primary risks related to lithium-ion batteries is thermal runaway. **Thermal runaway** is a phenomenon in which the lithium-ion cell enters an uncontrollable, self-heating state.

Thermal runaway can result in:

- Ejection of gas, shrapnel and/or particulates (violent cell venting)
- Extremely high temperatures
- Smoke
- Fire

In lithium-ion cells, the movement of electrons and lithium ions produces electricity. The process of charge and discharge is normally accompanied by a small amount of heat.



In ideal conditions, the heat is able to dissipate from the cell.

In thermal runaway, the lithium-ion cell generates heat at a rate several times higher than the rate at which heat dissipates from the cell.

The cell reaches thermal runaway when its temperature rises uncontrollably at a rate greater than 20° centigrade per minute with maximum temperatures reaching greater than 300°C accompanied by gas and/or electrolyte venting, smoke or fire or a combination of all.