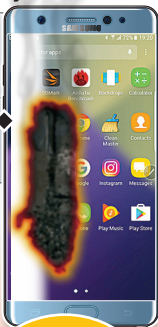


The battery that can extinguish itself

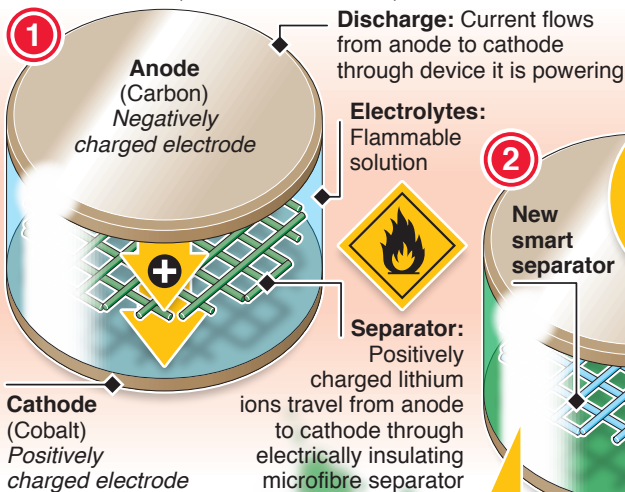
Scientists have developed a lithium-ion (li-ion) battery that contains a fire-extinguishing element which is released if the battery overheats

■ **Fire hazard:** Lithium-ion batteries will catch fire or explode if overcharged or if internal malfunction causes short circuit – condition known as **thermal runaway**

■ **Oct 11, 2016:** Samsung ceases production of its new **Galaxy Note7** smartphone following spate of exploding handsets – believed to be caused by faulty li-ion batteries



LI-ION BATTERY (schematic illustration)



5 billion
Number of li-ion batteries made every year

SEPARATOR MICROFIBRE

Triphenyl phosphate (TPP)
flame retardant contained within protective polymer shell

Shell melts if battery gets too hot, releasing TPP into electrolyte fluid, extinguishing fire in 0.4 seconds



BMW i3 electric supermini

■ **Market pressures:** Li-ion batteries considered promising power source for electric vehicles. But as demand for battery density increases, so dangers of thermal runaways rise