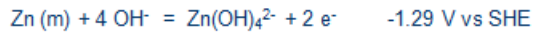
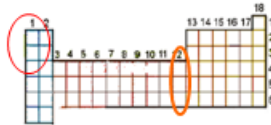


Higher energy anodes

Group 12



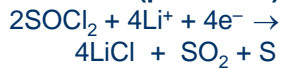
Group 1



1

Lithium batteries

Cathodes (partial list)

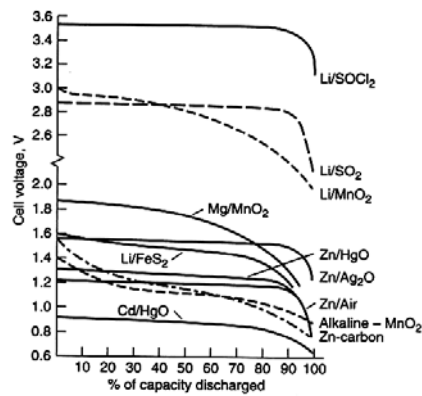


Anode



Electrolyte

Organic-based solvent



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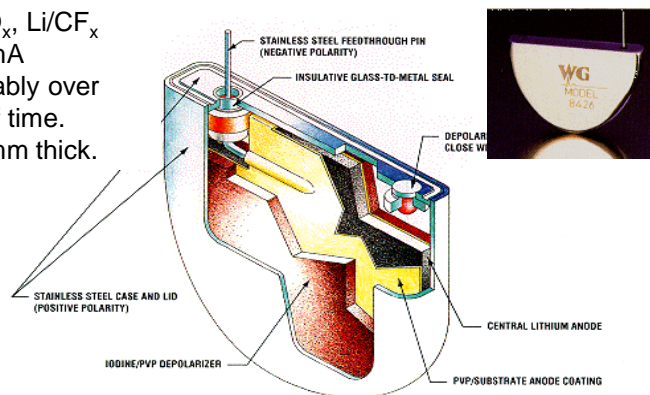
Cathodes for Li primaries

Chemistry	Cathode	SpE Wh/kg	V	Temp. Range	Life / Yrs	Package	Application
Li/SOCl ₂	Thionyl Chloride	700	3.6	-55 - 150°C	15-20	Bobbin hermetic weld	Industrial/commercial
Li/SO ₂	Sulfur Dioxide	260	2.8	-55 - 70°C	5	Spiral, hermetic weld, vented	Military/Aerospace
Li/MnO ₂	Manganese Dioxide	330	3.1	-20 - 60°C	5	Spiral, crimped elastomer seal	Consumer
Li/(CF) _x	Poly (Carbon monofluoride)	310	2.8	-20 - 60°C	5	Spiral, crimped elastomer seal	Consumer
Li/I ₂	Iodine	230	2.7	0 - 70°C	10	Welded	Implanted medical

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Implantable Li batteries

(Li/I₂), Li/AgVO_x, Li/CF_x
 Designed for mA discharge, reliably over long periods of time.
 Smallest is 4 mm thick.



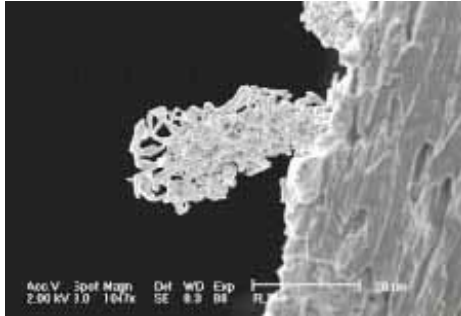
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Dendrites on metallic Li

Li (m) is not a reversible electrode for long-term cycling.

1. Dendrites grow from electrode on recharging. This causes short-circuits when dendrites grow through separator.
2. High surface area of dendrites causes electrolyte loss.



Source: LABORATOIRE DE RÉACTIVITÉ ET DE CHIMIE DES SOLIDES UPRES-A CNRS 60071

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Na/Sulfur battery

Cathode



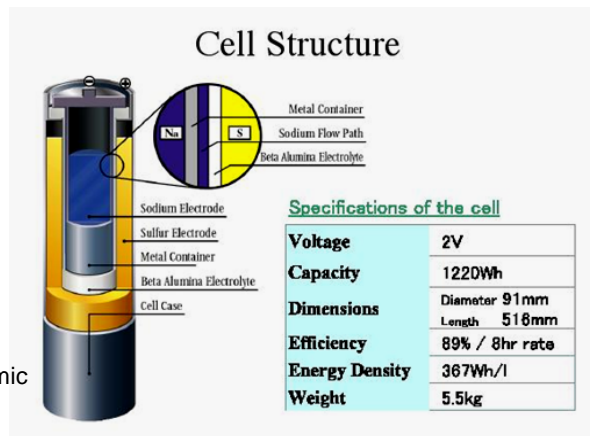
Anode



Electrolyte

Na-β"-alumina

Electrolyte is a ceramic and serves as a separator. Operating temp is approx. 300 C.



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