Chemistries

Chemistry	Cathode	Electrolyte	Nominal voltage	Open-circuit voltage	Wh/kg	Wh/dm^3
Li-MnO_2 (Li-Mn, "CR")	Heat-treated manganese dioxide	Lithium perchlorate in propylene carbonate and dimethoxyethane	3 V	3.3 V	280	580
	The most common consumer grade battery, about 80% of the lithium battery market. Uses inexpensive materials. Suitable for low-drain, long-life, low-cost applications. High energy density per both mass and volume. Can deliver high pulse currents. Wide temperature range. With discharge the internal impedance rises and the terminal voltage decreases. Maximum temperature limited to about 60 °C. High self-discharge at high temperatures.					
Li-$SOCl_2$	Thionyl chloride	Lithium tetrachloroaluminate in thionyl chloride	3.5 V	3.65 V	290	670
	Liquid cathode. For low temperature applications. Can operate down to -55 °C, where it retains over 50% of its rated capacity. Negligible amount of gas generated in nominal use, limited amount under abuse. Has relatively high internal impedance and limited short-circuit current. High energy density, about 500 Wh/kg. Toxic. Electrolyte reacts with water. Low-current cells used for portable electronics and memory backup. High-current cells used in military applications. In long storage forms passivation layer on anode, which may lead to temporary voltage delay when put into service. High cost and safety concerns limit use in civilian applications. Can explode when shorted. Underwriters Laboratories require trained technician for replacement of these batteries. Hazardous waste, Class 9 Hazmat shipment.[2]					
Li-$SOCl_2$,BrCl, Li-BCX	Thionyl chloride with bromine chloride	Lithium tetrachloroaluminate in thionyl chloride	3.7-3.8 V	3.9 V	350	770
	Liquid cathode. A variant of the thionyl chloride battery, with 300 mV higher voltage. The higher voltage drops back to 3.5 V soon as the bromine chloride gets consumed during the first 10-20% of discharge. The cells with added bromine chloride are thought to be safer when abused.					
Li-SO_2Cl_2	Sulfuryl chloride		3.7	3.95	330	720
	Liquid cathode. Similar to thionyl chloride. Discharge does not result in buildup of elemental sulfur, which is thought to be involved in some hazardous reactions, therefore sulfuryl chloride batteries may be safer. Commercial deployment hindered by tendency of the electrolyte to corrode the lithium anodes, reducing the shelf life. Chlorine is added to some cells to make them more resistant to abuse. Sulfuryl chloride cells give less maximum current than thionyl chloride ones, due to polarization of the carbon cathode. Sulfuryl chloride reacts violently with water, releasing hydrogen chloride and sulfuric acid.[3]					
Li-SO_2	Sulfur dioxide on teflon-bonded carbon	Lithium bromide in sulfur dioxide with small amount of acetonitrile	2.85 V	3.0 V	250	400
	Liquid cathode. Can operate down to -55 °C and up to +70 °C. Contains liquid SO_2 at high pressure. Requires safety vent, can explode in some conditions. High energy density. High cost. At low temperatures and high currents performs better than Li-MnO_2. Toxic. Acetonitrile forms lithium cyanide, and can form hydrogen cyanide in high temperatures.[4] Used in military applications. Addition of bromine monochloride can boost the voltage to 3.9 V and increase energy density.[5]					
Li-$(CF)_x$ ("BR")	Carbon monofluoride	Lithium tetrafluoroborate in propylene carbonate, dimethoxyethane, and/or gamma-butyrolactone	2.8 V	3.1 V	360	680
	Cathode material formed by high-temperature intercalation of fluorine gas into graphite powder. High energy density (250 Wh/kg), 7 year shelf life. Used for low to moderate current applications, eg. memory and clock backup batteries. Very good safety record. Used in aerospace applications, qualified for space since 1976. Used in military applications both terrestrial and marine, and in missiles. Also used in cardiac pacemakers.[6] Maximum temperature 85 °C. Very low self-discharge (<0.5%/year at 60 °C, <1%/yr at 85 °C). Developed in 1970s by Matsushita.[7]					
Li-I_2	Iodine	solid organic charge transfer complex (eg. poly-2-vinylpyridine, P2VP)	2.8 V	3.1 V		
	Solid electrolyte. Very high reliability. Used in medical applications. Does not generate gas even under short circuit. Solid-state chemistry, limited short-circuit current, suitable only for low-current applications. Terminal voltage decreases with degree of discharge due to precipitation of lithium iodide. Low self-discharge.					
Li-Ag_2CrO_4	Silver chromate	Lithium perchlorate solution	3.1/2.6 V	3.45 V		
	Very high reliability. Has a 2.6 V plateau after reaching certain percentage of discharge, provides early warning of impending discharge. Developed specifically for medical applications, eg. implanted pacemakers.					
Li-$Ag_2V_4O_{11}$, Li-SVO, Li-CSVO	Silver oxide+vanadium pentoxide (SVO)	lithium hexafluorophosphate or lithium hexafluoroarsenate in propylene carbonate with dimethoxyethane				
	Used in medical applications, eg. implantable defibrillators, neurostimulators, and drug infusion systems. Also projected for use in other electronics, eg. emergency locator transmitters. High energy density. Long shelf life. Capable of continuous operation at nominal temperature of 37 °C.[8] Two-stage discharge with a plateau. Output voltage decreasing proportionally to the degree of discharge. Resistant to abuse. Addition of copper(II) oxide to the cathode material results in the Li-CSVO variant.					
Li-CuO	Copper(II) oxide	Lithium Perchlorate dissolved in Dioxolane	1.5 V	2.4 V		
	Can operate up to 150 °C. Developed as a replacement of zinc-carbon and alkaline batteries. "Voltage up" problem, high difference between open-circuit and nominal voltage. Produced until mid-1990s, replaced by lithium-iron sulfide. Current use limited.					
Li-$Cu_4O(PO_4)_2$	Copper oxyphosphate					
	See Li-CuO					
Li-CuS	Copper sulfide		1.5 V			
Li-PbCuS	Lead sulfide and copper sulfide		1.5 V	2.2 V		
Li-FeS	Iron sulfide	Propylene carbonate, dioxolane, dimethoxyethane	1.5-1.2 V			
	"Lithium-iron", "Li/Fe". used as a replacement for alkaline batteries. See lithium — iron disulfide.					
Li-FeS_2	Iron disulfide	Propylene carbonate, dioxolane, dimethoxyethane	1.6-1.4 V	1.8 V	297 (http://data.energizer.com /PDFs/lithiuml91l92_appman.pdf)	
	"Lithium-iron", "Li/Fe". Used in Energizer lithium cells as a replacement for alkaline zinc-manganese chemistry. Called "voltage-compatible" lithiums. 2.5 times higher lifetime for high current discharge regime than alkaline batteries, better storage life in e.g. cars in summer due to lower self-discharge, 10 years storage time. FeS_2 is cheap. Some types rechargeable. Cathode often designed as a paste of iron sulfide powder mixed with powdered graphite. Variant is Li-$CuFeS_2$.					
Li-$Bi_2Pb_2O_5$	Lead bismuthate		1.5 V	1.8 V		
	Replacement of silver-oxide batteries, with higher energy density, lower tendency to leak, and better performance at higher temperatures.					
Li-Bi_2O_3	Bismuth trioxide		1.5 V	2.04 V		
Li-V_2O_5	Vanadium pentoxide		3.3/2.4 V	3.4 V	120/260	300/660
	Two discharge plateaus. Low-pressure. Rechargeable. Used in reserve batteries.					
Li-CoO_2	Cobalt dioxide					
Li-$CuCl_2$	Copper chloride					
	Rechargeable.					
Li/Al-MnO_2	Manganese dioxide					
	Rechargeable.					
Li/Al-V_2O_5	Vanadium pentoxide					
	Rechargeable.					
Li-ion	carbon	liquid				
	Rechargeable. See lithium ion battery.					
Li-poly	polymer	solid				
	Rechargeable. See lithium ion polymer battery.					