Electrical battery wikipedia

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They are typically lithium-ion batteries that are designed for high power-to-weight ratio and energy density. Compared to liquid fuels, most current battery technologies have much lower specific energy. This increases the weight of vehicles or reduces their range.

The battery makes up a significant portion of the cost and environmental impact of an electric vehicle. Growth in the industry has generated interest in securing ethical battery supply chains, which presents many challenges and has become an important geopolitical issue. Reduction of use of mined cobalt, which is also required in fossil fuel refining, has been a major goal of research. A number of new chemistries compete to displace Li-NMC with (see solid-state battery) performance above 800Wh/kg in laboratory testing.

As of December 2019[update], despite more reliance on recycled materials the cost of electric vehicle batteries has fallen 87% since 2010 on a per kilowatt-hour basis.[3]

Demand for EVBs exceeded 750 GWh in 2023.[1] EVBs have much higher capacities than automotive batteries used for starting, lighting, and ignition (SLI) in combustion cars. The average battery capacity of available EV models reached from 21 to 123 kWh in 2023 with an average of 80 kWh.[4][5]

150-220 kWh[10]165 kWh (sales avg 2023)[1]: 166

210 [11]90-160 kWh[10]135 kWh (sales avg 2023)[1]: 166

40-80$ (2034) [19][22]8-10$[23]

The Lithium iron phosphate battery has a shorter range but is cheaper, safer and more sustainable than the NMC battery.[28] It does not require the critical minerals manganese and cobalt.Since 2023, LFP has become the leading technology in China while the market share in Europe and North America remains lower than 10%.[1]: 86 LFP is the dominant type in grid energy storage.

The Sodium-ion battery completely avoids critical materials. [33] Due to the high availability of sodium which is a part of salt water, cost projections are low. In early 2024, various Chinese manufacturers began with the delivery of their first models.[2] Analysts see a high potential for this type especially for the use in small EVs, bikes and three-wheelers.[34]

Cathodes mostly use transition metal oxides, i.e. Lithium nickel manganese cobalt oxides (Li-NMC), or else Lithium metal phosphates, i.e. Lithium iron phosphates (LFP). The most popular material for anodes is

graphite. However, recently there have been a lot of companies started to make Si mixed anode (Sila Nanotech, ProLogium) and Li metal anode (Cuberg, Solid Power).