

Total investment cost of nickel manganese cobalt battery project in Zimbabwe

Can lithiated nickel manganese cobalt oxide be produced by co-precipitation?

A process model has been developed and used to study the production process of a common lithium-ion cathode material, lithiated nickel manganese cobalt oxide, using the co-precipitation method. The process was simulated for a plant producing 6500 kg day⁻¹.

How is lithium nickel manganese cobalt oxide powder produced?

Schematic of a process for the production of lithium nickel manganese cobalt oxide powder. The product stream, a slurry of solid precipitates in a solution, is phase separated, and then filtered and washed several times. The filtration may be done in a rotary vacuum filter followed by drying in a spray dryer.

Where is cobalt mined in the DRC?

Little of the cobalt mined in the DRC is processed domestically or on the continent. Instead, the raw material is shipped to China for refining. The journey between these mining and refining hubs is lengthy and expensive, particularly across the land segment in southern Africa.

How much will NMC cathode material cost?

This combination of changes indicates the possibility of the NMC cathode material price approaching \$20 per kg, or 19% less than the base case scenario. There are yet other cost-cutting measures that can drive the cost down even further. Fig. 6.

How is a lithium-nickel-manganese-cobalt oxide produced?

Fig. 1 shows a schematic of the process for the production of a lithium-nickel-manganese-cobalt oxide (NMC). The solution of sulfates is reacted with the carbonate solution in a continuous stirred tank reactor (CSTR) maintained at a desired pH with the addition of a hydroxide solution in a reactor maintained at 45-95 °C.

Given the importance of material costs in total battery costs, higher mineral prices could have a significant effect on achieving industry cost targets. For example, a doubling of lithium or nickel prices would induce a 6% increase in battery costs.



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Web: <https://solarcomplete.co.za/contact-us/>

Email: energystorage2000@gmail.com

WhatsApp: 8613816583346

