Cobalt scarcity lithium battery

Can cobalt-free batteries alleviate long-term supply risks?
We show that cobalt-free batteries and recycling progress can indeed significantly alleviate long-term cobalt supply risks. However,the cobalt supply shortage appears inevitable in the short- to medium-term (during 2028-2033),even under the most technologically optimistic scenario.

What is a cobalt battery?
Sources: Cobalt Institute (2023). According to the Cobalt Institute (2024a),Cobalt is a substantial metal for producing and developing electric vehicles (EV) batteries and wind power turbines. Modern EVs use battery chemistries,including the lithium-nickel-manganese-cobalt-oxide (NMC),often called cobalt battery,containing 10-20% cobalt.

Why is cobalt important for EV batteries?
Cobalt is crucial for efficiency and performancein EV batteries. It is expected that sales of EVs will increase by 30% worldwide in 2025,and Europe will lead in this growth. The production of wind power turbines is expected to grow because it will represent 35% of global electricity by 2050 (Cobalt Institute,2024b).

Can cobalt layered structures reduce battery costs?
Here we present a contrasting viewpoint. We show that cobalt's thermodynamic stability in layered structures is essential in enabling access to higher energy densities without sacrificing performance or safety,effectively lowering battery costsper kWh despite increasing raw material costs.

Can low-cobalt lithium-ion batteries be recycled?
Gaines,L. Profitable Recycling of Low-Cobalt Lithium-Ion Batteries Will Depend on New Process Developments. One Earth 1,413-415 (2019). Fan,E. et al. Sustainable Recycling Technology for Li-Ion Batteries and Beyond: Challenges and Future Prospects. Chem. Rev. 120,7020-7063 (2020).

Can battery technology reduce cobalt demand-supply imbalance?
While battery technology and recycling advancement are two widely acknowledged strategies for addressing such supply risks,the extent to which they will relieve global and regional cobalt demand-supply imbalance remains poorly understood.

Similar to cobalt, lithium shows a high risk of depletion before demand doubles, particularly under the OS scenario, which predicts higher demand growth. This reflects the ...

More than half of the world"s cobalt comes from the Democratic Republic of the Congo, which a2017 USGS report described as having a high risk for doing business and a substantial risk of civil war. The good news is that ...

Now, researchers in report evaluating an earth-abundant, carbon-based cathode material that could replace cobalt and other scarce and toxic metals without sacrificing lithium ...

Purpose Life cycle assessment (LCA) literature evaluating environmental burdens from lithium-ion battery (LIB) production facilities lacks an understanding of how ...

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BT4 includes a revolutionary breakthrough with "cobalt-free battery cathode technology" 72, such as lithium-air, lithium-sulfur 73, and solid-state batteries 74.

Lithium, cobalt, nickel, and graphite are essential raw materials for the adoption of electric vehicles (EVs) in line with climate targets, yet their supply chains could become important ...

We examine the relationship between electric vehicle battery chemistry and supply chain disruption vulnerability for four critical minerals: lithium, cobalt, nickel, and ...

Lithium deposits are found mostly in China and Bolivia. Two South Korean battery makers - Samsung SDI and LG Chem - have responded to the crisis by stepping up development of ...

July 16, 2020 -- Researchers say they"ve cracked the code to a cobalt-free high-energy lithium-ion battery, eliminating the cobalt and opening the door to reducing the ...

We show that cobalt"s thermodynamic stability in layered structures is essential in enabling access to higher energy densities without sacrificing performance or safety, ...

Challenges of cobalt in lithium-ion batteries. In many ways, cobalt is a victim of its own success. Driven by the increasing use of Li-ion batteries in EVs and consumer ...

The scarcity of cobalt supply must be addressed in transportation electrification. Driven by unrelenting market demands, especially in electric transportation, ...

Modern EVs use battery chemistries, including the lithium-nickel-manganese-cobalt-oxide (NMC), often called cobalt battery, containing 10-20% cobalt. Cobalt is crucial for ...

Among the raw resources required for LIB production, concerns have been raised over the supply chain of lithium and cobalt, which is closely linked with battery production.

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