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CRITICAL MINERALS

All the Right Elements Behind The Star of Electrochemistry

Part II : India's Hunt for Battery Minerals

The quantity and quality of domestic lithium resources discovered so far is significantly inferior to other world class deposits in key producing regions

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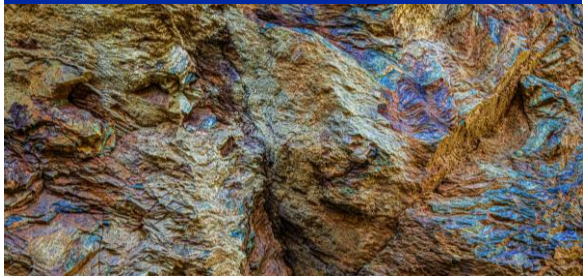

5 Cathode's Three Musketeers – Nickel, Manganese and Cobalt

OVERVIEW

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Following the lithium discoveries in Jammu & Kashmir and Chhattisgarh, the Government of India (GoI) has fast-tracked lithium exploration activities in other states as well, most notably in Rajasthan, Gujarat, Karnataka, Andhra Pradesh, Bihar, and Jharkhand. Public sector undertakings like NMDC have applied for prospecting and mining operation at the Amareshwara lithium block in Raichur, Karnataka. However, given the inferior grade of explored domestic ores, advancement in mineral beneficiation/processing technology remains critical for commercialisation of domestic mines

- Around 64% of the global lithium reserves are in the form of liquid brine deposits, with South America being a key producing region. Hard rock deposits account for around 26% of global lithium reserves, with Australia being the major producer. Only 9% of the global lithium reserves are in the form of clay deposits.
- The lithium mine being auctioned in Jammu & Kashmir (J&K) has clay deposits. While the technology for extracting lithium from hard rock and brine deposits has matured, the same for extracting lithium from clay deposits remains untested globally. Given these challenges, the J&K lithium block received less than three bids, resulting in the GoI re-auctioning the block.
- On the other hand, the lithium block being auctioned in Katghora, Chhattisgarh is a hard rock deposit. Katghora's ore belongs to a broader class of lithium-bearing minerals named lepidolite. China is a large producer of lithium from lepidolite ores. Therefore, competition to acquire the Katghora mine is likely to be much higher compared to the J&K block.
- Graphite accounts for ~40% of the weight of all critical minerals being used in a battery, and ~10% of its overall cost. Indian companies have outlined investments for setting up battery-grade synthetic graphite capacities. However, battery grade anode from natural graphite is expected to gain popularity globally in the future, and India lacks the technological capability in this area.
- While India does not have an operating nickel/cobalt mine, however, nickeliferous-limonite in the chromite overburden of Odisha's Sukinda Valley is the key domestic nickel/cobalt-bearing region. South-east Asian countries, like Indonesia, have perfected the technology of producing battery-grade nickel from limonite ores. India is yet to make some meaningful progress in this regard.
- Carbonate/ high-grade oxide ores remain the preferred starting material for making battery-grade manganese. However, most of India's manganese ore deposits are in the form of low to medium grade oxide ores being used in the steel industry. Though India would depend on manganese imports for making LIB cathodes, the metal is a notable omission from India's critical mineral list.

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Thank You!