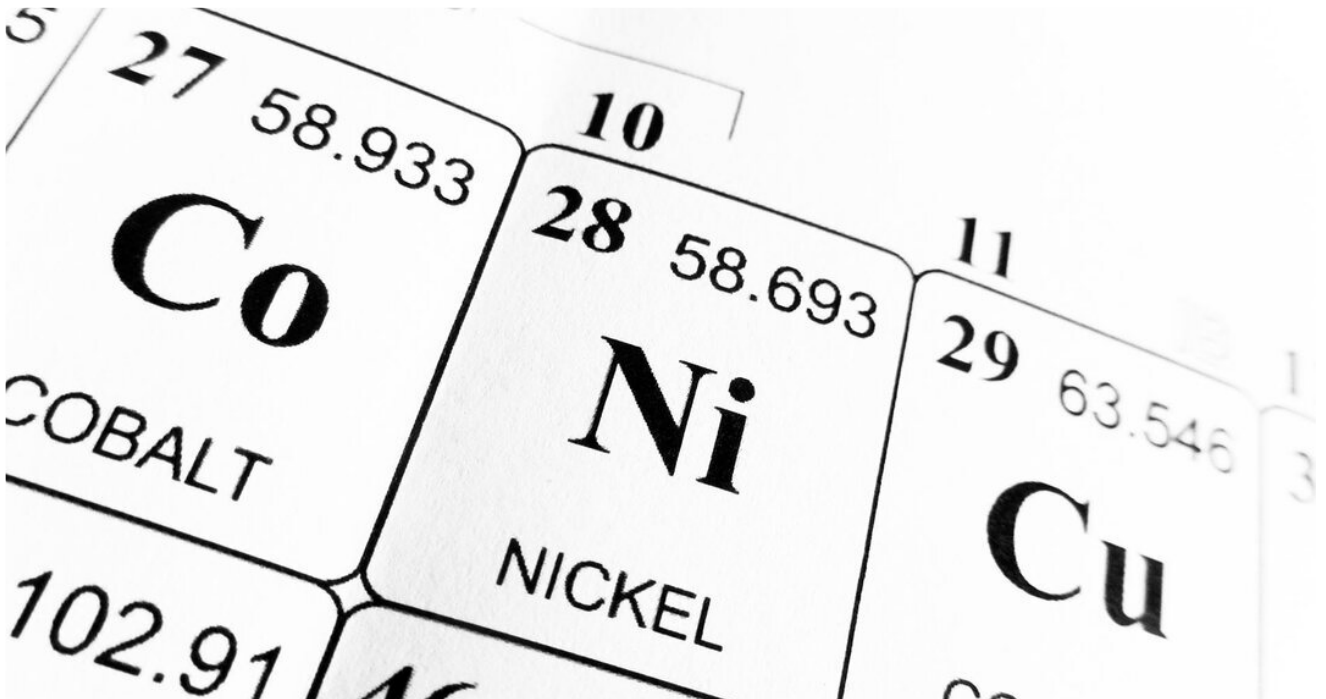


ENERGY MINERALS

High-grade nickel is an overlooked critical mineral

Concentrated supply, and a shortage of new sulphide projects, represent an underdiscussed risk

William Clarke



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Nickel is an unfashionable metal right now. Despite [a recent uptick in price](#), the metal is still languishing well below its 2022 highs, with the market heavily oversupplied by soaring Indonesia production.

Demand remains subdued, as Chinese steel production enters a downward trend. The battery sector, which was once expected to drive future demand, has shifted hard away from nickel-containing chemistries, and toward the cheaper LFPs, even as overall EV uptake has underwhelmed.

Unique properties

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Nickel has a number of key mechanical and chemical properties that make it very hard to replace. It is extremely ductile, allowing it to be drawn into fine wires, it is chemically stable, it is one of very few ferromagnetic metals, and it has unique catalytic properties.

A white paper seen by Mining Journal, co-authored by Upadrasta Ramamurty, Professor of Materials Science & Engineering at Nanyang Technological University in Singapore, and Arvinder Sood, chief executive of Hanover Square Capital, argues that this makes nickel key to the current technology boom.

"The increasing reliance on materials with tightly controlled purity and microstructure reflects a shift in technological development toward systems that operate at smaller length scales, higher energy densities, and greater functional complexity," the paper says.

"Materials such as ultra-high-purity nickel are no longer auxiliary components, but central elements that directly determine the feasibility, reliability, and scalability of advanced technological platforms."

In addition to its longstanding role as in superalloys, nickel has other properties particularly important to the defence sector, most notably its performance at high temperatures.

"Nickel-based materials are therefore widely used in radar systems, navigation electronics, shielding components, and precision sensing devices, where failure is unacceptable and maintenance is limited or impossible."

"Its ability to integrate mechanical strength, thermal stability, and electromagnetic functionality makes nickel one of the few materials capable of meeting the multi-physics demands of modern aerospace and defense systems."

"Overall, the expanding demand for nickel is not driven by incremental improvements in performance, but by the emergence of entire technological sectors that cannot function reliably without nickel-based materials."

Sulphide or laterite

Although nickel ores are relatively abundant and low cost material, the high purity market is inherently much more concentrated.

Nickel prices have been suppressed for years by heavy production out of Indonesia. However, that ramp up of production has been driven by the production of pig nickel from laterite ores, producing class two nickel suitable for stainless steel production.

Class one nickel, suitable for battery use, is primarily produced from sulphide deposits, which are rarer, and most existing projects are mature, with declining grades.

Although high pressure acid leaching can be used to produce battery grade nickel from laterite ores, the grade produced is usually around 99.5% purity, short of the 99.8% purity needed for class one specification, and the ultra-high-grade 99.9% or higher grades that perform best in high tech applications.

The flood of cheap nickel from Indonesia has stalled development of nickel projects elsewhere in the world, including sulphide projects, meaning an uptick in high-grade nickel demand could rapidly trigger a shortage.

Geopolitical risk

Geopolitics could also disrupt the nickel trade, particularly for the defence sector. The boom in Indonesia production has been primarily driven by Chinese investment, with offtakes by Chinese consumers. This means not only could supply for western defence use be by constricted by China, but some manufacturers in the EU and US could be unable to use nickel by sourcing regulations.

There are also growing signs that the Indonesian government is becoming unwilling to continue producing nickel while the market is so low, depleting and high grading their existing mines in an unsustainable way, as well as incurring significant environmental damage.

Indonesian regulators have [begun cutting quotas](#), triggering rising prices.

Although Indonesia and China currently control most of the nickel supply, much of the advanced metallurgical know-how still resides in Russia, adding another layer of geopolitical risk.

With the increasing focus on critical materials, it may be time for governments to look more seriously at their potentially vulnerability to any shock in high-grade nickel supply.

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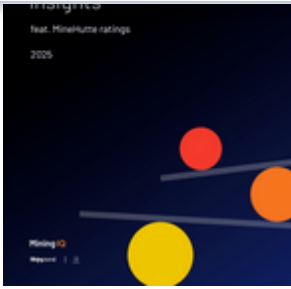
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