

## Occurrences of Co-rich pentlandite in serpentinized ultramafic rocks

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Cobalt is recovered mostly from magmatic Ni-Cu deposits, Ni laterite deposits and sandstone type Cu deposits. Significant amount of Co is also known to be accompanied in deep-sea manganese nodules. In magmatic Ni-Cu deposits, cobalt is hosted mainly in pentlandite (less than 1 wt % Co). However, we found Co-rich pentlandite in the Horoman and Nikanbetsu peridotite complexes, Hokkaido. We report occurrences of sulfide minerals in these rocks and discuss the origin of Co-rich pentlandite.

The Horoman peridotite complex is mainly comprised of lherzolite, harzburgite, and dunite. The Nikanbetsu complex consists of plagioclase lherzolite and harzburgite. Sulfide minerals in these complexes are dominated by pentlandite and accessory amounts of pyrrhotite, heazlewoodite, and bornite are accompanied. Occurrence of these minerals is divided into three types: 1) sulfide inclusion (less than 30 micron in size; enclosed in silicate minerals), 2) interstitial sulfide (20-300 micron; occurring in interstitial spaces of silicate minerals) and 3) sulfide (10-200 micron) in or contact with serpentine veinlet.

There are two-types of pentlandite in these peridotite samples from the view point of Co content. Co-poor (less than 1.0 wt %) pentlandite presents as single grain, coexists with pyrrhotite and is associated with silicate and/or oxide minerals. Co-rich pentlandite (more than 1.0 wt %; mainly 2-4 wt %) exists as single grain, coexists with heazlewoodite and occurs in serpentine veinlet. The Co-rich pentlandite occasionally contains more than 8 wt % Co. Their grain size is small (~10 micron).

These results suggest that pre-existing sulfide minerals (e.g., Co-poor pentlandite) and olivine (including trace amount of Co) have reacted with hydrothermal fluid to make serpentine. During this serpentinization, Co-rich pentlandite may recrystallize as small grain in serpentine veinlet.

Similar occurrences of Co-rich pentlandite have been reported in some previous works from the Ni-Cu deposit and PGE occurrences associated with serpentinization. Therefore, serpentinized ultramafic bodies are one of the future targets of Co resources.