New type of hydrotheraml Ni-Co deposit in Guangxi, China and its geological implication

HUAYING LIANG[1], JING WU[2], WENTIAN HUANG[3]

[1]CAS Key Lab of Mineralogy and Metallogeny

[2]CAS Key Lab of Mineralogy and Metallogeny

[3]College of Resource, Environment and Materials, Guangxi University, Nanning, Guangxi 530004, China

The world's nickel is gained from magmatic deposits associated genetically with mafic or ultramafic rocks and lateritic nickel deposits. Hydrothermal nickel deposits are relatively rare and most nickel deposits identified as hydorthermal type have direct link to mafic rocks[1]. The Longhua Ni-Co deposit occurred in Guangxi, southwest China is characterized by nickel-quartz-calcite vein hosted in faults in the Cambrian carbonaceous musdtone and siltstone. No mafic-ultramafic rocks cropout in the district. The beggest vein (>100 m long and 50-80 cm wide) contains high concentration of Ni (at an average content of 17.55%) and Co (~ 1.55%). The main ore minerals are nicolite and small amount of cobaltite, gersdorffite, pentlandite, parkerite, cahlcopyrite, pyrite and arsenopyrite. Gangle minerals include quartz, calcite, chalcedony and sericite. Homogeneous temperatures of the primary fluid inclusions in mineralized quartz range mainly from 150°C to 182°C, with salinities of 1.2 to 8.8 wt.% NaCl equivalent; The ore forming fluids are located near the meteoric line on the plot of δD(‰) vs. $\delta^{18}O_{H2O}$(‰); The Longhua Ni-Co deposit has nicolite Re-Os isochrong age of about 449 Ma. The above geochemical features of ore forming fluid and mineralization age indicate that the Longhua Ni-Co deposit was formed during Caledonian orogeny and owe its origin to low temperature circulated meteoric water. The Longhua Ni-Co deposit does not show direct genetical link to mafic-ultramafic rocks and differs from the identified hydrothermal nickel deposits in ore forming processes, suggesting it could be classified as a new type of hydrothermal nickel deposits. It is common assumpiton that nickel is not easily remobilized by low temperature hydrothermal fluids. The discovery of the Longhua nickel ore shoot indicates that nickel could be easily remobilized by low temperature fluids in some special fluids. Based on that the deposit is rich in arsnic and poor in sulfur, it is suggested that nickel is easy remobilized by arsenic-bearing hydrothermal fluids.

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[1] González-Álvarez I et al. (2013) Ore Geol Rev, 52, 1-3