Paragenetic associations of Pb-Zn, Au-Ag and Mo mineralizations in Qingchengzi orefield

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Qingchengzi orefield in Liaoning province is an important large-scale Pb-Zn-Au-Ag-Mo polymetallic orefield which clusters several Pb-Zn deposits, Au-Ag deposits and Mo deposit.The paragenetic relationships between different metals are unsettled.

Constrained by mineralized granite porphyry and cross-cutting lamprophyre dykes through relationships, Pb-Zn mineralization age is settled at 227-233Ma, coeval with the Triassic magmatic activities. The Re-Os age of Mo mineralization is 164.8±6.4 Ma which is consistent with emplacement age of Yaojiagou granite(165.7±1.3Ma) . This indicates the Mo mineralization is genetically related to Jurassic magmatic activities. As indicated by Pb isotope analysis, Ag ores have distinctively enriched Pb isotopes compared to Pb-Zn ores. And Ag ores show linear correlation with Jurassic intrusion and schist, implying their links with Jurassic magmatism while Pb-Zn ores show linear correlation with Triassic magmatic rocks and schist. Therefore, we infer Au-Ag and Mo mineralization are both associated with Jurassic magmatic activities and together they form the combination of skarn Mo mineralization with epithermal Au-Ag mineralization of porphyry system. On the other hand, The Pb-Zn mineralization is genetically linked to Triassic magmatic activities.