Types, Characteristics and Metallogenic Geodynamic Evolution of the Paleozoic Polymetallic Copper-Gold Deposits in the Western Tianshan Mountains

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Abstract

Based on ore-bearing host rocks and mineralization patterns of copper-gold deposits in the western Tianshan Mountains, copper deposits can be classified into three types, i.e. porphyry copper deposits, skarn copper deposits and volcanogene hydrothermal copper deposits; gold deposits can be grouped into two types, i.e. epithermal gold deposits and porphyry gold deposits. There exist three E-W-trending mineralization zones in the western Tianshan Mountains: ① the Alataw-Kokirqin copper polymetallic mineralization zone, which comprises porphyry-skarn copper deposits related to the Mesoproterozoic limestone and Mid-Hercynian hypabyssal medium-acidic intrusive rocks, porphyry copper deposits connected with Mid-Hercynian hypabyssal acidic intrusive rocks; ② Boluokeluo gold polymetallic mineralization zone, which consists of epithermal gold deposits related to Lower Carboniferous medium-acidic pyroclastic rock and medium-basic lava, porphyry gold deposits connected with Mid-Hercynian hypabyssal medium-acidic intrusive rocks; ③Awulale copper-silver polymetallic mineralization zone, which is composed of volcanogene hydrothermal copper deposits related to Permian continental medium-basic volcanic rocks, porphyry copper deposits connected with Late-Hercynian hypabyssal medium-acidic intrusive rocks. Based on discussion on the Paleozoic geodynamic evolution in the western Tianshan Mountains, three mineralization zones mentioned above are correspondent with the Alataw-Kokirqin Late Paleozoic island arc zone, the Boluokeluo Late Paleozoic back-arc basin and the Awulale Permian rift zone respectively.

Key words: copper-gold deposits; ore deposit characteristics; metallogenic geodynamics; western Tianshan Mountains; Xinjiang

辽宁五龙金矿成矿流体地球化学研究及 Rb-Sr 同位素测年

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在详细矿床地质研究的基础上, 将五龙金矿划分为三个主要的成矿阶段。以石英中的流体包裹体为研究对象, 分别研究了三个成矿阶段中包裹体的相态变化、成分变化、温压变化、流体演化。矿石、岩石的 Pb 同位素组成和流体包裹体的 Rb-Sr 同位素测年。研究表明: 流体中除 Na^+ 离子随成矿演化有明显降低外, K^+ 以及其它阳离子和气体组分(H_2、CO、CH_4、CO_2)含量随成矿演化略有升高, 并且随着成矿演化温度和盐度呈脉动性变化。氢氧同位素反演计算表明: 成矿第一阶段流体为岩浆水, 第二阶段以岩浆水为主, 有少量的大气降水参与, 演化到成矿的最后阶段已完全成为大气降水。铅同位素组成表明, 矿石铅的线性组成显示了二元混合铅的特点, 但矿石铅与三股流花岗岩的铅有一定的亲缘关系, 推测成矿物质和岩浆主体上来自深部的同一岩浆源区。流体包裹体 Rb-Sr 法成矿年龄为112.2±3.2Ma, 成矿为燕山期。

东营凹陷沙河街组湖相烃源岩的组合特征

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