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阿尔泰山南缘麦兹火山-沉积盆地东部萨吾斯铅锌矿床成因探讨

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摘要:

萨吾斯铅锌矿床位于阿尔泰山南缘麦兹火山-沉积盆地东部,本研究首次阐述了该矿床的地质地球化学特征及其成因。该矿床赋存于下泥盆统康布铁堡组上亚组,以层状黑云石榴铁闪石矽卡岩、变流纹质晶屑凝灰岩、流纹斑岩、少量不纯大理岩为主要赋矿岩石;矿化与两类矽卡岩密切相关;表现出矽卡岩矿床与火山喷流沉积矿床的双重特征。野外地质考察、岩石薄片观察以及大量的矿物化学成分分析等表明,矽卡岩主要由锰铝榴石、铁铝榴石、铁闪石、黑云母和少量铁锰钙质碳酸盐矿物组成,其原岩为凝灰岩及其所夹的铁锰钙质碳酸盐条带;二者相互渗透交代的尺度局限于几厘米,与接触交代成因矽卡岩形成鲜明对比。综合上述,萨吾斯铅锌矿床不属接触交代矽卡岩型,而与火山喷流-沉积作用密切相关。与金属硫化物共生的石英脉氧同位素及其包裹体碳、氢同位素组成表明,成矿流体由岩浆水与表层流体混合而成。因此,萨吾斯铅锌硫化物矿床为火山喷流成因,这为阿尔泰山南缘块状硫化物矿床的成因研究和找矿勘探部署提供重要理论依据。

英文摘要:

Sawusi lead-zinc sulfide deposit is located in the eastern portion of the Maizi volcanic-sedimentary basin along the southern margin of the Altay Mountains. This study elaborates the geological and geochemical characteristics of the deposit in an attempt to tackle its genesis for the first time. Host rock of the deposit consists of stratiform garnet-biotite and grunerite skarns, meta-rhyolitic crystalloclastic tuff, rhyolite-porphyry and a small amount of impure marble within the upper section of the Early Devonian Kangbutiebao Formation. In brief, the Sawusi deposit bears dual characteristics of both volcanic-exhalative sedimentary deposit and skarn deposit. This study performed geological investigation, petrographic observation and detailed electron microprobe analyses on typical minerals. Our results show that the stratiform skarn of the Sawusi consists mainly of spessartine, almandine, grunerite, biotite, and Fe-Mn-Ca carbonate minerals, and has been formed through mutual infiltrative-metasomatism between tuff and thin, intercalated sedimentary bands of Fe-Mn calcic carbonates. The scale of metasomatism is limited to a few centimeters. Carbon, hydrogen and oxygen isotope compositions show that the ore-forming fluid involves two components of magmatic fluid and surface water. In conclusion, skarns in the Sawusi deposit occur as stratiform, strata-bounded, consist of the Mn-rich mineral assemblage, and have been formed through centimeter-scale mutual infiltrative-metasomatism. These characteristics indicate a volcanic exhalative-sedimentary genesis instead of typical contact metasomatic origin. This study has broad relevance to the massive sulfide deposits along the southern Altay Mountains in both genesis study and ore prospecting.

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