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南天山萨瓦亚尔顿金矿床稀土微量元素特征及其成因意义

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摘要:

萨瓦亚尔顿金矿位于新疆乌恰县的南天山构造带中,是我国20世纪90年代发现的第一例“穆龙套型”金矿。矿床形成于印支期,矿化与石英脉密切相关,显示了与穆龙套金矿的相似性。成矿流体演化经历了早期高温无矿化石英阶段,中期中低温矿化石英阶段,晚期低温碳酸盐脉阶段。早期无矿石英的稀土及微量元素含量均低于矿化石英。矿化石英包体中流体的稀土元素配分模式显示较一致的轻稀土富集和Eu正异常,指示流体中较高的钙离子或相对还原环境;流体中Pb含量较高,而蚀变强烈的围岩则显示出明显的Ca和Pb流失,这表明成矿流体可能部分来源于与围岩发生交代作用的蚀变流体,矿质沉淀可能与流体混合作用相关。早期石英包体中流体的稀土和微量元素含量较低则指示早期阶段可能未发生流体混合。萨瓦亚尔顿IV号矿脉为最大矿带,其含矿石英包体中流体微量元素一般高于其它矿脉石英,可能显示较强的流体混合及成矿作用。II号矿脉在流体稀土及微量元素含量上显示与IV脉更为相似。萨瓦亚尔顿金矿稀土微量元素研究表明围岩组分可能为成矿流体主要来源之一,而流体混合则为成矿重要机制,这与前期流体包裹体及同位素研究结论一致,也符合造山型金矿的一般特征。

英文摘要:

The Sawayaerdun gold deposit in Wuqia, Xinjiang was discovered in the early 1990' s and is considered the first Muruntau-type gold deposit in the Chinese Tianshan. Gold mineralization occurred in Triassic and associated with quartz veins, showing similarities to the Muruntau gold deposit. Three major hydrothermal events can be identified at Sawayaerdun: An early barren quartz vein stage, middle stage quartz veins with pyrite and mineralization and late carbonate (-quartz) veins. The contents of rare earth elements (REE) and trace elements in early barren quartz veins are lower than those of mineralized quartz. REE distribution patterns of the fluids trapped in mineralized quartz are generally consistent with LREE enrichment and Eu positive anomaly, which probably indicates high Ca in fluids or a relatively reduced environment. High Pb in ore-forming fluids and leaching of Ca and Pb from the host rock may suggest the reaction between fluids and host rock. The precipitation of metals may be associated with fluid mixing, which is not identified in early barren quartz due to the low contents of REE and trace elements. Fluids in mineralized quartz from the largest IV ore zone have higher REE and trace elements than those of other ore zones, probably indicating a stronger fluid mixing. The II ore zone shows more similarities to zone IV than others. Characteristics of REE and trace elements of the Sawayaerdun gold deposit indicate that host rock is an important source for ore-forming fluids and fluid mixing played a critical role during mineralization, which is consistent with previous fluid inclusion and isotope studies and comparable with the general characteristics of orogenic gold deposits.

关键词: [稀土及微量元素](#) [成矿流体](#) [流体成分](#) [流体混合](#) [造山型金矿](#)

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