甘肃-新疆北山成矿带典型矿床成矿流体研究进展及成矿作用探讨

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中文摘要:北山地区典型金矿床中常见H2O溶液包裹体、富CO2多相包裹体和富CH4包裹体, 成矿流体的挥发分主要为H2O-CO2-CH4。包裹体测温结果显示各类型金矿经历了多期活动, 属于中高-中低温、中-低盐度流体成矿。CO2和CH4的δ13C值表明前者来自岩浆脱气, 后者来自围岩地层。氢、氧同位素组成指示成矿流体主要来源于岩浆流体和大气降水和地下水, 但部分矿床渗入了少量变质水。大部分矿床成矿物质来源具有多元性, 壳源和幔源均存在, 根据成矿物理化学条件壳幔成分有差别。金属硫化物具岩浆硫和地层硫混合特点, 受赋矿围岩控制; 铅同位素组成反映主要来源于造山带或成熟弧环境, 上地壳铅也不同程度地提供了成矿物质。综合北山地区典型金矿床的包裹体测温、成矿流体组分以及成矿流体H、O同位素和成矿物质的S、Pb同位素特征, 我们认为各类型金矿床具有不同的成因控制因素。马庄山、南金山、金窝子和210矿床都以不同组成流体混合作用控制成矿; 小西弓、厂及老金厂金矿成矿早期, 热液流体围绕着岩浆侵入体作对流循环, 成矿晚期, 流体在围岩中作大面积的渗透淋滤。

中文关键词:北山地区 成矿流体 成矿物质 混合作用 沸腾作用

Characteristics, Derivation and Evolution of Ore-Forming Fluids in Typical Gold Deposits of t Beishan Metallogenic Belt in Gansu-Xinjiang Border Area

Abstract:Quartz and other sulfide minerals in typical gold deposits of Beishan area contain abundant aqueous, CO2-rich and CH4-rich inclusions, suggesting that the main volatiles in the ore-forming fluids are of the H2O-CO2-CH4 system. Microthermometic measurements of fluid inclusions demonstrate that all types of gold deposits have experienced multi-period and multi-stage hydrothermal activities, thus belonging to mineralization of middle-low salinity and meso-hypothermal as well as meso-epithermal fluids. δ13C values of CO2 and CH4 reveal that CO?2 and CH4 of the ore-forming fluids were respectively degassed from the magma and leached from the carbonaceous country rocks. Hydrogen and oxygen isotopic compositions indicate that the ore-forming fluids were initially magmatic fluids and subsequently mixed with large amounts of meteoric water derived from groundwater. S isotope compositions of ore sulfides reflect that besides the contribution of the country rocks, most sulfur were provided mainly b the country rocks via fluid infiltration and leaching. Lead isotope compositions of ore sulfides suggest multiple sources for the metals that range from the crust to the mantle, certain amounts derived from the orogen or island arc.Data from microthermometric measurements of fluid inclusions, fluid components, carbon, hydrogen and oxygen isot of ore-forming fluids, and sulfur and lead isotopes of ore-forming materials in typical gold deposits together show that different types of gold deposits have varies geneses. I Mazhuangshan, Nanjinshan, Jinwozi and No. 210 gold deposits, mixing of different ore-forming fluids caused metal precipitation. In Xiaoxigong, Xinjinchang and Laojinchan gold deposits, however, hydrothermal fluids experienced convectional circulation around the magmatic intrusion at the early ore-forming stage and permeated into the countr rocks at the late stage.