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新疆阿尔泰山南缘乌吐布拉克铁矿成矿机制研究

作者	单位	E-mail
<a href="#">张志欣</a>	<a href="#">中国地质科学院矿产资源研究所,国土资源部成矿作用与资源评价重点实验室,北京 100037;</a> <a href="#">中国科学院新疆生态与地理研究所,新疆矿产资源研究中心,乌鲁木齐 830011</a>	<a href="mailto:ddzhangzhixin@163.com">ddzhangzhixin@163.com</a>
<a href="#">杨富全</a>	<a href="#">中国地质科学院矿产资源研究所,国土资源部成矿作用与资源评价重点实验室,北京 100037</a>	
<a href="#">刘锋</a>	<a href="#">中国地质科学院矿产资源研究所,国土资源部成矿作用与资源评价重点实验室,北京 100037</a>	
<a href="#">柴凤梅</a>	<a href="#">新疆大学地质与勘查工程学院,乌鲁木齐 830046</a>	
<a href="#">耿新霞</a>	<a href="#">中国地质科学院矿产资源研究所,国土资源部成矿作用与资源评价重点实验室,北京 100037</a>	
<a href="#">欧阳刘进</a>	<a href="#">新疆大学地质与勘查工程学院,乌鲁木齐 830046</a>	
<a href="#">姜丽萍</a>	<a href="#">新疆大学地质与勘查工程学院,乌鲁木齐 830046</a>	
<a href="#">吕书君</a>	<a href="#">中国地质大学地球科学与资源学院,北京 100083</a>	

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摘要:

乌吐布拉克中型铁矿床赋存于上志留统-下泥盆统康布铁堡组变质火山-沉积岩系中,矿体呈似层状、透镜状,矿体及其周围发育大量矽卡岩矿物组合。早期矽卡岩阶段包裹体均一温度为 $256\sim 534^{\circ}\text{C}$ ,盐度为 $11.90\%\sim >73.96\%$  NaCleqv,密度为 $0.56\sim 0.96\text{g}/\text{cm}^3$ ,表明成矿流体为高-中温、高-中盐度、高-中密度的NaCl-H<sub>2</sub>O体系;退化蚀变阶段包裹体均一温度为 $188\sim 313^{\circ}\text{C}$ ,盐度为 $12.30\%\sim >39.76\%$  NaCleqv,密度为 $0.83\sim 1.05\text{g}/\text{cm}^3$ ,表明成矿流体为中温、中-低盐度、高-中密度的NaCl-H<sub>2</sub>O体系。石英-硫化物-碳酸盐阶段包裹体均一温度为 $162\sim 320^{\circ}\text{C}$ ,盐度为 $2.90\%\sim 15.57\%$  NaCleqv,密度为 $0.70\sim 1.02\text{g}/\text{cm}^3$ ,成矿流体为NaCl-H<sub>2</sub>O-CO<sub>2</sub>±CH<sub>4</sub>或N<sub>2</sub>型流体。石榴子石氢氧同位素表明早期矽卡岩阶段成矿流体主要来源于岩浆水,石英及方解石的氢氧同位素暗示石英-硫化物-碳酸盐阶段存在低温、低盐度的大气降水的加入。方解石的碳、氧同位素表明流体中碳主要来自深部岩浆。硫化物硫同位素表明硫来源于岩浆硫。成矿机制可能为早三叠世岩浆热液交代上志留-下泥盆统康布铁堡组火山岩形成矽卡岩矿物,在矽卡岩退化蚀变过程中形成铁矿体。

英文摘要:

The medium sized Wutubulake iron deposit is hosted in the metamorphosed volcanoclastic-sedimentary sequence of the Upper Silurian-Lower Devonian Kangbutiebao Formation, the orebodies occur as stratoids or lenses, which are surrounded by the skarn minerals. Homogenization temperature of fluid inclusions in early skarn stage vary from  $256$  to  $534^{\circ}\text{C}$ , salinity range from  $11.90\%$  to  $>73.96\%$  NaCleqv, density range from  $0.56$  to  $0.96\text{g}/\text{cm}^3$ , all of these showed that the ore-forming fluid in early skarn stage are high-middle temperature, high-middle salinity and high-middle density, which is belong to NaCl-H<sub>2</sub>O system; Homogenization temperature of fluid inclusions in retrograde alteration stage vary from  $188$  to  $313^{\circ}\text{C}$ , salinity range from  $12.30\%$  to  $39.76\%$  NaCleqv, density range from  $0.83$  to  $1.05\text{g}/\text{cm}^3$ , which have the characteristic of middle temperature, middle-low salinity and high-middle density, also belong to NaCl-H<sub>2</sub>O system. In quartz-sulfide-carbonate stage, the ore-forming fluid is NaCl-H<sub>2</sub>O-CO<sub>2</sub>±CH<sub>4</sub> or N<sub>2</sub> type fluid. Homogenization temperature of fluid inclusions in this stage vary from  $162$  to  $320^{\circ}\text{C}$ , salinity range from  $2.90\%$  to  $15.57\%$  NaCleqv, density range from  $0.70$  to  $1.02\text{g}/\text{cm}^3$ . The oxygen and hydrogen isotopic data of garnet suggest that the ore-forming fluid in early skarn stage is mainly derived from magmatic water, but the oxygen and hydrogen isotopic characteristic of quartz and calcite imply that the ore-forming fluid in quartz-sulfide-carbonate stage is derived from mixing of magmatic water and low temperature and salinity meteoric water. The carbon and oxygen isotopic data of calcite suggest that the carbon in the fluid is mainly derived from the deep-seated magma, and the sulfide isotopic data show that the characteristic magma sulfur. We hold that the ore-forming mechanism is closely related to the retrogressive metamorphism of the skarn minerals, which might have resulted from the Early Triassic magmatic hydrothermal interaction with volcanic of the Upper Silurian-Lower Devonian Kangbutiebao Formation.

关键词: 矽卡岩 流体包裹体 稳定同位素 成矿机制 乌吐布拉克 新疆

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主办单位：中国矿物岩石地球化学学会

单位地址：北京9825信箱/北京朝阳区北土城西路19号

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