

王运,陈衍景,马宏卫,徐友灵. 2009. 河南省商城县汤家坪钼矿床地质和流体包裹体研究. 岩石学报, 25(2): 468-480

河南省商城县汤家坪钼矿床地质和流体包裹体研究

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基金项目: 国家973项目(2006CB403508)、国家自然科学基金项目(40730421和40425006)以及国家危机矿山办公室科研项目、科学院百人计划项目

摘要:

河南省商城县汤家坪钼矿床产于大别造山带,属于陆-陆碰撞体制的斑岩型矿床。其流体成矿过程可以分为早、中、晚3个阶段,分别以石英-钾长石-磁铁矿-辉钼矿-黄铁矿、石英-多金属硫化物和石英-碳酸盐±黄铁矿组合为标志。石英中可见水溶液包裹体、CO₂-H₂O型包裹体、纯CO₂包裹体和含子晶多相包裹体,但晚阶段石英中只有水溶液包裹体。早阶段和中阶段还发育特殊的含子晶的CO₂包裹体,这在以往的斑岩型矿床中鲜有报道。早阶段流体包裹体均一温度>375℃,盐度最高可达62.10%NaCl_{eqv},包裹体内含大量指示氧化条件的赤铁矿子晶以及一些石盐、钾盐、黄铜矿、脆硫锑铅矿子晶。中阶段包裹体均一温度集中在235~335℃,盐度为1.06%~45.87%NaCl_{eqv}。除石盐、钾盐子晶外,还含大量黄铜矿、脆硫锑铅矿子晶,表明中阶段还原性较强。晚阶段流体包裹体均一温度集中在115~195℃,盐度较低,介于1.91%~9.98%NaCl_{eqv}。中阶段强烈的流体沸腾作用是导致成矿物质快速沉淀的重要机制。总之,初始成矿流体为岩浆热液,以高温、高盐度、高氧化性、富CO₂、高金属元素含量为特征;中阶段流体发生沸腾,导致CO₂逃逸,氧化性降低,成矿物质快速沉淀;晚阶段流体以低温、低盐度、无子晶、贫CO₂为特征,属于大气降水热液。汤家坪钼矿床发育特殊的含子晶的CO₂包裹体,可作为大陆碰撞造山带产出富含CO₂的斑岩成矿系统的典型实例。

英文摘要:

The Tangjiaping Mo deposit in Shangcheng County, Henan Province is located in Dabie orogenic belt. It is a porphyry ore-system developed in continent-continent collision regime. The hydrothermal ore-forming process includes the early, middle and late stages, characterized by mineral assemblages of quartz-potash feldspar-magnetite-molybdenite-pyrite, quartz-polymetallic sulfides and quartz-carbonate±pyrite, respectively. In quartz, four types of fluid inclusions can be observed. They are NaCl-H₂O, CO₂-H₂O, pure CO₂ and daughter mineral-bearing fluid inclusions in composition. However, the late-stage quartz contains only FIs of NaCl-H₂O composition. The daughter mineral-bearing CO₂-H₂O FIs can be observed in the early and middle stage quartz, which were rarely reported in previous studies of porphyry deposits. Homogeneous temperatures of early stage FIs mainly above 375℃, with the salinities up to 62.10%NaCl_{eqv}. Hematite daughter-minerals, which possibly represent an oxidizing environment, together with halite, sylvite, chalcocopyrite, jamesonite are recognized in fluid inclusions of this stage. The homogeneous temperatures of fluid inclusions in middle stage are mainly ranging from 235 to 335℃, with fluid salinities ranging from 1.06% to 45.87%NaCl_{eqv}. In middle stage, besides halite and sylvite daughter minerals, there are many chalcocopyrite and jamesonite daughter minerals which represent a reducing environment. Fluid inclusions of the late stage display homogeneous temperatures of 115 to 195℃, with fluid salinities ranging from 1.91% to 9.98%NaCl_{eqv}. Strong fluid-boiling in the middle stage was recognized as an important mechanism for precipitation of ore-forming materials. In a word, the initial ore-fluids were magmatic in origin and characterized by high temperature, high salinity, high oxidibility, high content of CO₂ and metallic elements. The fluid boiling and release of CO₂ in middle stage resulted in rapid precipitation of ore-forming materials. The late stage fluids, characterized by low temperature, low salinity, lack of daughter mineral and poor in CO₂, could be sourced from meteoric water. Extraordinary daughter mineral-bearing CO₂ fluid inclusions may be recognized as a representative sign of porphyry ore systems developed in continental collision regime.

关键词: [汤家坪钼矿床](#) [斑岩型钼矿床](#) [矿床地质](#) [流体包裹体](#) [大别造山带](#)

投稿时间: 2008-10-09 最后修改时间: 2008-12-06

黔ICP备07002071号-2

主办单位：中国矿物岩石地球化学学会

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