Ore-forming fluids, stable isotope and mineralizing age of the Hubazhuang gold deposit in the Jiaodong Peninsula, eastern China

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Hubazhuang gold deposit is a typical pyrite- and polymetallic sulphide-quartz lode deposit in the Muping-Rushan gold belt of Jiaodong Peninsula, and gold occurs mainly in pyrite- and polymetallic sulphide-quartz vein. Fluid inclusion studies show that in the different altered wall rocks and gold ores of different mineralization stages there are three major types of fluid inclusions: CO_2-rich fluid inclusions, CO_2-H_2O fluid inclusions and aqueous fluid inclusions. CO_2-rich fluid inclusions occur mainly in the early mineralizing stage (stage I); the main mineralizing stage (stage II) contains CO_2-H_2O fluid inclusions and aqueous fluid inclusions; there are only the aqueous fluid inclusions in the late mineralizing stage (stage III). Microthermometric study shows that in stage the homogenization temperatures and salinities range respectively from 260 to 360 and 1.02 to 7.38 % NaCl, and stage the range is 180 to 269 and 1.74 to 13.07 % NaCl, then stage III is 104 to 189 and 0.88 to 8.81 % NaCl. The fluids in stage I were medium-high temperature, volatile-rich and low salinity fluid system. During stage II the fluids evolved to a CO_2-H_2O-NaCl fluid system with medium-low temperature, low volatile and wide range of salinity. Finally in stage the temperature, salinity and volatile content all decreased. The study of hydrogen and oxygen stable isotope indicates that in stage the mineralizing fluids were mainly magmatic water, but during stage II the mineralizing fluids were mixed fluids which originated mainly from meteoric water. Sulphur isotope of the main mineralizing stage reveals that ore-forming materials may mainly come from the wall rocks which were leached by the meteoric water. Temperature decline and fluid immiscibility are the main reason of the gold precipitation. Rb-Sr isochron of sericite in altered rocks shows that the mineralizing age of Hubazhuang gold deposit is 126.5±5.6Ma.