Fluid inclusion study and its implication for ore genesis of the Dahu Au(Mo) deposit from the Xiaoqinling gold belt

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The Xiaoqinling gold belt, located on the southern margin of the North China Craton, is the second largest gold producing center in China. The Dahu deposit in the northern part of Xiaoqinling gold belt is a large scale Au(Mo) deposit. It is a typical vein type gold deposit controlled by near NE-trending brittle-ductile shear zones hosted in the Taihua Group basement rocks. According to crosscutting relationships and mineral assemblages, the mineralization can be divided into three stages. Four types of fluid inclusions in quartz of the Dahu Au(Mo) deposit are identified as CO_2-H_2O, pure CO_2, H_2O-solution and a few daughter mineral-bearing fluid inclusions (S type) are identified based on petrographic observation, fluid inclusion micro-thermometric and micro Raman spectroscopic analysis. The early-stage quartz contains CO_2-H_2O inclusions with homogenization temperatures ranging from 209.3 to 414.3°C, salinities from 1.4% to 12.8% NaCleqv. The middle-stage quartz contains all four type fluid inclusions, of which CO_2-H_2O and H_2O-solution inclusions yield homogenization temperatures of 201.3-380.7°C, 202.7-333.6°C respectively, salinities of 0.6%-12.5%, 4.4%-12.2% respectively. Trapping pressures estimated from CO_2-H_2O inclusions are 140.0 to 445.9 Mpa and 112.2 to 346.8 Mpa for early and middle stage, respectively. In the late-stage quartz only H_2O-solution inclusions are observed with homogenization temperatures ranging from 156.9 to 251.3°C. In brief, the characteristics of the ore fluids in the early and middle stages is meso- to hypothermal, CO_2-rich and low salinity, which are consistent with the properties of metamorphic fluids. Late stage fluid inclusions are low salinity, CO_2-poor and low temperature, indicating meteoric water inflow. Fluid boiling and mixing caused fluid system evolved from CO_2-rich to CO_2-poor, from metamorphic to meteoric and quick precipitation of gold and molybdenum. Integrating with isotopic data obtained by other researchers, the Dahu gold deposit was an orogenic-type mineralization system formed during the collision between North China and Yangtze Cratons[1].

[1] Chen (2006) *Geol. China* **33**, 1181-1196 (in Chinese with abstract).