Fluid inclusion study and metallogenic mechanism of Xiejiagou gold deposit, Shandong province, China

CHEN Lei[1], DING DongSheng[2]

(1 MLR Laboratory of Metallogeny and Mineral Assessment, Institute of Mineral Resources, Chinese Academy of Geological Sciences, Beijing, 100037, China;

2 School of Resources and Civil Engineering, Northeastern University, shenyang110819, China)

The Xiejiagou gold deposit is one of numerous gold deposits in Jiaodong peninsula. Tectonically, it is located in the southwestern margin of Jiaodong uplift and between Jiaojia fault zone and Zhaoyuan-Pingdu fault zone. Ore bodies are mainly controlled by NNE and NNW trending fracture structure. Gold mineralization is hosted in Mesozoic Linglong granite and consists of auriferous quartz veins and subordinate disseminated ores in the vein-proximal alteration zone. Ore-related hydrothermal alteration is dominated by sericite+quartz+sulfide assemblages close to gold veins, and K-feldspar, chlorite and carbonate alteration. Pyrite is the predominant sulfide mineral, locally coexisting with minor amounts of chalcopyrite, sphalerite, and galena. Gold occurs mostly as free gold and electrum enclosed in or filling microfactures of pyrite and quartz and is also present in equilibrium with hessite and argentite.

Fluid inclusion studies suggest that gold was deposited at intermediate temperatures (226~331 ℃) from H_2O-CO_2-NaCl±CH_4 fluids with moderate salinity(4.87~10.29 wt% NaCl equiv). $\delta^{34}S$ values of pyrite range mainly from 5.9 to 7.8‰, which is close to or slightly less than typical gold deposits in Jiaodong peninsula, suggesting the ore-forming material of these gold deposits may come from the same reservoir. Comparing to other deposits in Jiaodong peninsula, the hydrogen and oxygen isotopic composition shows the ore-forming fluid of Xiejiagou gold deposit is mainly from magmatic water and accompanied with participation of meteoric water. The ore-forming fluids of main mineralization stage exhibit feature of multiple sources. Temperature decrease and fluid immiscibility are the important mechanisms for deposition and enrichment of gold and other mineralizing elements.