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Metallogenic mechanism of Ankou gold deposit in the Qixia-Penglai metallogenic belt, Jiaodong, China Constraints from H-O isotopes and in-suit trace element of pyrite

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Jiaodong Peninsula is the largest gold producing area in China. Among the three gold metallogenic belts, the Qixia-Penglai metallogenic belt is relatively poorly studied. Taking Ankou gold deposit in Qixia-Penglai metallogenic belt as the research object, Using the methods of fluid inclusion thermometry, H-O isotope and in situ trace elements of pyrite to systematically study the characteristics of ore-forming fluids, the sources of ore-forming fluids and the ore-forming mechanism. There are various types of inclusions, mainly gas-liquid two-phase inclusions, whose homogenization temperature ranges from 167.6°C to 372.2°C, salinity ranges from 3.23% to 10.86%, and density ranges from 0.71 to 0.96g/cm^3. The $\delta^{18}O_{H2O}$ and $\delta D_{V\text{-}SMOW}$ of quartz H-O isotopes range from 3.76 to 7.14‰ and from -95.8 to -83.0‰, respectively. There is a strong positive correlation between Au and As elements in the in-situ trace elements of pyrite, and the pyrite particles rich in Au-As belts are developed in the ore. Results show that the Ankou gold deposit ore-forming fluid is mainly derived from magmatic water and is partly added by meteoric water. The ore-forming fluid in Ankou gold deposit is generally characterized by medium-low temperature, medium-low salinity and low density, the characteristics of the immiscible/of cooling fluid and fluid boiling is the main mechanism of gold deposits, The multi-stage activity and precipitation of Au-As-rich fluids is one of the necessary conditions for large-scale high-grade mineralization in Ankou gold deposit.