Geological Characteristics and Molybdenite Re-Os Isotopic Dating of the Doupo Mo Deposit, Dabie Orogen, Eastern China

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1 Geological Characteristics of Deposit

The Doupo Mo Deposit is adjoined The Lingshan granite which between Lingshan- Luoshan, Xinyang area, Henan province, and Dawu, Hubei province, in the northern Dabie orogenic belt. The hydrothermal alteration types of wall rocks in the Doupo Mo deposit include silicification, K-felspar alteration, sericitization, and pyritization, etc. and the main ore-forming types are disseminated, veinlet, stockwork and laminated molybdenite mineralizations. The major metallogenic epoch could be devided into 4 stages: K-felspar-quartz stage, quartz-molybdenite stage, quartz-polymetallic sulfidestate, and quartz-carbonate stage. The deposit is of typical porphyry Mo deposit type.

Aqueous two-phase inclusions is predominant of the main metallogenic epoch in fluid inclusion. Their homogeneous temperatures of the main metallogenic epoch were concentrated in 170.4~432.1 °C, their salinities were concentrated in 0.35~13.5 wt % NaCl eq., Their average ore-forming pressures and depths were 21.39MPa and 0.79km respectively. Gas composition of fluid inclusions mostly includes H₂O, CO₂, N₂ and O₂ and a small amount of reducing gas like CH₄, C₂H₄, C₂H₆, C₂H₂. Cations of liquid composition are dominant with Ca²⁺, Na⁺, K⁺, followed by Mg²⁺. Anions are mainly consist of SO₄²⁻, F⁻, Cl⁻, with minor Br⁻. H-O isotope analyses suggest that the source of ore-forming fluid is probably the combination of magmatic water and the meteoric water. The Surfer isotope composition shows that it comes from the mantle. The Pb isotope composition shows that the metallogenic material was mainly derived from the crust with mingling of mantle materials.

2 The Result of Re-Os Isotopic Dating

Five main metallogenic stage of molybdenite samples were used as the experiments in Re-Os isotopic dating. With isoplot software to calculate a weighted mean of model ages (Fig. 1) and the isochron age of five points (Fig. 2), and the results were 126.8±1.9 Ma and 125.4±1.2 Ma. From MSWD value and fitting the probability, the weighted mean model age and the isochron age are reliable.

3 Summary

Re-Os isotopic dating of the molybdenites symbiosis with magnetites obtained model ages of (125.4±1.2) Ma, and the LA-MC-ICP-MS U-Pb dating of the deep Lingshan granite is from (122.14±0.38 ~124.21±0.28) Ma. Doupo Mo deposit was formed in the Early-Cretaceous, which is consistent with the emplacing age of the host rock Lingshan granitic pluton. These features indicated that they were produced in the same structure- magma-fluid
activity. The Doupo Mo deposit was formed under an extensional tectonic environment, the corresponding tectonic setting can be ascribed to Dabie orogenic belt large-scale lithospheric thinning, delamination and thermal erosion.

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References


