

## Research Advances

# Re-Os Dating of Chalcopyrite from the Lala IOCG Deposit in the Kangdian Copper Belt, China

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This study focused on the typical Precambrian copper-iron-gold-uranium deposits in the southwestern margin of the Yangtze block, such as the Lala in Huili, Dahongshan in Xinping, Yinachang in Wuding, and Chahe in Yuanjiang. Through systematically sampling of rocks, mineral and single mineral samples, this study discussed the continental geodynamics, age of magmatic rocks and metallogenic epoch, coupling relationship between polymetallic elements and ore-forming fluid, and the coupling relationship between magma evolution and polymetallic mineralization based on the latest metallogenic theory and modern analytical techniques.

The sulfide samples were collected from the Luodang orebody in the Lala deposit; the samples are veined chalcopyrite ores. The separated samples were determined for Re and Os at the State Key Lab of Ore Deposit Geochemistry, Institute of Geochemistry, Chinese Academy of Sciences, Guiyang, using the analytical procedures of Qi et al. (2010) and Huang et al. (2013). The <sup>187</sup>Re versus <sup>187</sup>Os<sup>r</sup> data yield a model (Ludwig, 2003) four-point isochron age of 1085±27 Ma (initial <sup>187</sup>Os =

0.0121±0.0019 ng/g and MSWD=1.3).

Predecessors have reported two molybdenite Re-Os model ages of 1001 ± 1, 1005 ± 1 Ma (Li et al., 2003) and 1086 ± 8 Ma, 1089±250 Ma (isochron age, MSWD = 2.6) (Chen and Zhou, 2012). Based on the original measured data and the former results from Chen and Zhou (2012), we get a comprehensive Re-Os isochron age for chalcopyrite and molybdenite, 1083±11 Ma (MSWD = 0.48), which can significantly constrict the error.

The Lala, Dahongshan and Chahe deposits were measured by Re-Os isochron age of chalcopyrite, yielding ore-forming ages of 1085±27 Ma (Fig. 1), 1083±45 Ma (Song, 2014) and 1082 ±46Ma (Song, 2014), respectively. These three metallogenic epochs have a good agreement, indicating that their mineralization may result from the same geological events in the late Mesoproterozoic, forming a metallogenic series of copper-molybdenum-gold-cobalt-rare earth-uranium polymetallic combination. This may suggest that the hydrothermal polymetallic deposits may enrich in this geological period.

By various mineralization superimposition, the

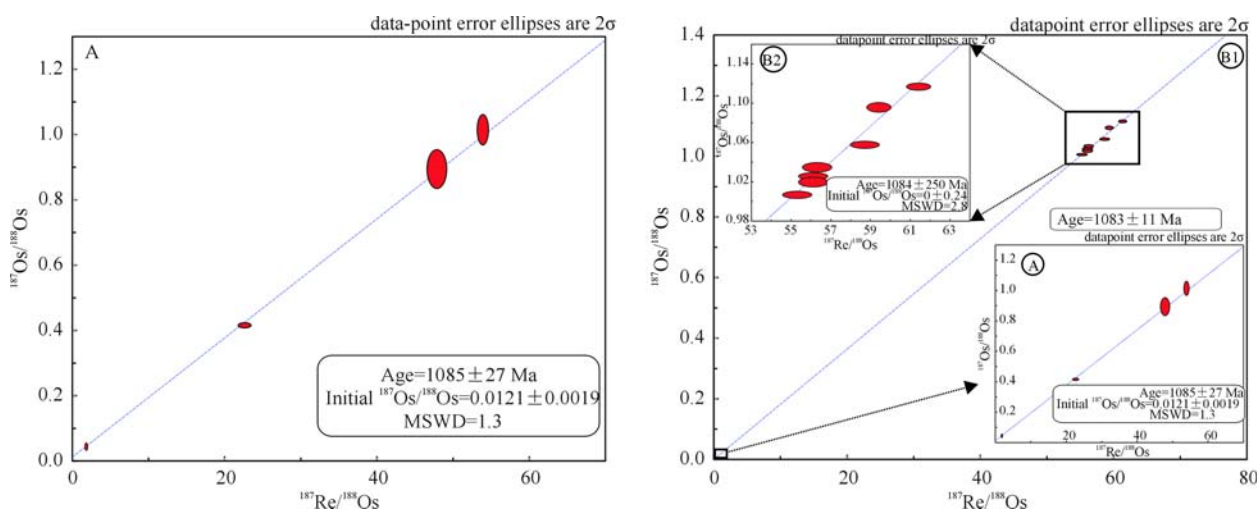


Fig. 1. Re-Os isochron of chalcopyrite from the LaLa deposit.

A. The original measured data; B1. Based on the original measured data and the former results; (B2. from CHEN and ZHOU, 2012)

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formation of the typical ore deposits was after the formation of the original source bed and the later complex superposition. From the view of regional evolution characteristics, Paleoproterozoic is the pre-enrichment of Lala Fe-Cu polymetallic deposit. In several superimposed mineralization events, 1.4~1.2 Ga and 1.1~1.0Ga are two necessary and important metallogenic epochs for copper polymetallic mineralization. Thus, the combination of iron-copper-gold-uranium-molybdenum-cobalt-rare earth was formed by multiple superimposed mineralization, which is critical for the Lala and Dahongshan copper-iron polymetallic deposits.

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