1 Introduction

The Dapai iron-lead-Zinc deposit is a medium-sized typical strata-bound and vertically zoned deposit, situated in Fujian Provence in Southeast China. Geotectonically, it is located along the southern margin of the southwestern Fujian depression belt (SFDB), in the core of the Longyan-Yongding multiple syncline of several other iron polymetallic deposits have been discovered along this belt e.g.; the super large Makeng iron deposit, Pantian iron deposit, Luoyang iron deposit, Yangshan iron deposit, Zhongjia iron deposit etc. These deposits are referred to as Makeng style deposits, because of their close relationship with the super large Makeng deposit. The age for Makeng deposit has been constrained at 133 Ma (Zhang C. , 2012), 133 Ma for the Luoyang deposit (Zhang, et al., 2012), both based on Re-Os dating of molybdenite. The Dapai deposit has been poorly researched, with no exact timing of the mineralization. Here we report 87Rb and 86Sr isotopes geochronology of pyrite and sphalerite grains from the Dapai orebody with aim of resolving the metallogenic geochronology of Dapai and their implication on the geological evolution of the Dapai deposit within tectonic frame of Fujian Provence and South china block.

2 Geology of the Deposit

The Dapai deposit is an important part of the Makeng style deposits along the SFDB. The formations within the Dapai iron polymetallic mine includes the Lower Carboniferous Lindi formation, Upper Carboniferous Jingshe formation, Lower Permian Chuanshan formation, Middle Permian Qixia Formation and Wenbishan formation. Qixia formation is a shallow marine carbonate deposits, the Chuanshan formation is the lower part of the thick limestone. The Dapai deposit has been poorly researched, with no exact timing of the mineralization. Here we report 87Rb and 86Sr isotopes geochronology of pyrite and sphalerite grains from the Dapai orebody with aim of resolving the metallogenic geochronology of Dapai and their implication on the geological evolution of the Dapai deposit within tectonic frame of Fujian Provence and South china block.

3 Sr-Rb isotopes Geochronology

Six grains of pyrite and two grains of sphalerite yielded a well-constrained 87Rb–86Sr Isochron, figure 1., with model age of 175.5±3 Ma, initial 87Rb/86Sr (I Sr) ratios of 0.70846 ±0.000083 and a MSWD=1.3.

This indicates mineralization during the stage of early Yanshanian (180 Ma-160 Ma) in the end of early Jurassic.

4 Discussion

A Comparison of the Geological and petrographic studies, the high 87Sr/86Sr (0.70871 to 0.716724) together with their age-corrected initial 87Rb/86Sr (I Sr) ratio of 0.70846 ±0.000083 coupled with O, S and Pb isotopes data for (Feng, unpublished), we propose that the Dapai deposit was part of a large-scale skarn system, which formed by an interaction between a slightly mixed magmatic fluids and the calcium-rich country rocks. The new yielded isochronal age of 175.5 ± 4 Ma, using pyrite and Sphalerite coincides with the epoch when the south china block was beginning to experience intercontinental
lithospheric extension due to shallow oblique subduction of the Izanagi plate beneath the Eurasian continent in the Jurassic, it is also close to the metallogenic epoch of Mid–Late Jurassic (170–150 Ma) proposed by Mao et al., (2013) in South China. It coincides the Re-Os isochron age of 175.4 ± 3.1 Ma for Fankeng basalts of the Yongding basin of southwestern Fujian (Jincheng et al., 2005), it is also close enough to the age of three magmatic zircon grains dated 179±4, 173±2 and 180±2 (Average 177 Ma), picked from Yashanian granites that have a close relationship with Dapai Fe-Zn-Pb deposit, but zircon ages averaged at 132.35 ±0.83 in (yuan yuan 2014, unpublished).

Thus far, a new age of 133±2 Ma of Re-Os Molybdenite of the Dapai deposit has been obtained (yuan yuan, unpublished). Other Makeng style deposits; Makeng and Luoyang, within the SFDB appears to be coeval to this age. These ages correspond to the epoch, when the angle of convergence of the Izanagi plate changed from oblique to parallel to the coastline, resulting in continental extensional tectonics and reactivation of regional-scale NE-trending faults (Mao et al., 2013). Of the multi age granitic complexes in south China, some granites coeval and cogeneric to these deposits have been identified, further exploration for these granites may lead to the discovery of more Makeng style deposit.

5 Conclusion

Considering the well-constrained isochronal yielded new age of 175.5 ± 3 Ma, coupled with 133±2 Re-Os age described above we propose that the Dapai iron-lead-Zinc deposit is a result of multiple stages of mineralization that has been enriched by superimposition of multiple magmatic activities that prevailed in this area.

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References


