Pyrite Re-Os dating from the Xinqiao Cu-S-Fe-Au deposit in Tongling area, East China

J.C. XIE[1,2] AND X.Y. YANG[1,2]*

[1]CAS Key Laboratory of Crust-Mantle Materials and Environments, School of Earth and Space Sciences, University Science and Technology of China, Hefei 230026, China (*correspondence: xyyang@ustc.edu.cn)
[2]Key Laboratory of Continental Dynamics, Department of Geology, Northwest University, Xi'an, 710069, China

The Tongling region of Anhui Province is an important ore district of the famous Middle-Lower Yangtze Cu-Au-Fe-S metallogenic belt in east China. The Cu-S-Fe-Au deposit at Xinqiao is situated 24 km east of Tongling. It is a large-scale polymetallic deposit with drilling indicated reserves of 0.5 million tonnes of Cu averaging 0.71%, 75.5 million tones of S averaging 29.3% and 24.9 million tones of Fe averaging 46%, as well as 11.2 tonnes of Au averaging at 4.7g/tones. There are two major mineralization types in the Xinqiao deposit: the significant stratiform orebody hosted in the Corboniferous and skarn-type mineralization related with the Yanshanian quartz diorite. The origin of the Xinqiao deposit has been discussed by precious workers since its discovery, with views varying from the magmatic hydrothermal deposit, through skarn-type deposit, to hydrothermally modified sedimentary deposit, so the isotopic precise dating for ore and quartz diorite is very important to understand its genesis.

In this study, 12 pyrite samples from pyrite ore were collected for Re-Os precise dating. These pyrite samples were analyzed by the ICP-MS method in National Research Center of Geoanlysis, Chinese Academy of Geological Sciences. The $^{187}Re/^{188}Os$ and $^{187}Os/^{188}Os$ values on the 12 samples by the ICP-MS method yield 4414±131 to 18338±879 and 12.0±1.04 to 65.1±1.04, respectively. The isochron age calculated with the ISOPLOT is 126±11 Ma with an initial Os ratio of 1.2±1.9 (MSWD=2.6). We believe the age represents the ore-forming time of the Cu-S-Fe-Au deposit, which indicates that the Yanshanian magmatism is of great significance for polymetallic mineralization in the district.

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Crystal-chemical constraints on Sn-accumulation capability of titanite from Qitianling granite, Hunan province, China

L. XIE, R.C. WANG AND D.Z. WANG

State Key Laboratory for Mineral Deposits Research (Nanjing University), Department of Earth Sciences, Nanjing 210093, China (xielei@nju.edu.cn)

Titanite, $CaTiSiO_4(O,OH,F)$, occurs in a variety of types of rocks, especially in calc-alkaline granites. It is a scavenger for trace elements, such as Nb, Sn, Ta, Y, U, REEs, etc. In this study, we suggested that the titanite is an important Sn-rich mineral except for cassiterite in Qitianling granite, which is a super-large granite-related tin deposit recently found in Hunan province (China). We present tin transference and accumulation by alternation of primary magmatic titanite grains in hydrothermal stage.

Abundant primary magmatic titanite grains are idiomorphic, ranging ca. 100-400 μm in size, and generally displaying zoned textures. EMPA analytical results indicate that it contains 0.15-1.12 wt.% SnO2 (the average value is 0.345 wt.% based on 29 data). During the hydrothermal stage, Sn-rich titiante was replaced by mineral assemblage, which includes flourite, ilmenite, rutile, quartz and cassiterite micro-inclusions (Fig. 1a and b). Consequently, such minerals entirely replaced titanite, and preserved the idiomorphic shape of primary titanites (Fig. 1c). Thus, it is inferred that mineral assemblages are products of the primary Sn-rich titanite mediated by fluids:

$$Ca(Ti_xSn_{1-x})SiO_4(O,OH,F) + Fluid \rightarrow CaF_2 + TiO_2 + FeTiO_3 + SiO_2 + SnO_2$$

The reaction allowed tin to activate and transfer from the titanite, and then to accumulate in forming cassiterite. It may be a very important mineralogical criterion for tin exploration.

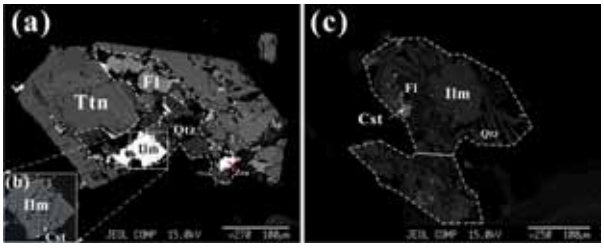

Figure 1: Primay magmatic titanite(Ttn) was (a) partly and (c) entirely replcaed by mineral assemblage during the different hydrothermal stages. The mineral assemblage includes ilmenite(Ilm) + flourite(Fl) + quartz(Qtz) + cassiterite(Cst).

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