

Two-stage Sn-Cu mineralizations in Jinkeng, Southeast China: response to extensional tectonics

JIAQI LIANG, KUIDONG ZHAO AND QIAN LI

State Key Laboratory of Geological Processes and Mineral Resources, Faculty of Earth Resources, China University of Geosciences,

Presenting Author: liangjq@cug.edu.cn

Due to subduction and rollback of the Paleo-Pacific plate, the coastal belt in Southeast China has undergone multi-stage tectonic transformation (compression – extension – compression) since the Late Mesozoic, accompanied by two metallogenic events: Late Jurassic (170-155 Ma) porphyry-skarn copper mineralizations and Early Cretaceous (145-135 Ma) granite-related tungsten-tin mineralizations.

The Jinkeng Sn-Cu polymetallic deposit, here, is a magmatic-hydrothermal deposit related to multistage magmatic events. The Jinkeng deposit consists of two different ore types: 1) the NE-striking chlorite-sulfide-cassiterite-garnet ore body occurs in the volcanic strata, and underwent ductile shear deformation and 2) the NW-striking cassiterite-sulfide veins fill in the NW-striking faults within the granodiorite porphyry. All veins didn't suffer ductile deformation. In-situ LA-ICP-MS cassiterite U-Pb dating of deformed and non-deformed grains in different ores indicates two stages of ore-forming events at 147 Ma and 141 Ma, respectively.

Abundant garnets in early-stage deformed ore display core-rim zoning. The major and trace element analysis shows that the cores are of volcanic origin whereas the rims have similar compositions to the garnet in granodiorite porphyry, which proves the contribution of granodiorite porphyry to early-stage mineralization. The whole-rock geochemistry and Hf isotope compositions of zircon from granodiorite porphyry and fine-grained granite suggest that the granodiorite porphyry exhibits a lower degree of magma differentiation, less addition of mantle materials, higher oxygen fugacity, higher Cl content, and lower F content than the latter. This diversity of magmatism in Jinkeng likely explains that the early Cu-dominated mineralization related to granodiorite porphyry is superimposed by the late Sn-dominated mineralization related to fine-grained granite. The two mineralizing events probably correspond to two regional extensional tectonic events separated by a compressional event.