Vol. 88 Supp. 2 ACTA GEOLOGICA SINICA (English Edition) Aug. 2014
http://www.geojournals.cn/dzxben/ch/index.aspx http://mc.manuscriptcentral.com/ags

TIAN Mingjun, LI Yonggang and HE Bin, 2014. Skarn Textures of Yongping Copper Deposit, Yanshan, Jiangxi Province. *Acta Geologica Sinica* (English Edition), 88(supp. 2): 40-42.

Skarn Textures of Yongping Copper Deposit, Yanshan, Jiangxi Province

TIAN Mingjun[1,2], LI Yonggang[1*] and HE Bin[3]

1 *Laboratory of Lithospheric Evolution, Institute of Geology and Geophysics, Chinese Academy of Science, Beijing 100029, China*
2 *University of Chinese Academy of Sciences, Beijing 100049*
3 *Jiangxi Copper Corporation, Guixi 335400*

1 Introduction

Yongping copper deposit is located at the collisional belt between Yangtze Block and Cathaysia Block. It is a historic mine, and plays an important role in China's copper production. Owing to the complicated geologic settings, the genesis of this deposit remains controversial for decades; VMS and generalized Skarn have been proposed.

According to the VMS model (Gu et al., 2007), Yongping deposit formed in late Paleozoic basins, appearing as strata-bound massive sulfides, and underwent remobilization of ore and magmatic hydrothermal overprinting by Mesozoic magmatism. Nevertheless, Mao et al. (2011) proposed a tectono-genetic model for porphyry -skarn-stratabound Cu-Au-Mo-Fe which is really suitable for Yongping Deposit. However, all these studies focus on regional scale rather than local scale. Therefore, we try to concentrate on small scale, ore textures for instance, to search for evidence of the genesis of this deposit.

2 Geology of Yongping Copper Deposit

Strata in mine area are simple without regard for structural geology. Precambrian Zhoutan Group (Pt_{zt}) and Paleozoic strata (C-P) emerge in mine. Carboniferous Yejiawan Formation hosts the main ore, which metamorphosed from limestone interbedding with sand-shale to garnet skarns, phyllitic shales and metasandstones.

Overthrust fault (F_1, F_2) and Tianpaishan overturned anticline are main structures in the central area. The faults (F_1, F_2) grip Yejiawan Formation and ore.

Shizitou granodiorite is exposed at the middle and the southeast of open pit. The granodiorite belongs to high-K calc-alkaline suite and has prospect for Mo mineralization.

Ores trend nearly northward-southward which is consistent with that of Yejiawan Formation. The main ore body (II) strenches about 2 km. Skarns are the main host rock in this mine, while few are phyllitic shales and metasandstones.

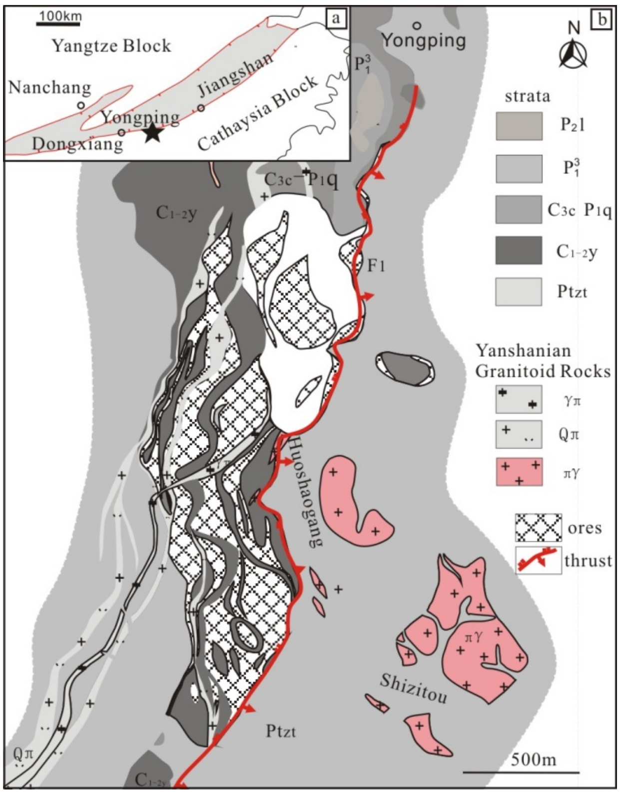

Fig. 1. Geologic map of Yongping Copper deposit.
(a), structure location of yongping deposit, collisional belt between Yangtze Block and Cathaysia Block; (b), geologic map of mine, P_2l-Longtan Formation, Permian, sandstone interlaying with sillstone. P3 1-Lijia formation, Permian. shale and silty shale. C_3c-P_1q-Chuanshan formation, Carboniferous, to Qixia Formation, Permian. Limestone. $C_{1\text{-}2}y$-Yejiawan Formation, limestone. Pt_{zt}-metabase, migamatite.

* Corresponding author. E-mail: tmj@mail.iggcas.ac.cn

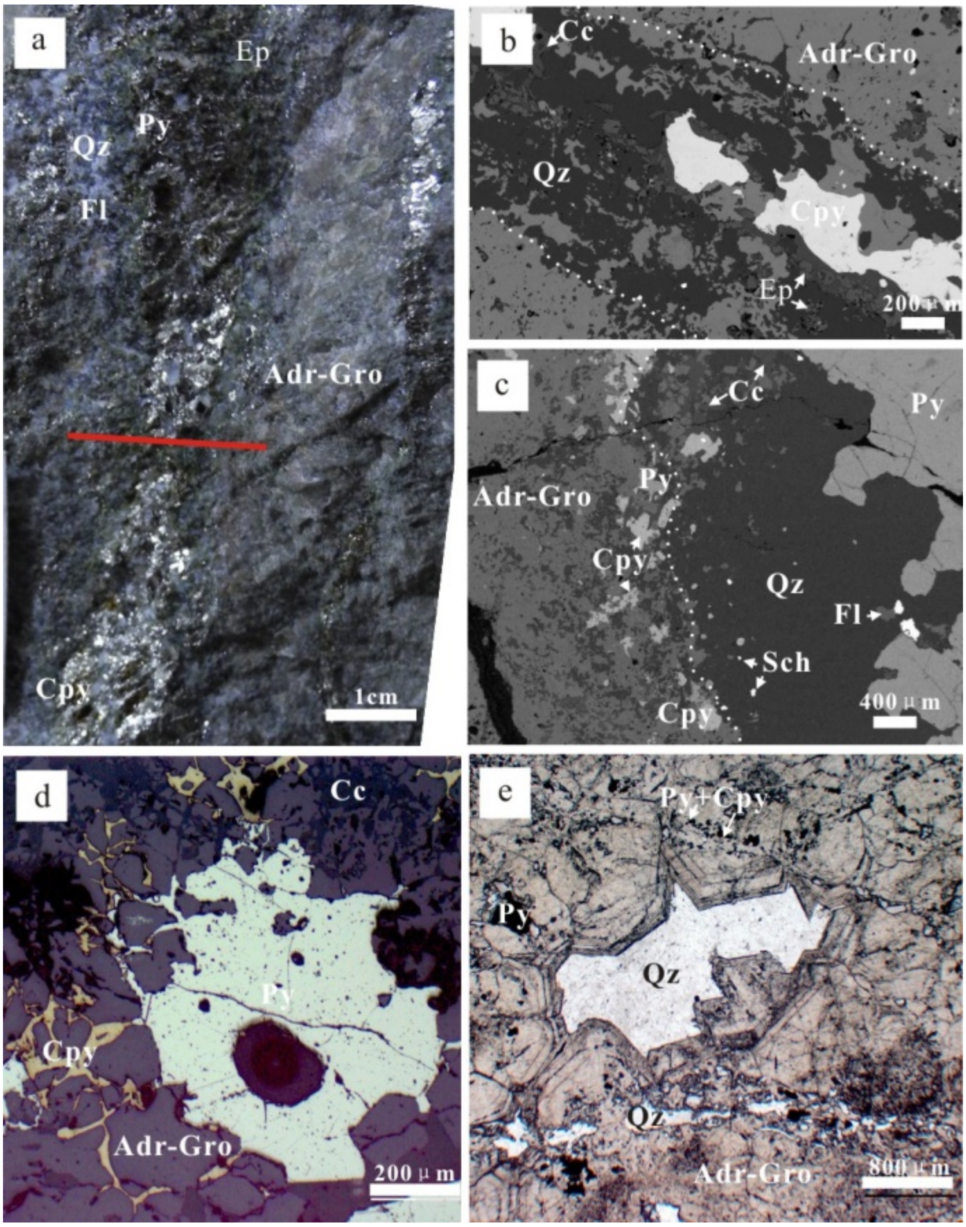

Fig. 2. Typical skarn texture in Yongping Copper deposit

(a)-typical specimen, showing quartz-sulfides vein with a metasomatic zoned envelope in massive garnet skarn. Note purple fluorite. Red line present as (b, c). (b, c)-minerals in quartz-sulfide, scheelite adjacent with fluorite and calcite, probably formed after early pyrite. Note chalcopyrite enwrap scheelite. (d)- pyrite and chalcopyrite filling in fractures in garnet, emerging in stockworks. (e)- euhedral massive garnet, replacing by late pyrite, chalcopyrite and quartz.

3 Skarn Textures and Ore-Forming Process

Skarn textures record useful information about primary and overprinting processes, therefore they become magnificent agents to understand the evolution of a skarn system and ore-forming process (Ciobanu et al., 2004). Epidote-diopside-garnet skarn (Fig. 2a) is the main ore-hosting rock, and widely distributes. This type of skarn displays numerous information of pre-ore stage, ore stage, and post- ore stage.

At pre-ore stage, closed packing garnet formed, mainly andradite (Fig. 2a, 2e), as a result of metasomatism between granite and limestone. Along with the cooling of granite, diopside generated, filling at the melt- fluid channel (Fig. 2b, e). In distal zone, wollastonite skarn sharply contact with marble.

During ore-forming stage, as magmatic-drived hydrothermal fluid gathering, the pressure increased and

2b, e). In distal zone, wollastonite skarn sharply contact with marble.

During ore-forming stage, as magmatic-drived hydrothermal fluid gathering, the pressure increased and caused fractures of early garnet skarn (Fig. 2a, b, c, d, e). Fractures provided more channels for hydrothermal fluids to circulate and interact with wall rock sufficiently, resulting in the formation of retrograde skarn. Andradite-grossular series formed during this period, as well as hematite. Epidote, scheelite, fluorite and minor calcite occurred at the early stage, while chlorite and sericite formed subsequently. Immense pyrite, colloidal chalcopyrite, pyrrhotite and fine-grained pyrite, likely all crystallized from sulfide melt (Fig. 2b, d).

At post-ore stage, quartz and calcite vein crosscut and replace prograde and retrograde skarn, symbolizing the termination of ore-forming process.

Acknowledgements

We thank Jiangxi Copper Corporation-Yongping mine for unrestricted access to the property. We also thank Department of Land and Resources of Jiangxi province and 912 Geological Party of Jiangxi Bureau of Geology and Exploration for assists at field work.

References

Ciobanu, C.L., and Cook, N.J., 2004. Skarn textures and a case study: the Ocna de Fier-Dognecea orefield, Banat, Romania. *Ore Geology Reviews*, 24: 315–370.

Gu, L.X., Khin Zaw, Hu, W.H., Zhang, K.J., Ni, P., and He, J.X., 2007. Distinctive features of Late Paleozoic massive sulphide deposits in South China. *Ore Geology Reviews*, 31(1–4): 107–138.

Mao, J.W., Xie, G.Q., Duan, C., Pirajno, F., Ishiyama, D., and Chen, Y.C., 2011. A tectono-genetic model for porphyry skarn stratabound Cu–Au–Mo–Fe and magnetite–apatite deposits along the Middle–Lower Yangtze River Valley, Eastern China. *Ore Geology Reviews*, 43(01): 294–314.