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CH_4-Rich Fluid of the No.I Porphyry Copper-Gold Deposit in the Xiongcun District, Gangdese Porphyry Copper Belt, Tibet, PRC

LANG Xinghai[1], Tang Juxing[2], Xie Fuwei[1] and Ding Feng[2]

1 *College of Earth Science and Key Laboratory of Tectonic Controlled Mineralization and Oil Reservoir, Chengdu University of Technology, Chengdu, China*
2 *Institute of Mineral Resources, Chinese Academy of Geological Sciences, Beijing, China*

The Gangdese porphyry copper belt (GPCB) is located in the southern margin of the Lhasa terrane (Fig. 1). Many porphyry and related skarn Cu (Mo, Au, Pb-Zn) deposits have been discovered in the GPCB, including Xiongcun, Jiama, Qulong, Tinggong, Chongjiang, Sharang, Zhunuo, Dabu, Lakanger etc (Qu et al., 2001; Hou et al., 2003). The Xiongcun district is located in the western segment of the GPCB (Fig.1). Three copper-gold deposits (No.I, No.II and No.III) have been discovered in the past decade (Lang et al., 2013). No. I deposit is the first porphyry copper-gold deposit discovered in the Xiongcun district. 167 diamond drill holes totaling 47,279 m completed by Tibet Tianyuan Minerals Exploration LTD. in cooperation with Chengdu University of Technology and the Institute of Mineral Resources of Chinese Academy of Geological Sciences in 2004 - 2012. An evaluation in 2012 showed that the No.I deposit hosts a measured and indicated resources of >1 Mt averaging 0.48% copper, >140 t averaging 0.66 g/t gold, and >900 t averaging 4.19 g/t silver (Tang et al., 2012). The mineralization of the No.I deposit formed ca.161.5 ± 2.7 Ma and related to the 167 – 161 Ma quartz diorite porphyry with large quartz eyes (IUQ) (Lang et al., 2004). The copper-gold mineralization is closely related to the silicification/stockworks and the potassic alteration. The main mineralized vein types in the No.I deposit are the quartz – sulfide and biotite – sulfide veins. The dominant sulfides of ore are pyrite, pyrrhotite and chalcopyrite. Magnetite is uncommon in the No.I dposit.

Due to quartz – sulfide veins contain highest grades of copper-gold mineralization and their distribution is one of the key controls on ore-grade mineralization (Tang et al., 2012), so in order to study charcteristics of the ore-forming fluid in the No.I deposit, we selected core samples of quartz – sulfide veins from the silicification/ stockworks and the potassic alteration zones within section A - B (Fig. 1). Raman spectroscopy is used to detect gaseous composition of fluid inclusions traped in quarzt of the quartz – sulfide veins. The results of Raman spectroscopy (Fig. 2) indicate the predominant CH_4 in the gaseous composition of hydrothermal fluids. CO_2 has been identified in inclusions from most porphyry copper deposits, whereas CH_4-rich fluid inclusions are typically not detected in most porphyry Copper deposits (Shen et al., 2010; Cao et al., 2014). The origin of the CH_4 in the No.I deposit is needed to more detailed studies, however this new understanding will provide further constrain to the genesis of the deposit.

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* Corresponding author. E-mail: langxinghai@126.com

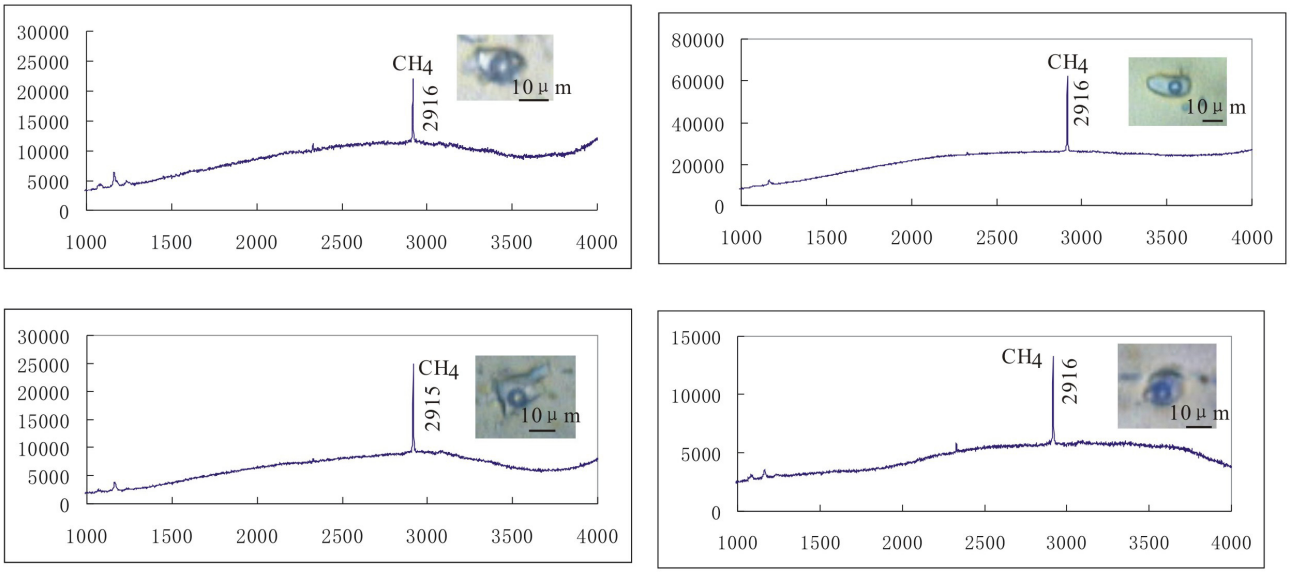

Fig. 2. Laser Raman spectra of fluid inclusions of the No.I deposit in the Xiongcun district.

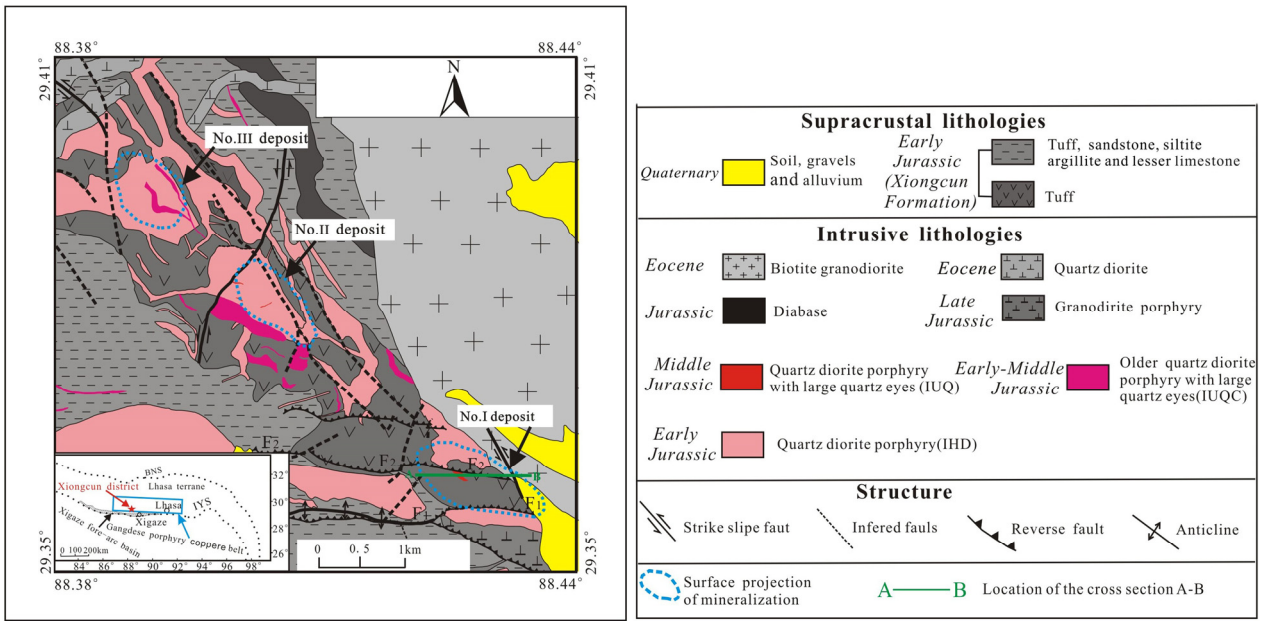

Fig.1. Summary geological map of the Xiongcun district

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