XIE Yuling, YAO Yu, GUO Xiang, ZHANG Jian, WANG Lei, LI Lamei, WANG Aiguo, 2014. The Characteristics of Primary Magmatic Fluid in Xichong Mo Deposit, Anhui Province, China. *Acta Geologica Sinica* (English Edition), 88(supp. 2): 1180-1182.

The Characteristics of Primary Magmatic Fluid in Xichong Mo Deposit, Anhui Province, China

XIE Yuling[1], YAO Yu[1], GUO Xiang[1], ZHANG Jian[1], WANG Lei[1], LI Lamei[1], WANG Aiguo[2]

1 *School of Civil and Environmental Engineering,University of Science and Technology, Beijing 100083,China;*
2 *.Nanjing Institute of Geology and Mineral Resource, Chinese Academy of Geoscience, Nanijing 210016, China*

1 Introduction

Xichong Mo deposit is located in Yuexi county of Anhui province, China, which is in the east part of Tongbai - Dabie metallogenic belt. A series of giant and large porphyry Mo deposits have been reported in this belt including Shapinggou, Qian'echong, Tangjiaping, Yaochong and Xichong etc. The geology, geochronology, geochemistry and fluid inclusion results of key porphyry Mo deposits in this belt have been reported by Meng et al. (2012), Zhang et al. (2010, 2012), Yang et al. (2011), Chen et al. (2013), Li et al. (2011), Yu et al. (2012), Huang et al. (2011), Yang (2009). Yang et al. (2007, 2008) and Wang et al. (2014), but few of them address on Xichong deposit.

Based on field observation, petrographic, ore-microscopic, SEM/EDS, XRD and fluid inclusion results, this paper discusses the characteristics of primary magmatic fluid.

2 Geology

Xichong Mo deposit is located in Dabie ultra-high pressure metamorphic terrane of east Qinling - Dabie orogenic belt (QDOB) (Fig.1). QDOB is the collisional zone of Yangtze and North China block, and underwent complex tectonic evolution (Wu et al., 2013).

Except quaternary, the most area of the district outcrop intrusive rocks including quartz monzonite (QM), fine grained granite (FGG) and bimodal dikes. FGG occurs as orientated stocks, blocky dikes which intrude into the QM. Bimodel dikes, which comprise of quartz syenite porphyry and hornblende - bearing lamprophyre, intruded into QM. Bimodel dikes occur as the latest intrusive rock in the district and show regular tabular shapes trending NW, NE and EW.

The Mo-Cu mineralization occurs dominantly as disseminated and stock works in QM and FGG, with minor vein style in QM. The alteration is well developed in the district including silification, K-silification, seritization, propylitization and argillization. Based on the vein crosscutting relationship, petrographic and ore microscopic results, five ore-forming stage can be recognized including K-feldspar – quartz - magnetite stage (I), serite - quartz stage (II), epidote - quartz stage (III), calcite - chlorite stage and clay - quartz stage (V). Stage II and stage V is dominated ore - forming stage, with minor Mo mineralization in K-feldspar – quarz vein (stage I). No Cu, Mo mineralization have been confirmed in bimodal dikes.

3 Fluid Inclusion results

Based on field observation, cystiform K-feldspar - quartz pegmatite occurs in QM (Fig.2a, b), and minor in FGG which best record the transition from magma to fluid. The mineral assemblage of pegmatite includes K-feldspar, quartz, magnetite and hematite, euzeolith is also confirmed by XRD in the druse center representing the latest crystalizing character.

Petrographic results show that the inclusions in K-feldspar is not well developed, whereas quartz from

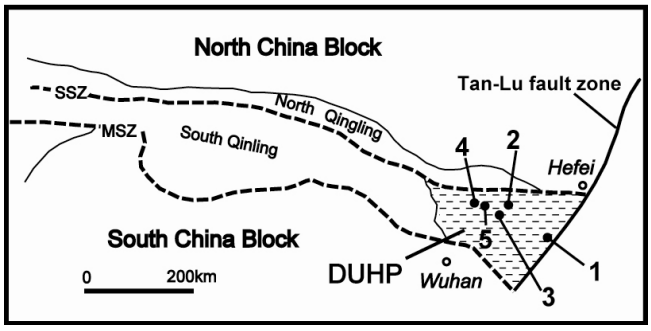

Fig. 1 Tectonic setting of Xichong deposit
(based on Meng and Zhang, 1999); SSZ - Shangdan suite zone; MSZ - Mianlue suite zone; DUHP - Dabie ultra-high pressure metamorphic terrane; 1-Xichong Mo deposit; 2-Shapinggou; 3-Tangjiaping; 4-Qian'echong; 5–Yaochong

* Corresponding author. E-mail: yulingxie63@hotmail.com

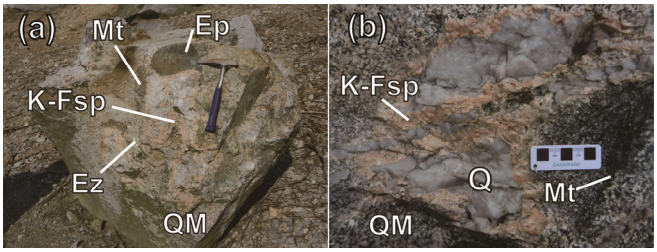

Fig. 2 Photo of druse in quartz monzonite
K-Fsp - K-feldspar; Q - quartz; Mt - magnatite; Ez - euzeolith; Ep - maffic xenolith; QM - quartz monzonite

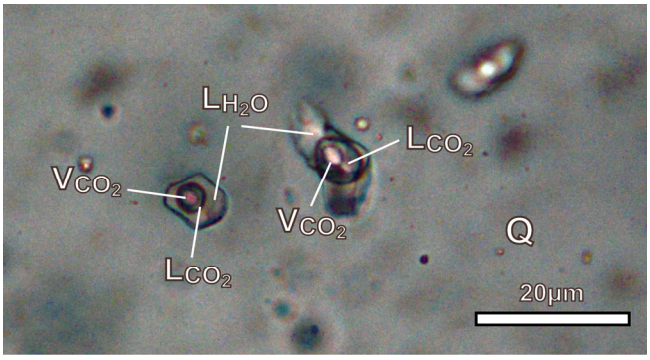

Fig. 3 Micrography of AC inclusions in quartz
L_{CO2} - liquid CO_2; V_{CO2} - vapor CO_2; L_{H2O} - liquid H_2O; Q-quartz

pegmatite host abundant CO_2-rich fluid inclusion including AC (CO_2 and water) (Fig.3), C (pure CO_2). Varied CO_2 percentage AC inclusion together with C type inclusion indicated an unmixing process between CO_2 and water during the fluid evolution.

4 Discussion and Conclusion

The irregular pegmatite pod in QG indicated that a more felsic melt had exsoluted from parent magma. Except irregular pegmatite pod, some K-feldspar - quartz veins or pegmatite veins are also found in QM indicating that the part of parent magma have been solidified during the exolution. Minor pegmatite pod are also found in FGG, and just in the contact zone between QM and FGG, that means the FGG magma is evolved magma from same parent magma. The partially crystallization of parent magma may cause the volatile enriched in residue melt and lead to exsolution of a volatile-rich, more felsic melt from parent magma. The CO_2 rich fluid trapped in quartz of pegmatite represent the early stage of magmatic fluid. Coexistence of varied CO_2 volume percentage AC and C inclusion indicate an immiscible process between CO_2 and water during the fluid evolution.

The petrographic, microthermometric and LRM results indicate that the primary magmatic fluid is high to moderate temperature, low salinity, CO_2 - rich fluid. The solubility of CO_2 in silicate magma is much lower than water (Nixon, 1995), and largely depended on pressure, high CO_2 in unmixed melt implies a high pressure.

Acknowledgments

This study was supported financially by the Ministry of Land and Resource of People's Republic of China (No. 201011011 and 1212011220515). Many thanks to Prof. Guangxi Ou and Ms. Min Zhang for their help in LRM analysis.

Reference

Chen Hongjin, Chen Yanjing, Zhang Jing, Chen Xiuzhong and Zhang Huaidong, 2013. Zircon U-Pb ages and Hf isotope characteristics of the orebearing intrusion from the shapinggou molybdenum deposit, Jinzhai County, Anhui Province. Acta Petrologica Sinica, 29(1): 131-145 (in Chinese with English abstract).

Huang Fan, Wang Denghong, Lu Sanming, Chen Yuchuan, Wang Bohua and Li Chao, 2011. Molybdenite Re-OS isotopic age of Shapinggou Mo deposit in Anhui Province and Mesozoic Mo ore-forming stages in East Qinling-Dabie Mountain region. Mineral Deposits, 30(6): 1039-1057 (in Chinese with English abstract).

Li Faling, 2011. Geological characteristics and metallogenic epoch of Qianechong large-size porphyry Mo deposit at the northern foot of Dabie Mountains, Henan Province. Mineral Deposits, 30(3): 457-468 (in Chinese with English abstract).

Meng Xiangjin, Xu Wenyi, Lv Qingtian, Qu Wenjun, Li Xianchu, Shi Dongfang and Wen Chunhua, 2012. Zircon U-Pb Dating of Ore-Bearing Rocks and Molybdenite Re-Os Age in Shapinggou Porphyry Molybdenum deposit, Anhui Province. Acta Geologica Sinica, 86(3): 486-494 (in Chinese with English abstract).

Meng Qingren and Zhang Guowei, 1999. Timing of collision of

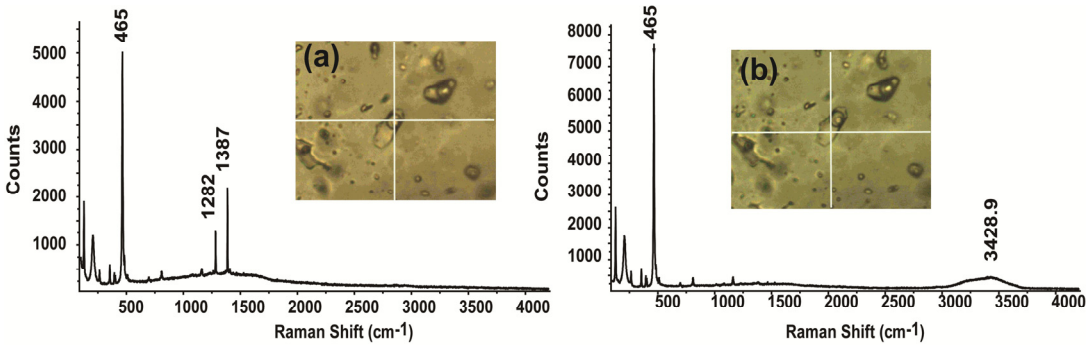

Fig. 4 LRM spectrum of AC fluid inclusion(a) CO2 phase; (b) aqueous phase

the North and South China blocks: controversy and reconciliation. Geology, 27(2): 123-126.

Nixon, P.H., 1995. The morphology and nature of primary diamondiferous occurrences. Journal Geochemical Exploration, 53, 41–71.

Wang Guoguang, Ni Pei, Yu Wen, Chen Hui, Jiang Laili, Wang Bohua, Zhang Huaidong and Li Pengfei, 2014. Petrogenesis of Early Cretaceous post-collisional granitoids at Shapinggou, Dabie Orogen: Implications for crustal architecture and porphyry Mo mineralization. Lithos, 184, 393-415.

Wu Yuanbao and Zheng Yongfei, 2013. Tectonic evolution of a composite collision orogen: An overview on the Qinling–Tongbai–Hong'an–Dabie–Sulu orogenic belt in central China. Gondwana Research, 23(4): 1402-1428.

Yang Meizhen, Zeng Jiannian, Ren Aiqun, Lu Jianpei and Pan Sidong, 2011. Characteristics of Mo mineralization and zircon LA-ICP-MS U-Pb geochronology of Mushan Mo deposit from Luoshan County, Henan Province. Mineral Deposits, 30 (3): 435–447 (in Chinese with English abstract).

Yang Yan, Zhang Jing, Liu Jiajun, Sun Yali, Li Jing and Yang Zeqiang, 2008. Hydrothermal metallogeny of the Tangjiaping molybdenum deposit, Henan Province. Geology In China, 35 (6): 1240-1249 (in Chinese with English abstract).

Yang Zeqiang, 2007. Re-Os isotopic ages of Tangjiaping molybdenum deposit in Shangcheng County, Henan and their geological significance. Mineral Deposits, 26(3): 289-295 (in Chinese with English abstract).

Yang Zeqiang, Wan Shouquan, Ma Hongwei and Tang Zhonggang, 2008. Geochemistry and Mineralization Model of Tangjiaping Mo Deposit in Shangcheng County, Henan Province. Acta Geologica Sinica, 82(6): 788-794 (in Chinese with English abstract).

Yu Wen, Ni Pei, Wang Guoguang, Shang Li, Jiang Laili, Wang Bohua and Zhang Huaidong, 2012. Evolution of ore-forming fluids of the Shapinggou porphyry molybdenum deposit, Jinzhai, Anhui Province. Journal Of Nanjing University (Natural Sciences), 48(3): 240-255 (in Chinese with English abstract).

Zhang Huaidong, Shi Dongfang, Hao Yuejin and Wang bohua, 2010. Geological features of the shapinggou porphyry molybdenum ore deposit, Jianzhai County, Ahui Province. Geology of Anhui, 20(2): 104-108 (in Chinese with English abstract).

Zhang Huaidong, Wang Genjie, Wang Bohua, Hao Yuejin, Xiang Bin and Peng Haihui, 2010. Shapinggou porphyry molybdenum ore-bearing intrusion and its alteration features. Geology of Anhui, 20(4): 260-266 (in Chinese with English abstract).

Zhang Huaidong, Wang Bohua, Hao Yuejin, Cheng Song and Xiang Bing, 2012. Geological characteristics and comprehensive ore-prospecting information of Shapinggou porphyry-type molybdenum deposit in Anhui Province. Mineral Deposits, 31(1): 41-51 (in Chinese with English abstract).