Zircon U-Pb geochronology of hosting rhyolites and mineralized quartz veins at the Tiemurt Pb-Zn-Cu Deposit： Insights for ore genesis

YI ZHENG[1,2]*, LI ZHANG[2] AND YAN-JING CHEN[3]

[1]Dept. of Earth Sciences, Sun Yat-sen University, Guangzhou, China, 510275. (*correspondence: zhengyi@gig.ac.cn)
[2]Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou, China, 510640[3]Key Laboratory of Crust and Orogen Evolution, Peking University, Beijing 100871, China

This contribution reports the finding of zircon-bearing rhyolites and mineralized quartz veins at the Tiemurt deposit, which occurs as veins controlled by NW-extending structures in the Devonian volcanic-sedimentary basin of the Altay orogenic belt Xinjiang, China.

The zircons separated from two hosting meta-rhyolites samples yield weighted mean $^{206}Pb/^{238}U$ ages of 403.1±5.1 Ma and 393.3±4.9 Ma, respectively. Integrated with their automorphic crystal, the lack of fluid inclusions, high Th/U and high ∑REE values, the $^{206}Pb/^{238}U$ ages ranging from 393Ma to 403Ma can be interpreted as the eruption age of the volcanic rocks in the Early Devonian.

The four mineralized quartz samples yield complicated zircon U-Pb ages. At least two age peaks are recognized, ca. 400Ma and ca. 220Ma. The age of ca.400Ma may be the joining age of the hosting volcanics. The zircons with ca. 220Ma age contain abundant hydrothermal fluid inclusions and coincide with the Ar-Ar ages of biotite in the polymetallic quartz veins. Therefore, the age ca. 220 Ma can represent that of the flowing metamorphism fluids migrations.

In term of the geological characteristics, structural, geochemical and geochronological characteristics of the zircon, the Tiemurt Pb-Zn-Cu deposit may be an example of epigenetic orogenic Pb-Zn+Cu systems formed in the settings of intercontinental collision at the Early Trassic of ca.220Ma.

Phosphorus-bearing pyroxenes in flood basalts with native iron, Khungtukun, Polar Siberia, Russia

L.M. ZHITOVA[1,2]*, V.V. SHARYGIN[1,2], V.S. KAMENETSKY[3], N.S. KARMANOV[1] AND E.N. NIGMATULINA[1]

[1]V.S. Sobolev Institute of Geology and Mineralogy SD RAS, Novosibirsk 630090, Russia (*correspondence: zhitova@igm.nsc.ru)[2]Novosibirsk State University, Novosibirsk 630090, Russia[3]University of Tasmania, Hobart TAS 7001, Australia

Native iron from the Khungtukun trap intrusion contains melt inclusions, some of which show silicate-silicate liquid immiscibility [1, 2]. We studied in detail composition of the immiscible inclusions (0.2-1 mm). The silicate melts in them represent the aluminosilicate (60-77 wt% SiO_2) and silica-poor, Fe-Ti-Ca-P-rich (in wt%: SiO_2 15-46; FeO 15-22; TiO_2 2-7; CaO 11-27; P_2O_5 5-30) conjugate liquids; one of components mainly occurs as globules in other (Fig. 1).

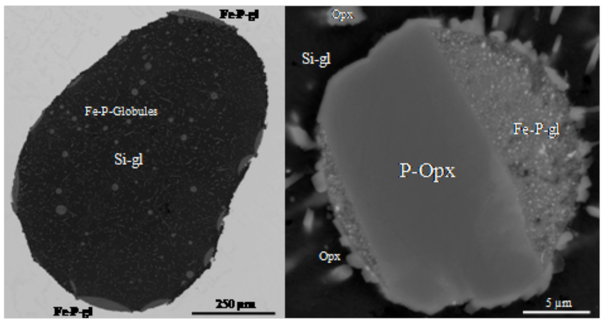

Figure 1: BSE images of an immiscible inclusion in native iron and one of Si-poor, Fe-Ti-Ca-P-rich globules in it.

In contrast with Si-rich part, the Si-poor globules contain ortho- and clinopyroxene with high P_2O_5. Composition of orthopyroxene is (in wt%): SiO_2 42.2-44.7; P_2O_5 3.3-4.3 (0.1-0.15 apfu); TiO_2 2.5-3.2; Al_2O_3 4.7-6.0; FeO 20.7-22.7; MnO 0.8-0.9; MgO 15.3-18.1; CaO 4.8-6.1; Na_2O 0.05-0.2; Mg# 55-61. Clinopyroxene is richer in P_2O_5 (up to 13 wt%) and has formula $Na_{0.05}Ca_{0.55}Fe_{0.7}Mg_{0.6}Ti_{0.1}(Al_{0.4}P_{0.4}Si_{1.2})O_6$. In general, Si-poor and P-rich nature of an immiscible liquid and reduced conditions were favourable to incorporation of P in the tetrahedral site in the structures of pyroxenes.

This work is supported by RFBR (grant 11-05-00681) and the Government of Russia (grant 14.V37.21.0879).

[1] Ryabov (1989) *Immiscibility in natural glasses*. Nauka, Novosibirsk. [2] Ryabov & Lapkovsky (2010) *Aust J Earth Sci* **57**, 707-736.

DOI:10.1180/minmag.2013.077.5.26