

Research Advances**First Report of Zircon U-Pb Ages from Lubei Cu-Ni Sulfide Deposit in East Tianshan of Central Asian Orogenic Belt, NW China**LI Ping^{*}, ZHAO Tongyang, ZHU Zhixin, TIAN Jiangtao and LI Dahai*Geological Survey Academy of Xinjiang, Urumqi 830000, Xinjiang, China***Objective**

The East Tianshan mafic-ultramafic rocks belt mainly produced in the eastern Jueluotage belt is an important part of the Central Asia Orogenic Belt (CAOB). The well-known deposits including Huangshan, Huangshandong, Tulaergen, Hulu, Xiangshan were have been consecutively discovered in this belt (Duan Xingxing et al., 2016). The new discovery of the Lubei Cu-Ni sulfide deposit in recent years, which locates in the west of Jueluotage belt, has great significance to the westward extension of the East Tianshan Cu-Ni metallogenic belt. To determine whether the mineralization age of the Lubei Cu-Ni sulfide deposit is consistent with other typical deposits, this study conducted zircon U-Pb geochronology on the diorite from the Lubei Cu-Ni sulfide deposit in order to provide new information for further exploring direction of Cu-Ni prospecting in East Tianshan.

Methods

Zircons were firstly separated from the sample using conventional density and magnetic separation techniques, and were then polished for back-scattered electron (BSE) and cathodoluminescence (CL) imaging on a JXA-8100. Zircons U-Pb dating and trace elements concentrations were determined by using a laser-ablation inductively coupled plasma mass spectrometer with Agilent 7700X at the Nanjing Focums Technology Co. Ltd., China. The spot size was 24 μm , and the standard zircon samples were 91500, GJ-1 and NIST SRM 610. Age and probability density plots were calculated using the Isoplot program 3.0. Details about the instrument are described by Duan Shigang et al. (2017).

Results

The Lubei rocks consist of peridotite, olive pyroxenite, pyroxenite, gabbro and diorite. The diorite for zircon U-Pb

dating was collected from drill hole No. ZK0004 in the Lubei deposit. It is located at the edge of the Lubei rocks, and is mainly composed of plagioclase, with small amounts of amphibole, biotite and magnetite. Most zircons from the sample exhibit similar clear oscillatory growth zoning, mostly euhedral and 50–100 μm in length, width ratio from 2:1 to 5:1. Most zircon crystals are transparent and light brown in color, and show characteristic oscillatory zoning. Th/U ratios of the analyzed zircons vary from 0.53 to 0.85, indicative of a magmatic origin. The weighted mean age and concord age obtained from 23 analytical spots are 281.2 ± 1.5 Ma (MSWD=2.4, $n=23$) and 281.3 ± 0.7 Ma (MSWD=4.2, $n=23$) (Fig. 1 and Appendix 1), respectively. This is consistent with the formation age of typical Cu-Ni deposits and mafic-ultramafic rocks such as the Huangshan, Huangshandong, and Xiangshan deposits in eastern Tianshan.

Conclusions

The Cu-Ni deposits in the East Tianshan area are mainly distributed in the Huangshan-Jing'erquan area with the mineralization ages of 298–269 Ma, which were formed in the post-collision extension environment as the product of mantle derived magma (Feng Yanqing et al., 2017). In recent years, the Lubei and Baixintan Cu-Ni deposits with medium scales have been discovered in the west of Jueluotage belt, which were formed at 281.2 ± 1.5 Ma and 284.8 ± 0.91 Ma (Feng Yanqing et al., 2017), and coincide with the formation age of typical Cu-Ni deposits in the eastern of East Tianshan area. In addition to the Lubei and Baixintan Cu-Ni deposits, there are dozens of mafic-ultramafic complexes with Cu-Ni mineralization in the western of the Jueluotage tectonic belt, such as the Yunhai, Hongling and Haibaotan deposits. It indicates that the western of the Jueluotage tectonic belt maybe the westward extension of the Huangshan-Jing'erquan Cu-Ni sulfide deposits belt, because they are located at the same metallogenic geological conditions and tectonic setting. It is considered that the western of the Jueluotage tectonic

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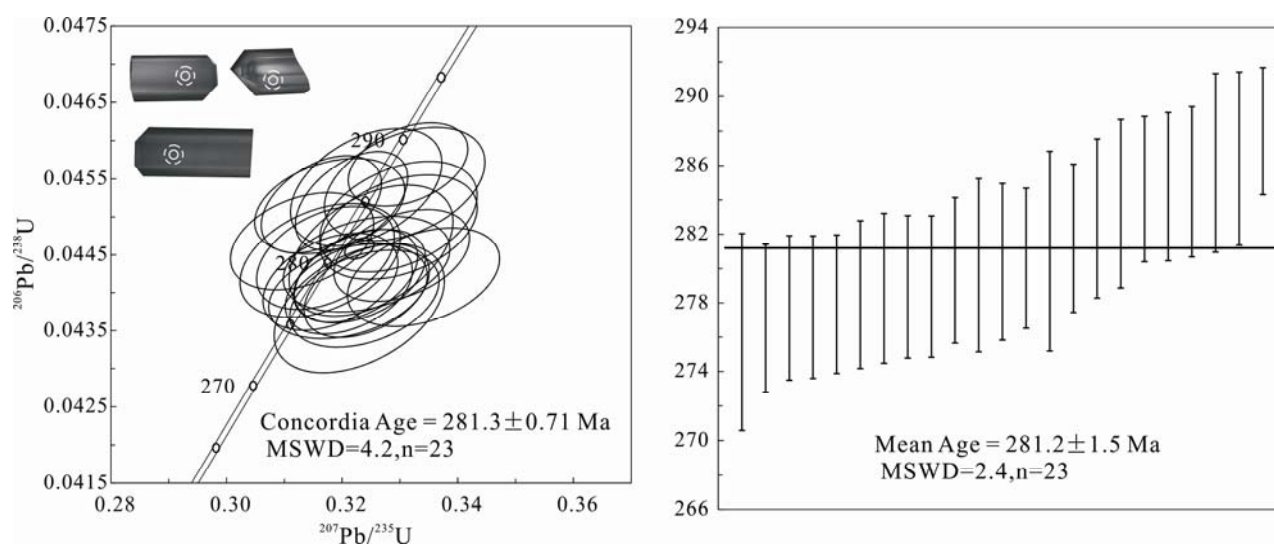


Fig. 1. Diagrams of zircon U-Pb ages of the Lubei rocks.

belt has a great potential for discovering Cu-Ni deposits, which further broadens the copper and nickel prospecting space in this belt.

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