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河北滦平周台子条带状铁矿地质特征、围岩时代及其地质意义

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摘要:

河北滦平县周台子铁矿位于华北克拉通北缘,是产于前寒武纪单塔子群变质岩系中的鞍山式铁矿,具有条带状铁建造(BIF)特征。矿石主要呈条带状构造,有的呈条纹和致密块状构造。矿石类型主要以石英磁铁矿型为主,含铁介于30%~35%。前寒武纪变质岩是矿床的主要围岩,出露有黑云母(角闪)斜长片麻岩和斜长角闪岩,局部见花岗片麻岩。原岩恢复表明,黑云母(角闪)斜长片麻岩的原岩为英安岩-流纹岩,斜长角闪岩原岩为玄武岩。花岗片麻岩的 SiO_2 含量大于56%, MgO 含量小于3%, Al_2O_3 含量大于15%, Sr 含量大于 500×10^{-6} , Yb 含量均小于 1.9×10^{-6} ,轻重稀土元素分异明显,重稀土元素强烈亏损,并且 Eu 负异常不明显,表明该片麻岩具埃达克质岩石的地球化学特征。锆石U-Pb定年结果显示出几组年龄,分别是 $2512 \pm 21\text{Ma}$, $2452 \pm 9.6\text{Ma}$, $2394 \pm 55\text{Ma}$ 。大体看, 2512Ma 代表了火山喷发和周台子铁矿BIF沉淀年龄, 2452Ma 左右的锆石年龄代表了TTG质花岗片麻岩的侵位结晶年龄, 2394Ma 锆石年龄代表了周台子铁矿经历了一次变质作用,并对原有的岩石和矿石进行了改造。锆石Hf同位素特征显示斜长角闪岩和TTG质片麻岩的岩浆源区受到过古老地壳物质的混染。周台子铁矿构造环境可能是与裂谷有关的张性环境。

英文摘要:

Zhoutaizi iron deposit lies on the northern margin of the North China Craton, which is located in Luanping, Hebei Province. The iron deposit occurred in the metamorphic rocks, Dantazi Group of Precambrian. And the deposit which has obvious banded iron formations is an Anshan type iron deposit. The banded structure is obvious in ore rock, whereas striate and massive structure is rare. The quartz magnetite type is the main ore rock type which contains 30%~35% irons. The main wall rock is the metamorphic rocks in Precambrian including biotite plagiogneiss, amphibolite and granitic gneiss. The granitic gneiss is characterized as $\text{SiO}_2 > 56\%$, $\text{MgO} < 3\%$, $\text{Al}_2\text{O}_3 > 15\%$, $\text{Sr} > 500 \times 10^{-6}$, $\text{Yb} > 1.9 \times 10^{-6}$, obvious fractionation between HREE and LREE, HREE depleted strongly, inconspicuous negative Eu anomalies. It is indicated that the granitic gneiss is geochemically similar to adakite. Zircon U-Pb analysis has shown several different ages, which are $2512 \pm 21\text{Ma}$, $2452 \pm 9.6\text{Ma}$, $2394 \pm 55\text{Ma}$, respectively. First of all, the ages around 2512Ma represent the volcanic eruption event and the sedimentary age of BIF deposit. Secondly, the ages around 2452Ma represent the crystallization age of TTG granitic gneiss. At last the ages around 2394Ma represent a metamorphic event which resulted in the modification of original rocks and ore rocks. The Hf isotope data indicates that the magma source of amphibolite and TTG granitic gneiss may be contaminated by ancient crustal material. And therefore the tectonic setting of Zhoutaizi iron deposit was extensional related to rifts.

关键词: [条带状铁建造](#) [Hf同位素](#) [锆石U-Pb年龄](#) [TTG](#) [周台子铁矿](#) [华北克拉通北缘](#)

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