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沂水青龙峪超镁铁质岩石和基性麻粒岩的锆石SHRIMP U-Pb定年

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摘要：

本文主要对沂水青龙峪出露的超镁铁质岩石和基性麻粒岩进行了锆石SHRIMP U-Pb定年研究。超镁铁质岩石以捕掳体形式存在于沂水杂岩中,不发育鬣刺结构,氧化物组成具有超镁铁质科马提岩的高MgO、富CaO、低SiO_2、TiO_2、K_2O和Na_2O含量特征;矿物组合以单斜辉石+橄榄石±斜方辉石+铬铁矿为主;变质矿物以角闪石+蛇纹石化为特征;该岩石以稀土元素总含量(ΣREE)低、LREE/HREE=3.35~4.40及Ce和Eu负异常为特征。微量元素组成以Ba、Nb、Zr负异常和Nd、Sm正异常为特征。根据锆石SHRIMP U-Pb定年法对该超镁铁质岩石中捕获的早期岩浆结晶锆石和新生的变质锆石进行的研究,年龄值分别为2657~2702Ma和2551~2585Ma,表明该超镁铁质岩石形成年龄为2585~2657Ma。基性麻粒岩的氧化物组成特征表明其属高Mg的洋岛拉斑玄武岩,麻粒岩相-高角闪岩相变质作用与新太古代的深熔和岩浆侵入作用有关,矿物组合以紫苏辉石+单斜辉石±角闪石+斜长石±石榴子石为特征;晚期蚀变作用与辉长岩墙、辉绿岩脉及石英闪长岩买的侵入有关,矿物组合以滑石化+绢云母化+绿泥石化为特征;稀土元素组成以轻重稀土元素无分异和无Eu异常为特征;微量元素组成以Nb、Zr、P、Ti负异常和Sr、K正异常为特征;锆石SHRIMP U-Pb定年结果表明麻粒岩相-角闪岩相变质作用年龄为2498.4±7.6Ma,导致麻粒岩相-角闪岩相变质的深熔和岩浆结晶年龄为2551±24Ma,晚期蚀变作用的年龄分别为2231~2235Ma和1850±19Ma。

英文摘要：

This study is focus on zircon SHRIMP U-Pb dating of ultramafic rock and mafic granulite from Qinglonyu, Yishui County, Shandong Province. Ultramafic rocks occur in the form of xenoliths in Yishui complex, without developed spinifex structure. Its oxides with high MgO ultramafic komatiites rich CaO, low SiO_2, TiO_2, K_2O and Na_2O content is characterized. Its major mineral assemblage to clinopyroxene+olivine±orthopyroxene+chromite, and metamorphic mineral to hornblende+serpentine is characterized. The ultramafic rock have fairly low REE contents with high LREE/HREE ratios (3.35~4.40) and negative Ce and Eu anomalies. The trace element to Ba, Nb, Zr negative anomalies and Nd, Sm positive anomalies is characterized. Zircon SHRIMP U-Pb dating results indicate that the magmatic crystal zircon age of 2657~2702Ma and the metamorphic zircon ages of 2551~2585Ma. The ultramafic rock formed ages between 2585~2657 Ma. The mafic granulites oxide compositions indicate its original rock is high Mg oceanic island tholeiite. The granulite facies-high amphibolite facies metamorphism related to the anatectic magma intrusion role of Neoarchean. The mineral assemblages with hypersthene+clinopyroxene±hornblende+plagioclase±garnet are characterized. The late alteration related to the intrusion of gabbro, diabase and quartz diorite. The late altered mineral assemblages include talc+sericite+chlorite etc. REE composition of light and heavy rare earth elements is no different and no Eu anomaly is characterized. Trace element compositions of Nb, Zr, P, Ti negative anomalies and Sr, K is abnormal for the characteristics. SHRIMP U-Pb zircon dating results show that the granulite facies-amphibolite facies metamorphism age of 2498.4±7.6 Ma, leading to granulite facies-amphibolite facies metamorphic anatectic magma crystallization age of 2551±24Ma, and the late alteration age of 2231~2235Ma and 1850±19Ma.

关键词：锆石 SHRIMP U-Pb定年 超镁铁质岩石 基性麻粒岩 沂水杂岩

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