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胶北南山口含榴辉石岩岩石学与锆石U-Pb定年的初步研究

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摘要:

胶北南山口镁铁-超镁铁质杂岩主要由含榴辉石岩和含榴基性麻粒岩所组成,且以不规则透镜体的形式赋存于太古宙英云闪长质片麻岩之中。岩相学观察、矿物相转变分析与矿物化学研究结果表明,胶北南山口含榴辉石岩不仅普遍发育近等温减压反应结构,即石榴石+富钙流体→单斜辉石+葡萄石+榍石±钠长石与石榴石+富钙流体+二氧化碳→角闪石+葡萄石±钠长石±方解石±榍石,指示其早期可能经历了高压麻粒岩相变质作用。而且,与南山口含榴基性麻粒岩类似,在晚期降温退变过程中,它们还经历了强烈的钙质交代作用,形成富钙矿物组合:富钙铝榴石的石榴石+次透辉石质单斜辉石+钙质角闪石+葡萄石+钠长石+方解石+榍石。SHRIMP锆石U-Pb定年结果表明,胶北南山口含榴辉石岩中的岩浆锆石记录了2900~2850Ma的²⁰⁷Pb/²⁰⁶Pb年龄,指示胶北地体在中太古代晚期存在一次重要的岩浆事件,而其变质锆石还记录了1950~1800Ma的²⁰⁷Pb/²⁰⁶Pb年龄,说明胶北南山口镁铁-超镁铁质杂岩曾卷入了胶北古元古代晚期地壳造山作用。结合研究区其它地质研究资料,本文推断胶北南山口镁铁-超镁铁质杂岩可能形成于古元古代,是华北克拉通胶-辽-吉带古元古代岩系的重要组成部分,并于1950~1800Ma期间,卷入了胶-辽-吉带古元古代造山作用,先后经历了高压麻粒岩相变质作用和晚期降温与钙质交代的联合退变质作用。

英文摘要:

The Nanshankou mafic-ultramafic complex are composed mainly of garnet-bearing pyroxenolites and garnet-bearing mafic granulites, and found as irregular lenses within the Archean tonalitic gneisses within the Jiaobei terrane, the southeastern segment of the Jiao-Liao-Ji Belt of the North China Craton. An integrated study involving petrographic observation and analysis of mineral transformation and mineral chemistry, shows that the Nanshankou garnet-bearing pyroxenolites contain the near-isothermal and decompressive metamorphic textures, such as garnet+Ca-rich liquid→clinopyroxene+prehnite+sphene±albite and garnet+Ca-rich liquid+CO₂→amphibole+prehnite±albite±calcite±sphene, indicating that the Nanshankou garnet-bearing pyroxenolites have ever undergone a high-pressure granulite-facies metamorphism. In addition, just like the Nanshankou garnet-bearing mafic granulites, the Nanshankou garnet-bearing pyroxenolites have undergone strongly calcic metasomatism during the late cooling retrograde stage and formed the typical Ca-rich mineral assemblage such as grossular-rich garnet+sahlitic clinopyroxene+Ca-rich amphibole+prehnite+albite+calcite+sphene. SHRIMP U-Pb dating of zircons from the Nanshankou garnet-bearing pyroxenolites demonstrate that the magmatic zircons record the older ²⁰⁷Pb/²⁰⁶Pb ages of 2900~2850Ma, representing the timing of the Late Mesoproterozoic magmatic event in the Jiaobei terrane, and metamorphic zircons record the younger ²⁰⁷Pb/²⁰⁶Pb ages of 1950~1800Ma, interpreted as the timing of the Late Paleoproterozoic regional collisional orogenesis of the Jiaobei terrane. Combined with other geological data of the Jiao-Liao-Ji Belt, it is speculated that the Nanshankou mafic-ultramafic rocks were probably formed at Paleoproterozoic era, belong to the representative Paleoproterozoic rock associations within the Jiao-Liao-Ji Belt, were involved in the Late Paleoproterozoic (1950~1800Ma) crustal orogenesis of the Jiao-Liao-Ji Belt, have probably undergone the peak high-pressure granulite-facies metamorphism and the late cooling retrograde metamorphism and calcic metasomatism.

关键词: [含榴辉石岩](#) [岩石学](#) [锆石U-Pb定年](#) [胶北](#) [华北克拉通](#)

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