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吕梁山前寒武纪野鸡山群火山岩的地质学、地球化学及其构造意义

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## 摘要:

吕梁山前寒武纪变质杂岩位于华北克拉通中部带中段西侧。其中野鸡山群位于该杂岩的中西部,呈NNE-SSW向狭长带状展布。野鸡山群的底部保存了变质的滨海-浅海相的砾岩和粗砂岩,中部主体岩性为变质玄武岩和玄武质安山岩,保存了良好的枕状构造,发育同期辉长岩浅成侵入体,并有少量的变质安山岩、英安岩和流纹岩。变质火山岩之上发育了良好的薄层状复理石沉积,记录了深水海相火山喷发和沉积特征。复理石之上以角度不整合沉积了河流相砾岩和含砾砂岩。岩石化学分析表明,野鸡山群火山岩有右斜式稀土配分模式,稀土总量在 $101 \times 10^{-6} \sim 240 \times 10^{-6}$ 范围内,  $(La/Yb)_N$  比值在6~13之间变化。随着 $SiO_2$ 的增加 $(La/Yb)_N$ 和负Eu异常明显增加。在原始地幔标准化的蛛网图上,所有的岩石都表现了明显的Nb、Ta、Sr、P、Ti负异常。岩石成因研究揭示这套变质火山岩组合的原始岩浆导源于成分相当于尖晶石二辉橄榄岩与石榴石二辉橄榄岩大约以等量混合地幔源区的低度部分熔融。岩浆演化过程中经历了单斜辉石和少量斜长石的分离结晶,并在上升过程中受到了地壳物质的混染。综合地质学、岩石学和地球化学研究,结合前人的Sm-Nd同位素研究成果,野鸡山群变质火山岩组合最有可能形成于大陆边缘岛弧的弧后靠近岛弧一侧的构造背景,其形成可能与古元古代晚期洋壳俯冲作用有关。

## 英文摘要:

Precambrian Lüliang metamorphic complex is located in western side within middle segment of the Trans-North China Craton. Of which the Yejishan Group in the middle to western part of the Complex, distributes along a NNE-SSW striking narrow and longer zone. Littoral to neritic facies conglomerates and coarse sandstones are preserved in the bottom sequence. However, there are the metamorphic basalt, basaltic-andesite with good pillow structure, having synchronous hypabyssal gabbro intrusions and a little of andesite, dacite and rhyolite in the metamorphic volcanic assemblage of the middle sequence of the Yejishan Group. Upper on the metamorphic volcanic rock sequence, deep water flysch sediment sequences were well kept. Middle and bottom metamorphic volcanic and sedimentary sequences are unconformably overlain by the upper fluvial sediments of conglomerate and coarse sandstone. Petrochemical analyses reveal that the metamorphic volcanic rocks in the Yejishan Group have right-declined chondrite-normalized REE patterns and total REE concentration of  $101 \times 10^{-6} \sim 240 \times 10^{-6}$ ,  $(La/Yb)_N$  values vary within 6~13 range. The  $(La/Yb)_N$  values and negative Eu anomalies aggrandize gently with the  $SiO_2$  increasing. On the primitive mantle normalized spider diagrams, all analyzed samples show significantly negative Nb, Ta, Sr, P, Ti anomalies. Studies in petrogenesis reveal that the apparent magma of the metamorphic volcanic rock suite derived from low-degree partial melting of the spinel and garnet lherzolites (50:50), and the apparent magma underwent fractionation of the clinopyroxene and some plagioclase. The derivative magma was also contaminated by continent crustal materials during their ascending. Integrated the geology, petrological association, geochemistry and previous Sm-Nd isotopes, this metamorphic volcanic rock suite is most likely to be produced in the post-arc tectonic background at a side of the arc.

关键词: [野鸡山群](#) [变质火山岩](#) [岩石成因](#) [构造背景](#) [前寒武纪](#) [吕梁杂岩](#)

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