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冀东晚古生代东湾子岩体的岩石成因研究

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摘要:

冀东晚古生代东湾子岩体由角闪石岩、少量辉石岩和辉长岩组成。典型的堆晶结构、全岩和镁铁质矿物(透辉石、角闪石)的上凸型稀土分布模式、相容元素含量低且变化范围大(如: 角闪石岩中 $V=296\times 10^{-6}\sim 673\times 10^{-6}$)的特征表明了岩体的堆晶成因。计算得到的与辉石岩中的透辉石相平衡的熔体具有很高的稀土含量,轻重稀土分馏较为明显,富集大离子亲石元素(如: Sr, Ba, K),亏损高场强元素(如: Nb, Zr, Ti),具有典型的弧岩浆特征。透辉石和角闪石的矿物成分也具有弧岩浆的特征。高钙透辉石、大量的角闪石与黑云母的存在说明母岩浆富水。透辉石在高 P_{H_2O} 的状态下与熔体反应,生成角闪石的结构特征也证明了这一点。结合岩体的球化学特征,认为岩浆来源于富集的含有角闪石的尖晶石橄榄岩的部分熔融,母岩浆具有富水的特征(>3%)。考虑到岩体形成时代(~300Ma; Zhao *et al.*, 2007)和地质背景,认为东湾子岩体与位于华北北缘的其它晚石炭-早二叠世的岩体形成于同一构造背景下,都是晚古生代时期古亚洲洋向华北板块之下俯冲的产物。

英文摘要:

The Late Paleozoic Dongwanzi pluton is made up of hornblendite, pyroxenite and gabbro. Cumulate origin of these rocks is suggested by the cumulative textures, the convex-upward REE patterns of whole rock and mafic minerals (diopside and hornblende), and the low and large variation of compatible elements such as V in hornblendites. Calculated REE patterns of the parental magma in equilibrium with the pyroxenite show strong fractionation between LREE and HREE. The enrichment in LILE (e. g. Sr, Ba, K) and depletion in HFSE (e. g. Nb, Ta, Ti), along with the compositions of diopside and hornblende, suggest their arc magmatic affinity. High Ca-diopside, magmatic hornblende and the reactions between diopside and melt to form amphibole all can be attributed to the high content of water in the parental magma. It seems that the parental magma with H_2O content >3%, was originated from partial melting of a metasomatized mantle wedge which was dominated by amphibole-bearing spinel peridotite. The metasomatism by fluids released from the down-going Paleo-Asian oceanic slab led to the formation of the enriched mantle. Based on these data, we believe that the Dongwanzi mafic pluton was formed as a consequence of subduction of the Paleo-Asian Ocean beneath the northern margin of the North China craton.

关键词: [东湾子岩体](#) [晚古生代](#) [堆晶](#) [活动大陆边缘](#) [华北板块](#)

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