王萌,张招崇,侯通,骆文娟. 2011. 攀西地区大板山岩体的年代学、元素地球化学及其对铜镍硫化物矿床成因的约束. 岩石学报, 27(9): 2665-2678

攀西地区大板山岩体的年代学、元素地球化学及其对铜镍硫化物矿床成因的约束

作者	单位	E-mail
王萌	中国地质大学地质过程与矿产资源国家重点实验室,北京 100083	
张招崇	中国地质大学地质过程与矿产资源国家重点实验室,北京 100083	zczhang@cugb.edu.cn
侯通	中国地质大学地质过程与矿产资源国家重点实验室,北京 100083	
骆文娟	中国地质大学地质过程与矿产资源国家重点实验室,北京 100083	

基金项目：本文受国家973项目(2009CB421002)和国家自然科学基金项目(40925006)联合资助.

摘要：

大板山镁铁-超镁铁质杂岩体位于攀西地区西北部,受金河-菁河断裂带控制,主要岩石类型有辉长岩、苏长辉长岩和二辉橄榄岩。本次研究集中于苏长辉长岩和二辉橄榄岩,其中,二辉橄榄岩具有明显的堆晶结构,橄榄石Fo值最高可达81.4。二辉橄榄岩SiO_2含量为42.93%~44.18%,苏长辉长岩SiO_2含量为44.89%~52.76%,稀土总量(ΣREE)相对较低(23.2×10^{-6}~61.7×10^{-6}),并均呈现出近平行的、相对平缓的右倾稀土元素配分模式,说明其为同源岩浆演化的关系。此外,大部分样品相对富集大离子亲石元素(LILE;如Rb、Sr、Ba等),适度亏损高场强元素(HFSE;如Nb、Ta、Ti等)。结合其较低的SiO_2含量和微量元素比值(如Th/Ta和La/Nb等),表明岩浆未遭受大量的地壳混染。岩相学和岩石地球化学特征均显示了非常明显的分离结晶作用。根据$(Tb/Yb)_{PM}$-$(Yb/Sm)_{PM}$图解,大板山岩体的原始岩浆主要来源于岩石圈地幔轻度富集不相容元素的尖晶石相二辉橄榄岩。二辉橄榄岩样品中橄榄石Fo-NiO图解中多数点落在硫化物未熔离的范围,且样品全岩Cu/Zr比值为7.04~103,而苏长辉长岩中Cu/Zr比值为0.88~5.56,反映了二辉橄榄岩-苏长辉长岩可能经历了由S不饱和到过饱和的过程。推测硫化物的熔离可能是岩浆在上地壳岩浆房中发生了以橄榄石和辉石为主的分离结晶作用,造成硫化物达到过饱和。锆石LA-ICP-MS测年表明,岩体年龄为259.69±0.61Ma,与峨眉山大火成岩省其它镁铁-超镁铁质岩体的形成时间基本一致。

英文摘要：

The Dabanshan mafic-ultramafic intrusion, situated in the northwestern part of the Panxi district, is confined by the Jinhe-Jinghe fault. It consists predominantly of gabbros, noritegabbros and lherzolites. This study focuses on the petrogenesis of noritegabbros and lherzolites, in which the cumulus texture is pronounced and the olivine has maximal forsterite content (Fo) of 81.4%. The SiO_2 content of lherzolites ranges from 42.93% to 44.18%, whereas SiO_2 of noritegabbros varies between 44.89% and 52.76%. The total REE contents of the two types of rocks are relatively low (23.2×10^{-6}~61.7×10^{-6}), and are enriched in LREE. The similar REE patterns suggest that they are co-magmatic. Most of the samples are slightly enriched in large ion lithophile elements (LILEs, e.g. Rb, Ba and Sr) and moderately depleted in high field strength elements (HFSEs, e.g. Nb, Ta and Ti), suggesting that the magmas had not experienced significant crustal contamination. The petrographic characteristics and the geochemical signatures indicate an intensive fractional crystallization. On $(Tb/Yb)_{PM}$ versus $(Yb/Sm)_{PM}$ diagram, the primitive magma which formed the Dabanshan intrusion was likely derived from the incompatible elements-enriched spinel-facies lherzolite of lithospheric mantle. Most plots of NiO versus Fo contents in olivine show that the sulfides separated from the parental magma by liquid immiscibility, which is also supported by the bulk-rock Cu/Zr ratios in lherzolite (7.04~103) and noritegabbro (0.88~5.56). These suggested that the noritegabbros-lherzolites underwent undersaturation to oversaturation of sulfur, which could be attributed to fractional crystallization in high-level magma chamber, accounting for the sulfide segregation. LA-ICP-MS zircon data yield U-Pb age of 259.69±0.61Ma, being consistent with the ages of other mafic-ultramafic intrusions in Emeishan large igneous province.

关键词：地球化学 岩浆演化 矿床成因 锆石U-Pb年代学 大板山岩体 攀西

投稿时间： 2011-03-21 最后修改时间： 2011-07-04

HTML 查看全文 查看/发表评论 下载PDF阅读器

单位地址：北京9825信箱/北京朝阳区北土城西路19号