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北秦岭东段二郎坪群基性火山岩中浅色岩体的地球化学、年代学及其地质意义

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摘要：

豫西湾潭地区二郎坪群基性火山岩中存在颜色深浅不同的浅色岩体。它们呈透镜状或不规则脉状产出,主要由斜长石(50%~60%)和石英(40%~50%)组成,另含少量黑云母和绿泥石(<3%)。地球化学研究显示,这些浅色岩体主要为英云闪长岩或为奥长花岗岩,具有高Si、富Na,极端贫K,中等Al,低Fe、Mg、Ti的特点,与大洋斜长花岗岩的成分特征相似。微量元素方面则显示出富集Ba、Th等大离子亲石元素,亏损Nb、Ta、Zr、Hf等高场强元素的岛弧花岗岩特征。在多种主、微量元素判别图解中,这些不同颜色的浅色岩体之间及与二郎坪蛇绿岩中的基性火山岩之间都显示出明显的结晶分异特征,指示这些浅色岩体与二郎坪蛇绿岩一起形成在弧后盆地环境,是幔源低钾拉斑玄武质岩浆结晶分异的产物。LA-ICP-MS锆石定年结果得到两个斜长花岗岩样品的形成年龄分别为468.5±1.5Ma和470.0±2.6Ma,代表浅色岩体的结晶年龄。该年龄与新近获得的二郎坪群基性火山岩的形成年龄(475±1.5Ma)一致,表明北秦岭二郎坪群弧后盆地型蛇绿岩的形成时代为~ 470Ma的早古生代。二郎坪基性火山岩470Ma的形成时代和弧后盆地型蛇绿岩的构造属性与秦岭群超高压榴辉岩的原岩年龄(~800Ma)及板内玄武岩的地球化学属性截然不同,而且470Ma年龄明显晚于其南侧秦岭群中超高压榴辉岩~500Ma的峰期变质年龄,暗示二郎坪群基性火山岩与其南侧的北秦岭超高压榴辉岩可能直接成因联系。

英文摘要：

Detailed field investigation discovered two types of leucosomes in basic volcanics of the Erlangping Group in the Wantan area of western Henan Province. They occur as lenses or irregular veins within the volcanics and are light grey and offwhite respectively. Their mineral compositions consist mainly of different content of plagioclase (50%~60%) and quartz (40%~50%) and minor amount of biotite and chlorite (<3%). Geochemical signatures indicate that these leucosomes are tonalite or trondhjemite. Their high Si and Na contents, moderate Al contents, low Fe, Mg, Ti contents and very low K concentrations are similar to that of oceanic plagiogranite. Whereas, the enrichment of Ba, Th and depletion of Nb, Ta, Zr and Hf (HFSE) are comparable to that of ocean ridge granite (ORG), indicating an affinity of island arc magmatism. The distribution and correlation between the two kinds of leucosomes and between leucosome and the Erlangping basalts in different major and trace element discrimination diagrams indicate that these different leucosomes are the products of crystallization differentiation of mantle-derived low-K tholeiitic basaltic magma in the setting of back-arc basin. Zircon LA-ICP-MS U-Pb dating for two leucosomes yield their crystallization ages of 468.5±1.5Ma and 470.0±2.6Ma, respectively. These ages are consistent with the emplacement timing of the Erlangping basic volcanics (475±1.5Ma) indicating that the Erlangping back-arc ophiolite was formed during ~470Ma. The formation age (470Ma) and back-arc basin ophiolite affinity of Erlangping volcanics is quite different from the protolith age (~800Ma) and within plate basalts (WPB) affinity of the UHP eclogites in the Qinling Group, and 470Ma is also younger than the metamorphic age (~500Ma) of the North Qinling UHP eclogites. It suggests that the North Qinling UHP eclogites may have no genetic relationship with the Erlangping basic volcanics.

关键词：大洋斜长花岗岩 弧后盆地 地球化学 锆石LA-ICP-MS U-Pb定年 二郎坪群 北秦岭

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