

论文

扬子地块西北缘轿子顶新元古代过铝质花岗岩：锆石SHRIMP U-Pb年龄和岩石地球化学及其构造意义

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摘要:

对扬子地块西北缘后龙门山地区轿子顶穹窿构造核部的花岗岩类进行了锆石U-Pb年代学和岩石地球化学研究,以便对其形成时代和岩石成因进行约束。研究表明,轿子顶花岗岩体中变形花岗岩和块状花岗岩中锆石均发育岩浆韵律环带结构,具有较高的Th/U比值(0.52~1.23, 0.32~1.16),为岩浆成因锆石。对变形花岗岩和块状花岗岩中岩浆锆石的SHRIMP U-Pb定年结果分别为(793±11) Ma和(792±11) Ma,表明它们的形成时代完全一致,均为新元古代晚期南华纪早期。轿子顶花岗岩体的SiO<sub>2</sub>(72.01%~77.65%) and Al<sub>2</sub>O<sub>3</sub>(12.12%~14.18%)含量均很高,A/CNK在0.95~1.13(平均为1.04),为硅和铝过饱和类型,属典型的过铝质花岗岩,具有S型花岗岩特征;稀土元素总量(ΣREE)为(75.81~79.97)×10<sup>-6</sup>(平均为77.89×10<sup>-6</sup>),稀土元素配分曲线呈右倾型,具有弱—中等的负Eu异常;高场强元素(Ta、Nb、Ti等)具有明显的负异常,大离子亲石元素(Rb、Ba、Sr等)具有明显的正异常。岩体是以杂砂岩成分为主的沉积岩部分熔融形成的花岗质岩浆上升侵位过程中形成的,是一种典型的壳源成因类型。轿子顶岩体具有后碰撞岩浆活动的特征,是新元古代扬子地块西北缘活动大陆边缘俯冲以及弧陆碰撞造山作用导致的地壳增厚下地壳部分熔融的产物,形成于同碰撞(挤压环境)向碰撞后(伸展环境)转化阶段,即后造山期,是Rodinia超大陆初始裂解阶段产物。

关键词: 过铝质花岗岩; 地球化学; 锆石SHRIMP U-Pb年龄; 新元古代; 扬子地块西北缘; Rodinia超大陆

Neoproterozoic Jiaoziding peraluminous granite in the northwest margin of Yangtze Block: Zircon SHRIMP U-Pb age and geochemistry, and their tectonic significance

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Abstract:

Abstract: The granite of Jiaoziding dome core is located in back Longmenshan Area of the northwest margin of Yangtze Block. The study of granite's zircon SHRIMP U-Pb geochronology and geochemistry is aiming at constraining its formation age and petrogenesis. The results show that the zircons of the samples in deformative granite and massive granite of the Jiaoziding granites have internal oscillatory zoning; zircons of the Jiaoziding granites have higher Th/U ratios (0.521.23, 0.321.16) and are igneous in origin. The results of zircon SHRIMP U-Pb dating for deformative granite and massive granite were (793±11) Ma and (792±11) Ma respectively, which indicates that the granite intrusions formed in Nanhua period of the late Neoproterozoic, and their formation times are fully coincident. The Jiaoziding granite is high in SiO<sub>2</sub> (72.01%~77.65%) and Al<sub>2</sub>O<sub>3</sub> (12.12%~14.18%), and its A/CNK=0.951.13 (1.04 on average). It is a typical peraluminous granites, with supersaturation in Al and Si, and is identified as S type granite. The abundance of ΣREE varies in the range of (75.8179.97) ×10<sup>-6</sup> (77.89×10<sup>-6</sup> on average). The rocks show a LREE enrichment pattern and obviously weak to intermediate negative Eu anomalies. The trace element geochemistry is characterized evidently by negative anomaly of Ta, Nb, Ti, etc. and positive anomaly of Rb, Ba, Sr, etc. The granite emplaced by underplating of granitic magma, which formed through partial melting of sedimentary mainly of arenite, and is typical crust source petrogenesis. The Jiaoziding granite shows the characteristics of post collisional granite, and is regarded as the post orogenic granite. Thus the granite intrusions are interpreted as syn collisional granites resulted from the crustal thickening caused by active continental margin subduction and arc-continent collision orogeny during the Neoproterozoic in the northwest margin of Yangtze Block. The granitic intrusion formed in a transitional environment from syn collision (compressional environment) to post collision (extensional environment), and is the product of the initial break up of Rodinia supercontinent.

Keywords:

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Key words: peraluminous granites; geochemistry; zircon SHRIMP U-Pb age; Neoproterozoic; northwest margin of Yangtze Block; Rodinia supercontinent

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