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北山辉铜山泥盆纪钾长花岗岩锆石U-Pb年龄、成因及构造意义

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摘要:

LA-ICP-MS锆石U-Pb定年结果表明,北山柳园地区辉铜山钾长花岗岩的形成年龄为 $397 \pm 3\text{Ma}$ (MSWD=1.1)。地球化学特征显示为高钾钙碱性的高分异I型花岗岩到A型花岗岩过渡的特征。其全岩 $\epsilon_{\text{Nd}}(t)$ 值为-1.3~+1.2, Nd模式年龄(t_{DM})为960~1530Ma; 锆石 $\epsilon_{\text{Hf}}(t)$ 值为-1.0~+5.8, 两阶段Hf模式年龄($t_{\text{DM}2}$)为1024~1455Ma。地质背景、地球化学和同位素综合分析显示,辉铜山岩体为造山后伸展拉张背景下,幔源岩浆底侵导致上覆年轻地壳(可能为洋壳、岛弧建造或增生楔物质)部分熔融形成的钙碱性花岗闪长质岩浆经进一步演化及结晶分异形成。北山南带地区早-中泥盆世花岗岩显示出高分异钙碱性I型花岗岩、I-A型花岗岩和A型花岗岩的组合特征。因此,在397Ma左右,北山地区古生代岩浆已经从I型或S型转化为I-A型特征,构造环境转化为后造山或同造山晚期的伸展环境。

英文摘要:

LA-ICP-MS zircon U-Pb dating yields a $^{206}\text{Pb}/^{238}\text{U}$ age of $397 \pm 3\text{Ma}$ (MSWD=1.1) for the Huitongshan K-feldspar granite, and is interpreted as the emplacement age. Major and trace elements show a transition feature from high-K calc-alkaline or high-fractionated I-type granite to A-type granite. Their $\epsilon_{\text{Nd}}(t)$ values are between -1.3 and +1.2, t_{DM} values of 960Ma to 1530Ma; zircon $\epsilon_{\text{Hf}}(t)$ values from -1.0 to +5.8, and $t_{\text{DM}2}$ from 1024Ma to 1455Ma. Integration analysis of structural pattern, geochronology, geochemistry and Sr-Nd-Hf isotope, as well as regional geology suggest that this granitic pluton was emplaced in a post-orogenic setting or a late stage of syn-orogenic setting. The granitic magmas were, probably originated from crystallization/differentiation of earlier calc-alkaline granodioritic magmas formed by partial melting of juvenile crust (maybe oceanic crust, island arc or accretionary wedge) due to underplated mantle-derived magmas. Early-middle Devonian granites show associate characteristics of high-fractionated I-type, I-A type and A-type. Therefore, Paleozoic magmatism transformed from syn-orogenic I/S type into I-A type feature at about 397Ma in the Beishan area and tectonic setting has transformed into a post-orogenic extensional setting or a late-stage of syn-orogenic setting.

关键词: [锆石U-Pb年龄](#) [高分异I-A型花岗岩](#) [Sr,Nd,Hf同位素](#) [构造环境](#) [北山造山带](#)

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