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安徽省金寨县沙坪沟钼矿含矿岩体锆石U-Pb年龄和Hf同位素特征及其地质意义

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摘要:

安徽省金寨县沙坪沟斑岩型钼矿位于大别山东段,钼矿化与石英正长斑岩和爆破角砾岩紧密相关。石英正长斑岩和爆破角砾岩LA-ICP-MS锆石U-Pb年龄分别为 $116.1 \pm 2.2\text{Ma}$ 和 $112.9 \pm 1.2\text{Ma}$,侵位于早白垩世。两类岩石都显示出高钾、富碱、富铝的特点,属过铝质A型花岗岩,具有较高浓度的大离子亲石元素和相对低含量的高场强元素以及较低的HREE和Y、Yb含量,暗示其源于石榴石作为残留相的较深层次的地下壳物质部分熔融。石英正长斑岩 $\epsilon_{\text{Hf}}(t)$ 变化于-14.4~-12.4,分布于亏损地幔演化线之下, t_{DM2} 变化于1598~1707Ma,指示岩浆源于古老下地壳物质的部分熔融,古老下地壳可能由宽坪群(1.85~1.4Ga)组成;爆破角砾岩 $\epsilon_{\text{Hf}}(t)$ 为-10.1~-2.7, t_{DM2} 为1097~1486Ma,指示物源区比斑岩更年轻,可能来自宽坪群与地幔物质的混合。以上表明,从石英正长斑岩到爆破角砾岩,成岩岩浆来源变深,由地壳为主演变为壳幔混合,形成于碰撞造山加厚地壳的减薄过程;在大地构造上,能够作为源区的地层单元皆分布于矿区以北,因此我们认为在中生代碰撞造山过程中,华北大陆板块向南俯冲到大别山之下。

英文摘要:

The Shapingou porphyry molybdenum deposit in Jinzhai County, Anhui Province is located in eastern Dabie Shan. Mo mineralization is closely associated with the Shapinggou quartz-orthophyre and breccia pipes, which yield LA-ICP-MS zircon U-Pb ages $116.1 \pm 2.2\text{Ma}$ and $112.9 \pm 1.2\text{Ma}$, respectively. The porphyritic rocks and breccias have high contents of K_2O , Al_2O_3 and alkali, petrochemically resembling the peraluminous A-type granitoids. They are enriched in LILE, depleted in HFSE, HREE, Y and Yb, and have been generated by partial melting of a thickened lower crust with garnet residues. The $\epsilon_{\text{Hf}}(t)$ values of the porphyry range from -14.4 to -12.4, which are below the depleted mantle line, with $t_{\text{DM2}}(\text{Hf})$ of 1598Ma to 1707Ma, suggesting that the porphyry was originated from partial melting of the crust mainly composed of the Kuanping Group (1.85~1.4Ga). The explosive breccias yield $\epsilon_{\text{Hf}}(t)$ values of -10.1 to -2.7, and t_{DM2} of 1097Ma to 1486Ma, indicating that the explosive breccias, compared to the porphyry, were originated from a younger source mixed by the Kuanping Group and the mantle. This suggests that from the porphyry to breccias the parental magma source became deeper, from an old crust-dominated to crust-mantle mixture; and that the tectonic setting involved a crustal thinning from a thickened crust resulted from continental collision orogeny. Moreover, the above mentioned stratigraphic units are tectonically north of the Shapinggou deposit, which leads us to envisage a tectonic model that the North China continent southwardly underthrusts beneath the northern Dabie Shan during Mesozoic continental collision.

关键词: [锆石U-Pb年龄](#) [Hf同位素](#) [斑岩矿床](#) [沙坪沟钼矿](#) [大别山](#)

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