

杨水源, 蒋少涌, 赵葵东, 姜耀辉, 范洪海. 2012. 江西相山铀矿田邹家山矿床中流纹斑岩的锆石U-Pb年代学、岩石地球化学与Sr-Nd-Hf同位素组成. 岩石学报, 28(12): 3915-3928

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基金项目: 本文受科技部973项目(2012CB416706)和教育部重大项目(306007)联合资助。

摘要:

在相山铀矿田邹家山矿床中发现晚期侵入到碎斑熔岩中的流纹斑岩岩脉。本文运用激光等离子质谱(LA-ICP-MS)对该岩脉中锆石进行了U-Pb年龄测定, 获得了 $134.6 \pm 1.2\text{Ma}$ (2σ , $\text{MSDW}=1.2$)的形成年龄。该年龄与我们已报导的相山火山侵入杂岩中流纹英安岩、流纹英安斑岩、碎斑熔岩等岩石的年龄一致, 进一步表明相山大规模火山活动的时间为早白垩世, 并且是一次集中的岩浆活动。相山邹家山流纹斑岩具有高硅、富钾、铝过饱和指数(A/CNK)大于1.1, 属于过铝质岩系。该岩石还具有Rb、Th、U、La、Ce、Nd、LREE元素相对富集; Nb、Ta、Sr、P、Ti明显负异常和中等铕负异常($\text{Eu}/\text{Eu}^*=0.32\sim 0.46$)的特点。岩石的锶同位素初始比值 I_{Sr} 为0.7097~0.7136, $\epsilon_{\text{Nd}}(t)$ 值为-8.49~-9.62, 锆石的 $\epsilon_{\text{Hf}}(t)$ 值为-3.6~-9.4(集中在-7到-9之间), 这些特征表明相山流纹斑岩为硅铝层地壳物质重熔演化的产物。流纹斑岩的Sr-Nd同位素, 锆石Hf同位素以及稀土元素配分模式与前人报导的相山火山岩、次火山岩及基底变质岩相似, 表明相山火山侵入杂岩在成岩物质的来源上与基底变质岩关系密切, 可能是由基底变质岩经部分熔融的产物。结合前人的研究资料, 认为相山流纹斑岩可能也是形成于与太平洋板块俯冲作用有关的弧后拉张环境。

英文摘要:

A rhyolite porphyry dyke was found in the Zhoujiashan uranium ore deposit from the Xiangshan uranium ore field, which intruded into the porphyroclastic lava in the Xiangshan volcanic complex. LA-ICP-MS zircon U-Pb dating shows that this rock was formed at $134.6 \pm 1.2\text{Ma}$ ($\text{MSDW}=1.2$). This age is similar to those of rhyodacite in the early stage and rhyodacitic porphyry in the late stage of the Xiangshan volcanic complex, which suggests that the volcanic-intrusive activity in the Xiangshan region began in Cretaceous and the activity is concentrative. Geochemically, the rhyolite porphyry shows high Si and K contents and peraluminous with $\text{A/CNK}>1.1$. The rock is enriched in Rb, Th, U, La, Ce, Nd and LREE; depleted in Nb, Ta, Sr, P and Ti; and has moderate negative Eu anomaly ($\text{Eu}/\text{Eu}^*=0.32\sim 0.46$). The $^{87}\text{Sr}/^{86}\text{Sr}$ initial ratios range from 0.7097 to 0.7136, the $\epsilon_{\text{Nd}}(t)$ values range from -8.49 to -9.62, and zircon $\epsilon_{\text{Hf}}(t)$ values range from -3.6 to -9.4 (mostly between -7 and -9), with Hf depleted mantle model ages mostly between 1.6Ga and 1.7Ga. These geochemical and isotopic data indicate that the sources of the rhyolite porphyry were likely derived from partial melting of crustal materials. Based on the similar patterns of Sr-Nd isotopes, zircon Hf isotopes and REE patterns of the rhyolite porphyry to those of the Xiangshan volcanic rocks, subvolcanic rocks and the metamorphic rocks of the basement, it is suggested that the sources of the Xiangshan volcanic complex have a close relationship with the metamorphic rocks; they may have been derived mainly from partial melting of crustal rocks resembling the basement metamorphic rocks. In combination with previous studies, we concluded that the Xiangshan rhyolite porphyry may have formed in a back-arc extensional setting which related to subduction of the Palaeo-Pacific plate.

关键词: [流纹斑岩](#) [LA-ICP-MS锆石U-Pb年龄](#) [岩石地球化学](#) [Hf同位素](#) [相山铀矿田](#)

投稿时间: 2012-07-25 最后修改时间: 2012-10-16

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