

原娅斌,袁顺达,陈长江,霍然. 2014. 黄沙坪矿区花岗岩类的锆石U-Pb年龄、Hf同位素组成及其地质意义. 岩石学报, 30(1): 64-78

黄沙坪矿区花岗岩类的锆石U-Pb年龄、Hf同位素组成及其地质意义

作者	单位	E-mail
原娅斌	中国地质大学地球科学与资源学院, 北京 100083	
袁顺达	中国地质科学院矿产资源研究所, 国土资源部成矿作用与矿产资源评价重点实验室, 北京 100037	shundayuan@cags.ac.cn
陈长江	湖南省湘南地质勘察院, 郴州 423000	
霍然	湖南省湘南地质勘察院, 郴州 423000	

基金项目: 本文受国家重点基础研究“973”项目(2012CB416704); 国家自然科学基金项目(41173052、41373047、40903020)和中央级公益性科研院所基本业务费专项资金(K1204)联合资助。

摘要:

黄沙坪矿床是湖南最大的铅锌矿床。矿区内岩浆活动复杂, 矿化类型齐全, 成矿元素多样, 是湘南地区斑岩-矽卡岩-热液脉型Cu多金属与W-Sn多金属复合成矿作用的典型代表。为厘清区内不同花岗质岩石的时间格架、源区特征及其与成矿的关系, 本次研究对黄沙坪矿区的不同类型花岗岩进行了系统的锆石LA-ICP-MS U-Pb定年和Hf同位素组成研究, 研究表明, 英安斑岩、二长花岗斑岩和石英斑岩的侵位年龄分别为 $158.5 \pm 0.9\text{Ma}$ 、 $155.2 \pm 0.4\text{Ma}$ 、 $160.8 \pm 1.0\text{Ma}$, 石英斑岩内花岗质岩石包体可能形成于 $220.4 \pm 1.2\text{Ma}$ 。另外, 在二长花岗斑岩锆石中发现古元古代-新太古代的继承锆石核。不同花岗质岩石中, 中晚侏罗世锆石的 $\epsilon_{\text{Hf}}(t)$ 值为 $-7.6 \sim -3.2$, Hf同位素两阶段模式年龄为 $1.7 \sim 1.4\text{Ga}$, 表明该区花岗质岩浆主要源自中元古代的古老基底物质部分熔融。继承锆石中接近0的 $\epsilon_{\text{Hf}}(t)$ 负值($-1.5 \sim -0.07$)和 $\epsilon_{\text{Hf}}(t)$ 正值($0.5 \sim 6.5$)暗示形成这些古老继承锆石的初始物质中有幔源物质的加入。黄沙坪矿区不同类型花岗质岩石的锆石年龄和Hf同位素特征表明, 英安斑岩、二长花岗斑岩、石英斑岩可能是同源同时期岩浆演化的产物, 与矿床成矿年龄($154 \sim 159\text{Ma}$)接近, 反映其成岩成矿具有密切的时空联系。花岗岩中存在多组古老的残留锆石, 暗示了黄沙坪地区自新太古代以来经历了复杂的岩浆作用, 这可能是区内Cu-Pb-Zn-W-Mo-Fe多金属复合型矿床形成的关键要素。

英文摘要:

The Huangshaping polymetallic deposit is the largest lead-zinc mine in Hunan Province. There are various kinds of magmatic rocks distributing in this mining area, associated with W-Sn-Cu-Pb-Zn-Ag polymetallic mineralization. It's also a representative deposit in southern Hunan with porphyry-skarn-vein Cu-Pb-Zn-Ag and W-Sn polymetallic superimposed mineralization. To clarify the geochronological framework and source characteristics of Huangshaping granitoids, and to address the temporal relationship between magmatism and mineralization, three types of granite including dacite porphyry, monzogranite porphyry and quartz porphyry, and the enclaves hosted in the quartz porphyry in Huangshaping were collected for zircon U-Pb dating and Hf isotope analysis. The results show that the zircon U-Pb ages of the dacite-porphyry, monzogranite porphyry and quartz porphyry are $158.5 \pm 0.9\text{Ma}$, $155.2 \pm 0.4\text{Ma}$ and $160.8 \pm 1.0\text{Ma}$, respectively. The zircon U-Pb age of the enclave hosted in the quartz porphyry is $220.4 \pm 1.2\text{Ma}$. The inherited zircon cores that yield Paleoproterozoic and Neoproterozoic ages were found in the monzogranite porphyry. Igneous zircons of Middle-Late Jurassic have low and similar $\epsilon_{\text{Hf}}(t)$ values of $-7.6 \sim -3.2$ and Mesoproterozoic ($1.7 \sim 1.4\text{Ga}$) depleted-mantle model ages, which is interpreted to reflect derivation from old crust source. Those old zircons yield positive $\epsilon_{\text{Hf}}(t)$ values of $0.5 \sim 6.5$ and negative of $-1.5 \sim -0.07$, suggesting involvement of the depleted mantle source in the magma generation. The zircon U-Pb dating and Hf isotope analysis of different kinds of granitoids in ore district imply that they had a cognate origin related to partial melting of ancient continental crust. These data also provide important evidence for temporal-spatial connections of emplacement of the granitoids and W-Sn-Cu-Pb-Zn-Ag polymetallic mineralization in the Huangshaping mining area. In addition, U-Pb ages of the inherited zircon cores indicate that this area has undergone a complex magmatic history, which maybe the crucial reason of the formation of Cu-Pb-Zn-W-Mo-Fe polymetallic deposit.

关键词: [锆石U-Pb定年](#) [Hf同位素](#) [继承锆石](#) [黄沙坪岩体](#)

投稿时间: 2013-08-11 最后修改时间: 2013-11-28

黔ICP备07002071号-2

主办单位：中国矿物岩石地球化学学会

单位地址：北京9825信箱/北京朝阳区北土城西路19号

本系统由北京勤云科技发展有限公司设计

