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姜丽莉,薛传东,侯增谦,向坤. 2015. 滇西北甯哥正长岩体成因:锆石U-Pb年龄、Hf同位素和地球化学证据. 岩石学报, 31(11): 3234-3246

滇西北甯哥正长岩体成因:锆石U-Pb年龄、Hf同位素和地球化学证据

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基金项目: 本文受973项目(2015CB452601)和国家自然科学基金项目(U0933605)联合资助。

摘要:

滇西北甯哥金矿区赋矿岩石类型主要为黑云辉石正长岩、黑云母正长岩及正长斑岩。锆石LA-ICP-MS定年结果表明黑云辉石正长岩和黑云母正长岩的结晶年龄分别为 213.8 ± 2.2 Ma和 219.1 ± 4.7 Ma,形成于印支期甘孜-理塘洋向西俯冲时期。岩石地球化学分析表明三类岩石均高钾富碱,属于钾玄质系列,富集LREE和大离子亲石元素(Sr、K、Rb、Ba、Th),亏损高场强元素(如Nb、Ta、Hf、Ti等),具有高的 $Mg^\#$ 、Zr/Nd比值、Cr和Ni含量,黑云辉石正长岩和黑云母正长岩锆石 $\epsilon_{Hf}(t)$ 值多集中于-2~+2之间,显示源区为俯冲板片物质交代的富集地幔。二阶段Hf模式年龄(978~1317 Ma和998~1611 Ma)远大于结晶年龄,结合从黑云母正长岩的部分锆石中获得510~534 Ma、598~945 Ma和1096~1206 Ma三组晚古生代-元古代的年龄信息,显示岩浆在上升侵位的过程中经历了壳源物质的混染。推测此次岩浆活动可能与晚三叠世甘孜-理塘洋向西俯冲,大洋板片断离,形成弧后拉伸作用相关。

英文摘要:

The host rocks of the Bengge gold deposit include biotite-pyroxene syenite, biotite syenite and porphyry syenite. Zircon LA-ICP-MS U-Pb dating results indicate that the biotite pyroxene syenite and the biotite syenite crystallized at 213.8 ± 2.2 Ma and 219.1 ± 4.7 Ma, respectively, which is located within the arc-like magmatism period deduced from the Indosinian subduction of the Ganze-Litang oceanic crust. Geochemically, the syenites have very high potassium-and alkaline-contents, and are of shoshonitic series. They are characterized by high $Mg^\#$, Zr/Nd ratio, and Ni-, Co-contents, and enriched in LREE and large ion lithophile elements and depleted in the high field strength elements. The $\epsilon_{Hf}(t)$ of the biotite pyroxene syenite and biotite syenite mostly range from -2 to +2. These features suggest the syenites are derived from partial melting of an enrichment mantle which has been metasomatized by the fluid derived from the dehydration of the subducted oceanic slab. Their corresponding $t_{DM2}(Hf)$ model ages (978~1317 Ma and 998~1611 Ma) are older than the crystallization age, combining with the inherited zircon age information of Late Palaeozoic to Proterozoic (510~534 Ma, 598~945 Ma and 1096~1206 Ma), indicating crustal contamination during magma evolution. This magma then were likely formed in an extensional back-arc setting related with a slab break-off resulting from the westward subduction of the Garze-Litang oceanic crust in the Late Triassic.

关键词: [正长岩](#) [地球化学](#) [年代学](#) [Hf同位素](#) [滇西北甯哥](#)

投稿时间: 2015-03-15 **修订日期:** 2015-06-28

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黔ICP备07002071号-2

主办单位: 中国矿物岩石地球化学学会

印刷版(Print): ISSN 1000-0569 网络版(Online): ISSN 2095-8927

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