

焦淑娟,郭敬辉,彭松柏. 2013. 华南大容山-十万大山花岗岩体中石榴石成因以及麻粒岩包体变质作用研究. 岩石学报, 29(5): 1740-1758

华南大容山-十万大山花岗岩体中石榴石成因以及麻粒岩包体变质作用研究

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基金项目: 本文受国家自然科学基金重点项目(41023009、40730315)和"973"项目(2012CB416601)联合资助.

摘要:

根据石榴石不同的结构和化学特征,在大容山-十万大山岩套旧州岩体中共识别出四种不同成因类型的石榴石:岩浆型、转熔型、变质型和由于上升岩浆中溶解-再沉淀机制导致的从转熔型向岩浆型转变的过渡型石榴石。由于含不同的微域矿物组合,麻粒岩包体被分为两类。根据微区矿物组合识别,变质期次确定和变质反应分析,结合矿物化学和相平衡模拟计算,得到了两类麻粒岩包体内不同矿物组合的温压条件。麻粒岩包体源区的温压条件为800~830℃和7.2~8.0kbar,以含石榴石的矿物组合为代表,反映了源区部分熔融作用的晚期阶段。岩浆上升过程中石榴石或黑云母首先反应形成了Opx+Crd反应边组合,温压条件为810~860℃和4.6~5.2kbar。花岗岩中岩浆型堇青石的形成也可能基本与此同期。进一步减压在850℃和3.1~3.8kbar时形成了Spl+Crd组合。综合这些数据可以确定一条顺时针的*P-T*轨迹以减压为主但伴随轻微的升温,随后为一个近等压冷却过程。这是由寄主花岗质岩浆上升和侵位造成的。本研究与有效的年代学资料相结合,暗示了花岗质岩浆和麻粒岩包体是下地壳源区部分熔融的结果,形成时代为250~260Ma,可能受到了同期峨眉山幔柱的热影响。

英文摘要:

Garnets from the Jiuzhou granitic pluton of the Darongshan-Shiwandashan suite have been distinguished into four types based on their different textural and chemical characteristics: magmatic, peritectic, residual/metamorphic grain, and the transform from peritectic to magmatic that confirms the dissolution-precipitation process. Two types of granulite enclaves are divided based on their different microdomainal mineral assemblages. Recognition of microdomainal mineral assemblages, determination of metamorphic stages, and reaction analyses, combined mineral chemistry with phase equilibria modeling are performed to constrain thermal evolution of the two types of granulite enclave in granite. The original conditions of the granulite enclaves are 800~830℃ and 7.2~8.0kbar, which is representative of the garnet-bearing assemblage, reflecting the late stage of the partial melting in the source. Opx+Crd reaction rim around garnet or biotite might be coeval with crystallization of cordierite, and formed at conditions of 810~860℃ and 4.6~5.2kbar. Further decompression results in the formation of Spl+Crd association at 850℃ and 3.1~3.8kbar. In combination of the obtained data, a clockwise *P-T* path is retrieved and characteristic of decompression associated with slightly heating and succedent isobaric cooling in response to ascent and emplacement of the host granitic magma. This study coupled with the available geochronological data from previous researches suggests that the petrogenesis of both granite and its granulite enclave is related to the anatexis of the crust during 250~260Ma, and might have been provided with heat source by the coeval Emeishan mantle plume.

关键词: [石榴石成因](#) [石榴石微量元素特征](#) [麻粒岩包体](#) [相平衡模拟](#) [S-型花岗岩](#)

投稿时间: 2013-02-04 最后修改时间: 2013-04-02

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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

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