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峨眉山高钛玄武岩中主要的赋钛矿物——榍石的产状、特征及成因

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摘要：

峨眉山玄武岩中钛以什么矿物形式存在一直以来很少有学者提及。本文通过镜下观察、全岩化学分析、X-衍射、能谱、扫描电镜、电子探针、阴极发光对川西南部周公山-汉王场地区钻井岩心中峨眉山玄武岩进行了详细的分析,讨论了其主要赋钛矿物及成因。(1)SiO_2含量46.4%~48.3%和TiO_2>3%显示区内峨眉山玄武岩属于高钛峨眉山玄武岩系列。但多个层段榍石含量>5%,而极少见磁铁矿、钛铁矿;(2)榍石主要以隐晶质的云雾状、雪花状、芝麻点状、枝状等形态分布于微晶长石之间和溶孔、溶洞边缘及裂缝中,少量呈显晶质粒状分布于微晶长石、绿泥石之间。(3)电子探针分析显示:所有含钛矿物中,钛铁矿中TiO_2含量最高,为39.069%,榍石中TiO_2次之,TiO_2含量为17.143%~38.648%,磁铁矿中TiO_2含量最高为12.293%,平均在5%~10%左右,其他矿物基本上都少于1%。(4)扫描电镜及其能谱分析显示:榍石中的Ti含量(2.49%~24.97%)明显高于含钛磁铁矿(2.68%~9.21%)、含钛赤铁矿(3.64%)中Ti含量,与钛铁矿(19.51%)含量相当。分析结果认为:峨眉山玄武岩中大量出现的隐晶榍石可能是岩浆后期产物或期后蚀变的产物。在峨眉山玄武岩中首次鉴别出的大量隐晶质榍石是高钛峨眉山玄武岩中最主要的赋钛矿物。隐晶榍石在玄武岩中的含量是区分"高钛"和"低钛"玄武岩的主要标志之一。

英文摘要：

The form of the mineral of the titanium existing in Emeishan basalt have been mentioned by few scholars. Using by thin section identification, chemical-rock, X-ray diffraction, energy spectroscopy electronic probe (SEM) and cathodeluminescence, this paper analysed the Emeishan basalt from well cores in Zhougong mountain-Hanwang field of southwestern of Sichuan Province in detail, and discussed the main mineral which occurred in titanium and its formation. (1) SiO_2 between 46.4% and 48.3% and TiO_2>3% showed that the Emeishan basalt generally belonged to high-Ti and alkaline Emeishan basalt series. Many layers have so much cryptocrystal sphene(>5%),but have few magnetite and ilmenite. (2) The cryptocrystal sphene mainly formed in mist shape, snowflake, sesamepoint like, branch shapea and distributed in microcrystalline feldspar, the intramarginal of solution pores and cave and crack, in a small amount is grain distributed in microcrystalline feldspar and chlorite. (3) The result of electronic probe showed that the highest content of TiO_2(39.069%)was ilmenite, in the second was sphene (17.143%~38.648%), the third was magnetite(5%~10%)and the highest content was 12.293% in it, other minerals basically all less than 1%. (4) Element analysis showed that the content of Ti (2.49%~24.97%) in sphene is obviously higher than magnetite (2.68%~9.21%) and hematite (3.64%), its quite clear to ilmenite (19.51%). The result from the analyses was that: The abundant increasing cryptocrystal sphene in the Emeishan basalt may be the late magma products or altered product after the period of the magma. Expressed that a large number of cryptocrystal sphene found in Emeishan basalt for the first time was a major Ti-bearing mineral in high-Ti Emeishan basalt. The content of the cryptocrystal sphene in Emeishan basalt is one of the major marks to differentiate between 'high-Ti' and 'low-Ti' basalt.

关键词：峨眉山玄武岩 高钛玄武岩 隐晶榍石 岩浆产物 赋钛矿物

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