

西秦岭同仁隆务峡蛇绿岩矿物成分特征及构造环境

王绘清, 朱云海, 林启祥, 李益龙

(中国地质大学 地球科学学院, 湖北 武汉 430074)

摘要: 同仁隆务峡蛇绿岩大地构造位置位于西秦岭造山带与中祁连带结合部, 其组成为: 地幔橄榄岩(纯橄岩、蛇纹石化纯橄岩)、超镁铁质堆晶单元(单辉橄榄岩、橄榄辉石岩)、镁铁质堆晶单元(含橄榄石辉长岩、辉长岩等)及少量辉绿岩, 各单元均以断层接触, 弱蚀变。镜下研究发现其岩浆结晶序列为橄榄石-单斜辉石-(斜方辉石)-斜长石, 与典型的 SSZ 型(Supra-Subduction Zone type)蛇绿岩结晶序列吻合。对各单元矿物电子探针研究发现: 橄榄石成分多为贵橄榄石, 单斜辉石则多为普通辉石和透辉石, 在利用其成分进行构造环境判别中, 本区蛇绿岩形成于与挤压背景密切相关的环境。该蛇绿岩表现出轻稀土元素略富集、重稀土元素平坦的稀土元素配分形式, 与 MORB 有较大差异。微量元素特征为相对富集大离子亲石元素 Ba、Rb、K, 而强烈亏损 Nb、P, 这恰与俯冲带组分特点吻合; 同时高场强元素构造判别图解佐证了前述构造环境的判定。研究区的蛇绿岩应形成于成熟度较高的岛弧环境中。

关键词: 隆务峡; 蛇绿岩; 构造环境; 电子探针; 岛弧; 西秦岭

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Mineral characteristics and tectonic environment of Longwuxia Gorge ophiolite in Tongren, West Qinling area

WANG Hui-qing, ZHU Yun-hai, LIN Qi-xiang and LI Yi-long

(Earth Science Faculty, China University of Geosciences, Wuhan 430074, China)

Abstract: Located in Tongren of Qinghai Province, the Longwuxia Gorge ophiolite lies at the juncture between West Qinling and Middle Qilian orogenic belts and is composed of mantle peridotite (dunite, serpentinized dunite), ultramafic cumulate units (clinopyroxene-peridotites, olivine-pyroxenites), mafic cumulate units (olivine-bearing gabbro, gabbro etc.) and diabases. All these units are in contact with faults and have been weakly altered. Polarized light microscope studies of thin sections reveal that the crystallization sequences is Ol→Cpx→(Opx)→Pl, consistent well with the marked SSZ-type ophiolite crystallization sequence. EPMA analyses of the minerals show that olivines belong to the chrysolite family, and clinopyroxenes mostly have the composition similar to that of augite and diopside. Discrimination diagrams based on clinopyroxene geochemical data indicate that ophiolite originated in a compression tectonic background related closely to volcanic-arc. REE concentrations of most samples assume the chondrite-normalized distribution pattern with weak LREE enrichment, which is very different from the pattern of MORB. The enrichment of large ion lithophile trace elements (e.g., Ba, Rb and Sr) and the depletion of Nb, P are similar to things of the subduction zone components. High field strength elements discrimination diagrams also prove the above conclusion. In addition, the ophiolite is supposed to have been derived from a mature island arc tectonic environment, with the participation of some continental crust materials during the formation process.

Key words: Longwuxia Gorge; ophiolite; tectonic environment; EPMA; island arc; West Qinling

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作者简介: 王绘清(1984-), 男, 硕士, 岩石学专业, E-mail: huiq-w@yahoo.com.cn。