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西南天山东德沟橄榄岩的岩相学、矿物学演化特征及其地质意义

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#### 摘要:

中国西南天山东德沟橄榄岩出露于天山伊犁-中天山板块和塔里木板块碰撞造山带北缘,普遍经历了复杂多期的含水流体(熔体)交代作用。主要矿物为橄榄石、斜方辉石、尖晶石、角闪石、金云母和单斜辉石,研究发现,橄榄石和斜方辉石与地幔楔橄榄岩中橄榄石和斜方辉石成份相近,原生铬尖晶石具有SSZ环境橄榄岩的特征,次生绿色尖晶石形成于麻粒岩相-角闪岩相环境。岩相学、矿物转变结构分析和矿物组合及矿物成分变化表明,东德沟橄榄岩记录了复杂的演化历史,先后经历了地幔交代、麻粒岩相-角闪岩相退变质作用和蛇纹石化等阶段的演化。研究认为东德沟橄榄岩最初可能形成于915~961℃的地幔环境,而发生地幔交代时的温压条件约为770~900℃,10~18kbar。该橄榄岩全岩较低的TiO<sub>2</sub>含量和尖晶石中较低TiO<sub>2</sub>含量,以及矿物组合显示出因俯冲板块脱水而造成的快速冷却特征,表明东德沟橄榄岩极有可能是SSZ环境俯冲板上地幔楔橄榄岩残片。

#### 英文摘要:

Peridotites of the Dongdegou are located at the northern of the orogenic belt between the Tarim plate and the Yili-central Tianshan plate, southwestern Tianshan, China, and are generally metasomatized by hydrous melt or fluid. The main minerals in the rocks are olivine, spinel, orthopyroxene, amphibole, phlogopite and diopside. Studies suggested that compositions of olivine and orthopyroxene are similar to those from mantle wedge peridotite, and the primary chromian spinel carries characteristics of mantle wedge above subduction zone peridotites, while secondary green spinels form later in granulite/amphibolite facies. Comprehensive analyses of petrography, mineralogy and mineral assemblage provide insight into a very complicated evolutionary history of the peridotites from the Dongdegou. In generally, after the formation of peridotites, they experienced early mantle metasomatism, retrogressive metamorphism of granulite/amphibolite facies and finally followed by an episode of serpentinization. The peridotites from the Dongdegou were considered formed at mantle environment at temperature of 915~961℃, and the mantle metasomatism may be under *PT* conditions of 770~900℃, 10~18kbar. The features of the peridotite, such as lower TiO<sub>2</sub> in both whole rock composition and in spinel minerals, and mineral assemblages, imply that the rocks has been cooled effectively by fluid released from the subducted slab, and are most likely to be the fragments of peridotite from SSZ volcanic arc environment.

关键词: [SSZ](#) [含水交代](#) [地幔楔橄榄岩](#) [西南天山](#)

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