

论文

碳酸盐化榴辉岩的岩石学研究进展

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摘要:

碳循环进入地幔中主要是通过大洋板块俯冲作用完成的,再通过火山去气作用释放出来,以维持大气中CO₂的平衡。洋壳主要由玄武岩组成,一般经热液改造后的洋壳含有一定数量的碳酸盐(质量分数大约为3%),而这些以脉或角砾形式存在的碳酸盐是碳沉淀的一个巨大储库。这些碳酸盐化的玄武岩在俯冲带背景下经历高压变质作用,相应地形成了碳酸盐化榴辉岩。碳酸盐化榴辉岩的部分熔融形成的熔体和气体对于弧岩浆的生成、CO₂去气都有非常重要的作用,从而对整个碳循环研究具有重要的意义。文中较全面地总结了近年来,在不同的超高压变质地区发现的碳酸盐化榴辉岩的岩石学和野外产状特征,对比经热液改造的玄武岩-碳酸盐体系的高温高压岩石学研究取得的进展,明确了在俯冲带变质过程中碳酸盐与榴辉岩质硅酸盐体系是如何发生变化的,并对于NCFMASH+CO₂体系的热力学相平衡计算的研究进展展开了讨论,对于探讨碳的深部循环过程具有重要意义。

关键词: [碳循环](#); [碳酸盐化榴辉岩](#); [相平衡计算](#); [板块俯冲作用](#)

Current research progress in petrology of carbonated eclogites

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Abstract:

Abstract: Cycling of carbon into and out of the mantle plays a key role in the global carbon cycle and influences the CO₂ budget of the Earth's atmosphere. Subduction introduces carbon into the mantle, while volcanic outgassing releases it to the surface. Oceanic crust is mainly composed of basalts, and hydrothermal altered basalts contains several wt% of carbonates (average 3wt%), which is a huge carbon sink for global carbon cycling. Carbonates (in the form of veins) within basalts can be delivered to the upper mantle until 300 km during oceanic crust subduction, thus produced carbonated eclogites. Partial melting of carbonated eclogites plays an important role in arc magmatism and volcanic outgassing. In this paper, we summarize up to now all reports of ultrahigh pressure metamorphic areas of natural carbonated eclogite samples and compare with the recent progress in experimental petrology of altered MORB plus carbonate minerals and reach some basic conclusions of how carbonate minerals interact with silicate system (eclogitic) with progressively elevated temperature and pressure in subduction zones. What is more, we summarize the current research progress of phase equilibrium calculation of carbonated eclogites in NCFMASH+CO₂ system and the H₂O-CO₂ activity model, thus forecast the future phase relationship calculation of NCFMASH+CO₂ system, which is important for global carbon cycling.

Keywords:

[Key words: carbon cycling; carbonated eclogites; phase equilibrium calculation; subduction](#)

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