

Petrography of magnesite-orthopyroxene-olivine veins in the Ujaragssuit Nunât layered ultramafic body terrane, southern West Greenland

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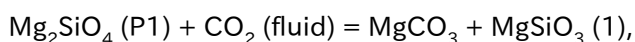
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Researches on Hadean-Archean terranes are essential to reconstruct the geologic past of the early Earth, which is believed to be different from the present plate tectonics. Southern West Greenland preserves a wide exposure of Archean geologic units. This study reports magnesite-bearing veins in the Ujaragssuit Nunât layered ultramafic body, southern West Greenland.

Ultramafic rocks are transformed into serpentinite and carbonated rocks when they react with H₂O-CO₂ fluids under low temperature conditions. Carbonated ultramafic rocks from the Archean geological unit might provide information on impact of carbonatization of peridotite on atmospheric and water chemistry in Archean.

The studied magnesite-bearing veins occur in amphibole harzburgite. The magnesite-bearing veins contain coarse grained olivine and orthopyroxene, anthophyllite and talc, with minor amounts of phlogopite, chlorite, Cr-spinel and Fe-Ni sulfide. Magnesite contain anthophyllite and olivine. Anthophyllite is radial in shape. The Mg# (Mg/(Mg+Fe) atomic ratio) is 0.927-0.941 for magnesite, 0.862-0.882 for anthophyllite, 0.893-0.901 for coarse-grained orthopyroxene, 0.974-0.984 for talc, respectively. Orthopyroxene sometimes contains magnesite as inclusion, and micro-veins mainly composed of talc. Fine-grained olivine with minor amount of magnetite occurs in the micro-veins. The Mg# is 0.893-0.901 for coarse-grained orthopyroxene, 0.974-0.984 for talc, and 0.872-0.889 for fine-grained olivine. The Mg# of fine-grained olivine in talc micro-veins (0.872-0.889) are distinctively lower than coarse-grained olivine and olivine inclusions in magnesite (0.882-0.905).

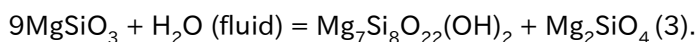
The carbonate veins were formed as follows: 1) coarse-grained orthopyroxene was formed by the reaction between olivine in the host and CO₂-bearing fluid



whereas coarse-grained olivine and anthophyllite were formed by reaction with low-CO₂ activity fluids, such as



and the fine-grained olivine in talc veins in large grained orthopyroxene was formed by the reaction



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