

Compositional heterogeneity of olivine in thermally metamorphosed serpentinite from Southwest Japan

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ABSTRACT

Compositionally heterogeneous crystals of olivine occur in thermally metamorphosed serpentinites from Southwest Japan. They have a variation in forsterite (Fo) content up to 10 mol% within a specimen. The chemical heterogeneity is the result of two causes: the intermingling of metamorphic neoblasts with relict crystals of primary olivine, and the compositional variation within the neoblasts themselves. The metamorphic olivine in each specimen shows a bimodal distribution of Fo content with a highly magnesian group (Fo_{93–98}, varying among specimens) and a relatively ferroan one (Fo_{85–94}). Textural relationships and the variation of NiO and FeO contents between the two groups of olivine suggest that the heterogeneity results from the local involvement of magnetite and awaruite in dehydration reactions of serpentine at the initial stages of metamorphism.