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LETTER

Magnetite-rutile symplectite derived from ilmenite-hematite solid solution in the Xinjie Fe-Ti oxide-bearing, mafic-ultramafic layered intrusion (SW China)

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ABSTRACT

A unique symplectitic intergrowth of magnetite + rutile is hosted by ilmenite in the gabbro of the Xinjie Fe-Ti oxide-bearing, mafic-ultramafic layered intrusion. The crystallization of rutile in the symplectite is probably formed by oxidation of ilmenite-hematite solid solution (Ilm-Hem_{ss}). Segregation of Fe^{3+} in the Ilm-Hem_{ss} at the rutile-host interfaces triggered the crystallization of magnetite along the margin of the growing rutile, and shaped the vermicular morphology of the rutile. The crystallization of magnetite can also locally release Ti^{4+} to enhance the progressive growth and subsequent nucleation of rutile in the symplectite. The growth of the symplectite ceased when the temperature decreased to that of the miscibility gap of Ilm-Hem_{ss} and Fe^{3+} began to exsolve to form hematite lamellae in the ilmenite.

Keywords: Magnetite-rutile symplectite, solid transformation, ilmenite-hematite solid solution, hematite lamellae