

Partial melting of ultrahigh-temperature metamorphic rocks from Howard Hills and Mt. Pardoe in the Napier Complex, East Antarctica

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The Howard Hills and Mt. Pardoe area occur aluminous gneiss rich in garnet, sapphirine and sillimanite interlayered with garnet felsic gneiss. Quartz inclusions in the cores of garnets from silica-undersaturated layers within the aluminous gneiss indicate that the medium in which the garnets crystallized under the silica-oversaturated condition. This implies mass transfer within the aluminous gneiss, probably involving partial melting that also led to high Y concentrations in garnet cores, high An values for plagioclase, and high Ba contents in mesoperthites from the aluminous gneiss. Partial melt from aluminous gneiss was generated during prograde metamorphism and segregated; the restite might have undergone continuous ultrahigh-temperature metamorphism.