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LETTER

Feldspar thermometry in ultrahigh-temperature metamorphic rocks: Evidence of crustal metamorphism attaining ~1100 °C in the Archean Napier Complex, East Antarctica

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ABSTRACT

Ultrahigh metamorphic temperatures attained in the mid- to lower-crust have been assessed by examining the mineral chemistry of ternary feldspars with relatively coarse exsolution lamellae from the Archean Napier Complex, East Antarctica. Chemical compositions of re-integrated perthitic, mesoperthitic and antiperthitic feldspars are calculated from the modal proportions and the chemical analyses of host and lamellar domains formed through exsolution. Based on ternary feldspar solvus models, re-integrated compositions of feldspars from a variety of rock types yield the minimum equilibrium temperatures ranging from 1000 to 1110 °C (0.8 GPa). These data confirm the suggestion that the regional thermal conditions of the Napier Complex reached or exceeded 1100 °C. As feldspar is one of the common constituents of the crustal rocks, this approach could be applicable to a wide variety of rocks in which feldspar represents exsolution textures.