

Crystal chemistry of Cr-spinels from the lherzolite mantle peridotite of Ronda (Spain)

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ABSTRACT

The crystal chemistry of some Cr-spinels from the lherzolite body of the Ronda peridotite in southern Spain has been investigated. Cell edge spans between 8.1692(2) and 8.2367(1) Å, while the oxygen positional parameter u ranges between 0.26306(7) and 0.26351(7). By using the Princivalle thermometer (1999), an intracrystalline closure temperature between 640 and 840 °C has been calculated. The higher temperatures are very close to the intercrystalline temperatures based on the olivine-spinel thermometer calculated by Woodland et al. (2006) for the Ronda orogenic lherzolites suggesting that the intracrystalline closure occurred soon after the intercrystalline closure. By comparison with Cr-spinels from lherzolite mantle xenoliths, it should be noted that: (1) the oxygen positional parameter can be linearly related to the intracrystalline temperature for both mantle peridotite and mantle xenolith Cr-spinels; (2) the intracrystalline closure temperature is reached faster and is higher in Cr-spinels in mantle xenoliths; and (3) Cr content is linearly related to u in mantle peridotite, but not in mantle xenoliths, suggesting the u value in Cr-spinels from mantle peridotite is driven solely by the chemistry of the spinels.

Keywords: Cr-spinel, crystal chemistry, intracrystalline closure temperature, mantle peridotite, Ronda (Spain)