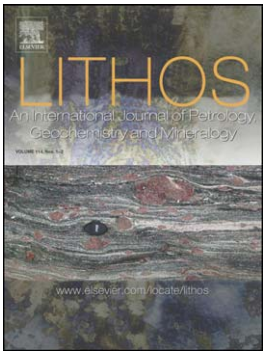

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The Aluminum-in-Olivine Thermometer for Mantle Peridotites - Experimental versus Empirical Calibration and Potential Applications

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Abstract

This study provides an experimental calibration of the empirical Al-in-olivine thermometer for mantle peridotites proposed by De Hoog et al. (2010). We report Al concentrations measured by secondary ion mass spectrometry (SIMS) in olivines produced in the original high-pressure, high-temperature, four-phase lherzolite experiments by Brey et al. (1990). These reversed experiments were used for the calibration of the two-pyroxene thermometer and Al-in-orthopyroxene barometer by Brey and Köhler (1990). The experimental conditions of the runs investigated here range from 28 to 60 kbar and 1000 to 1300 °C. Olivine compositions from this range of experiments have Al concentrations that are consistent, within analytical uncertainties, with those predicted by the empirical calibration of the Al-in-olivine