

The composition of KLB-1 peridotite

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ABSTRACT

Electron microprobe analyses of major- and minor-element oxide components for two glassed samples of natural KLB-1 peridotite are presented. One glass was made with the aid of a phosphate flux, and the second glass was made by laser melting of aerodynamically levitated spheroids resulting in homogeneous silicate glass beads. For unknown reasons, the silicate-phosphate glass yields compositions that are incompatible with the composition of KLB-1 peridotite. However, analysis of the glass bead formed by laser synthesis is believed to give an accurate representation of the composition of KLB-1 peridotite, except for minor loss of Na₂O owing to volatilization. The new data resolve conflicting FeO, CaO, and TiO₂ values from two older measurements present in the literature. Mass-balance calculations using the new composition measurement combined with new analyses of the mineral compositions in KLB-1 result in a lower sum of squares of the residuals than those using the older measurements. There are appreciable differences in calculated modes from partial-melting experiments of KLB-1 when calculated using older KLB-1 analyses or our new analysis.

Keywords: Peridotite, KLB-1, microprobe, mantle, levitating/laser fusion