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Carbon is not required during crystallization to produce ferrobasalts/ferrodiorites (FTP rocks)

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ABSTRACT

Experiments were conducted to determine whether the presence of graphite is required to produce the Fe-Ti-P-enrichment, silica-depletion trend seen in ferrobasalts and ferrodiorites/jotunites. A nominally anhydrous Snake River Plain olivine tholeiite was crystallized at 9.3 kbar in Fe-Pt capsules; the composition of the Fe-Pt alloy was empirically chosen such that the charge neither lost nor gained iron. The results of these experiments and those of previous experiments conducted in graphite are strikingly similar: in both cases the residual liquids were depleted in silica and enriched in Fe, Ti, and P. We conclude that the presence of carbon is *not* essential for producing this distinctive trend.

Keywords: Experimental petrology, tholeiite, crystal-liquid differentiation, phase equilibria