

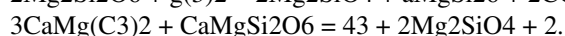
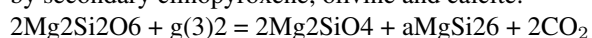


Fractionation of High-field-strength elements during Processes of Mantle Metasomatism

Liya Kogarko

Vernadsky Institute of Geochemistry, Geochemistry of Alkaline rocks, Moscow, Russian Federation (kogarko@geokhi.ru)

For the first time, fractionation of zirconium and hafnium in carbonatized mantle xenoliths from the eastern Antarctic has been studied. An high elevation relative to the chondrite values of Zr/Hf in the metasomatized xenoliths has been revealed. The main reactions of the carbonate metasomatism lead to replacement of primary orthopyroxene by secondary clinopyroxene, olivine and calcite:



A substantial broadening of the clinopyroxene crystallization field results in an increase of Zr/Hf in an equilibrium melt due to a higher partition coefficient of Hf in clinopyroxene, relative to that of Zr. Migration of the active carbonate and carbonate-silicate melts have been in equilibrium with the metasomatic vehrllite, leads to higher Zr/Hf ratios in carbonatized mantle substrate. The combination of mantle metasomatism under conditions of an increased regime of volatiles, mainly carbon dioxide, with variation of the partial melting parameters of the mantle substrate is undoubtedly the cause of significant geochemical differentiation in abyssal magma generation zones, and it triggers fractionation of rare elements with subsequent formation of enriched mantle reservoirs, i.e. sources of carbonatite magmas and related deposits of critical metals.

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