

Unraveling the geochemical signature of metasomatism in mantle eclogites

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In order to elucidate the effect of metasomatism on eclogite xenoliths, major element and trace element analyses were acquired on approximately the same spots on garnets and cpxs from two eclogite xenoliths entrained in the Jericho kimberlite pipe, Nunavut, Canada. Three patterns of metasomatism are recognized based on garnet texture and composition, the geochemical signatures of which are most easily identified in the Y-Zr diagram below.

There are three apparent layers of geochemical variations that can be discerned from these arrays. Pattern 1 is interpreted to reflect interaction with kimberlite, Pattern 2 reflects new metasomatic garnet growth characterized by complex, fine-scaled zoning, and Pattern 3 may represent ancient mantle metasomatism by a low Y and Zr fluid. Together with textural evaluation, the Y-Zr plot is a useful screen for elucidating primary from metasomatic garnet compositions in eclogite.

