

Petrology and geochemistry of ultramafic xenoliths cumulates related to Seguela diamandiferous kimberlite and lamproite (central-western Côte D'Ivoire)

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The Seguela kimberlites located 30 km North of Seguela city in the central-western part of Côte d'Ivoire are characterized by the presence of a lot of olivine pyroxenite xenoliths that are characteristic of the lithospheric mantle. The study of these xenoliths provides an opportunity of understanding the lithospheric mantle underneath the region. These xenoliths are formed by olivine (forsterite; Fo₉₀), enstatite, phlogopite, amphibole, chromites and Cr-spinels. Enstatites have relatively high Mg# ($Mg/(Mg+Fe^{2+}) > 0.8$). The olivine pyroxenite xenoliths have Mg# higher than the host kimberlite, and their high Cr (>3000 ppm), Ni (>1000 ppm), Co, Cu, V, and Zn contents are indicative of affinity with alkaline ultramafic rocks.

Compared with kimberlites, these olivine pyroxenite xenoliths show high enrichment in HFSE, LILE, REE. Their low La/Yb (<14) ratios, and Ba (<150 ppm), Rb (<50 ppm) and Nb (<6 ppm) contents indicate high degree of partial melting. Zr/Hf (39) and Nb/Ta (14) ratios support their lithospheric mantle origin. The age of these olivine pyroxenite xenoliths as derived from zircon is Paleoproterozoic. The geochemical signatures observed on these olivine pyroxenite are different from those of continental basalts. This indicates that the arc magmatism in the region derived from ancient subduction process in that affected the composition of the lithospheric mantle modification and led to the continental tholeiitic arc signatures observed on olivine pyroxenite xenoliths from Côte d'Ivoire.

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