

Petrology and geochemistry of peridotite xenoliths from Vietnam, Indochina block

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Mantle xenoliths entrained in the Neogene basalts at central and southern Vietnam provide important constraints on the nature of the lithospheric mantle beneath the eastern Indochina block. The basalts contain mantle xenoliths (garnet lherzolite, spinel lherzolite, harzburgite, eclogite), cumulate xenoliths (wehrlite, websterite, pyroxenite) and megacrysts (olivine, Al-rich clinopyroxene, orthopyroxene, anorthoclase, Ti-amphibole, phlogopite, sapphire, zircon). The mineral compositions of spinel lherzolite xenoliths studied are typical of mantle phases: Fo-rich olivine, En-rich orthopyroxene, Di-rich clinopyroxene and Cr-rich spinel. Concentrations of trace elements for clinopyroxene were determined in situ by laser ablation ICP-MS. Clinopyroxenes exhibit large compositional variations ranging from LREE-depleted ($La_N/Yb_N = 0.5 - 0.7$) to cryptically metasomatized LREE-enriched ($La_N/Yb_N = 6.7 - 20.3$). Slightly LREE-depleted REE patterns with Yb_N of 10 indicate these peridotites were originated from very low degree of partial melting. However, most REE patterns present much lower HREE concentrations with Yb_N of 2 – 6 suggesting these peridotites were products of either high degree of partial melting or the residual from the removal of garnet. Spidergrams of most clinopyroxenes show Ba, Nb-Ta, Hf-Zr and Ti depletion. Therefore, the hydrous silicate melts/fluids of subduction zone origin are likely candidates for the required metasomatic agent. The subcontinental lithospheric mantle beneath central and southern Vietnam was complicated and heterogeneous.