INCOMPATIBLE TRACE-ELEMENT ANALYSES OF PYROXENES AND OLIVINE FROM SPINEL LHERZOLITE MANTLE XENOLITHS FROM UBATUBA (SP) AND COROMANDEL (MG) BY LA-ICPMS

Vidyã Vieira de Almeida (1); Valdecir de Assis Janasi (2); Margareth Sugano Navarro (3); Sandra Andrade (4); Darcy Pedro Svisero (5).

(1) INSTITUTO DE GEOCIÊNCIAS. UNIVERSIDADE DE SÃO PAULO; (2) INSTITUTO DE GEOCIÊNCIAS. UNIVERSIDADE DE SÃO PAULO; (3) INSTITUTO DE GEOCIÊNCIAS. UNIVERSIDADE DE SÃO PAULO; (4) INSTITUTO DE GEOCIÊNCIAS. UNIVERSIDADE DE SÃO PAULO; (5) INSTITUTO DE GEOCIÊNCIAS. UNIVERSIDADE DE SÃO PAULO.

Resumo: Recently developped routines for in situ spot analyses of minerals by LA-ICPMS at Instituto de Geociências, Universidade de São Paulo, were applied to determine the trace-element compositions of pyroxene and olivine crystals from spinel lherzolite mantle xenoliths from Ubatuba (SP) and Coromandel (MG).

The Ubatuba xenoliths occur as small (up to 3 cm) inclusions in a kaersutite lamprophyre found in Praia Vermelha, and consists of a spinel lherzolite with protogranular texture.

The Coromandel xenoliths were collected in the Limeira I kimberlite, and correspond to spinel lherzolites with protogranular and transitional from protogranular to porphyroclastic textures. They differ from the Ubatuba xenoliths by the presence of phlogopite as a common mineral, and textures indicative of metasomatic replacement, to which are associated part of the clinopyroxene, besides phlogopite, ilmenite, chromite and exotic titanates (priderite and lindsleyite-mathiasite).

As expected, the bulk of the trace-elements reside in clinopyroxene; olivine and orthopyroxene show concentrations below detection limit (Important differences exist between clinopyroxenes from the two localities, and they are a reflection of different processes in the mantle. Crystals of calcic augite from Limeira I show greater amounts of Ba (72 ppm), Sr (395 ppm), Zr (100 ppm), Hf (7.1 ppm) and LREE (e.g. La= 8 ppm, Sm= 5 ppm). The REE patterns are fractionated ($(La/Yb)_N$=6-15), with a convex shape, due to depletion of La, Ce, Pr and Eu relative to Nd and Sm. Bulk rock analyses show that a significant proportion of the LREE, plus Sr and Ba must reside in the titanates. The chemistry of pyroxenes from Limeira I, coupled with the textural evidences, indicate that they result from interaction of fluids/melts rich in highly incompatible elements with a strongly depleted harzburgite, as indicated by the extremely low concentrations of HREE (e.g. Lu Crystals of diopside from Ubatuba show flat REE patterns ($(La/Yb)_N$= 1-1.7) with concentrations ~7 x chondrite; they are richer in HREE (e.g. Lu 0.37 ppm) and Y (19 ppm), and are inferred to represent samples of a fertile upper mantle that was not affected by metasomatic processes.

Palavras-chave: mantle xenoliths; spinel lherzolite; LA-ICPMS.