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EXOTIC ACCESSORY MINERALS IN LAYERED CHROMITITES OF THE CAMPO FORMOSO COMPLEX (BRAZIL)

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The Campo Formoso stratiform intrusive complex, in Bahia State, Brazil, consists of a tabular body of ultramafic rocks, about 40 km long and 100-1100 meters wide. The ultramafic suite rests on Archean granulites of the Caraiba group and its upper contact is in contact along an angular unconformity with Paleoproterozoic quartzites of the Jacobina Group. A huge body of granite of Paleoproterozoic age cuts across the serpentinized ultramafic suite, which as a result underwent a renewed cycle of hydrothermal alteration. The latest influx of fluid led to the formation of talc, silica, and carbonates, such that the rocks were locally converted to listwanite. No primary magmatic silicates have survived the episodes of alteration. Only the grains of chromite from cumulus layers of chromitite show an unaltered core surrounded by an extensive rim of ferrian chromite (Fig. 1A). The silicate matrix of the chromitite layers consists of chromian clinochlore, with minor antigorite, talc, dolomite, magnesite, and a hydroxycarbonate of chromium (stichtite ?). Quartz veins are locally important. A study of accessory minerals developed in the chromitite layers reveals the presence of rather exotic accessory minerals, such as monazite-(La), fluorapatite, galena, bismuthinite, antimony, and unknown Pb-Sb bearing minerals, corresponding to the formula $PbSb_2$, Pb_6Sb, $PbSb_4$. Grains of the latter are only a few μm in size. These minerals are restricted to the secondary silicates of the matrix and to fractures dissecting the chromite grains, and are typically associated with chromian clinochlore (Fig. 1B).

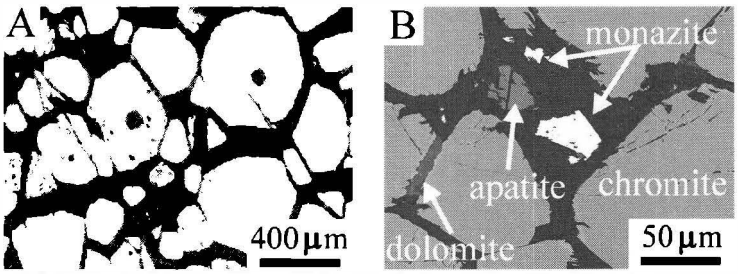

Fig.1: SEM images of altered chromite (A) and monazite, apatite in chromian clinochlore (B).

In some cases, grains of monazite-(La) contain small inclusions of chromian clinochlore. The presence of these exotic minerals together with quartz strongly supports the hypothesis that the latest alteration of the Campo Formoso chromitites was caused by a fluid phase expelled from the adjacent granite.