

Ti-V oxide deposits in the Kunene Anorthositic Complex (SW Angola)

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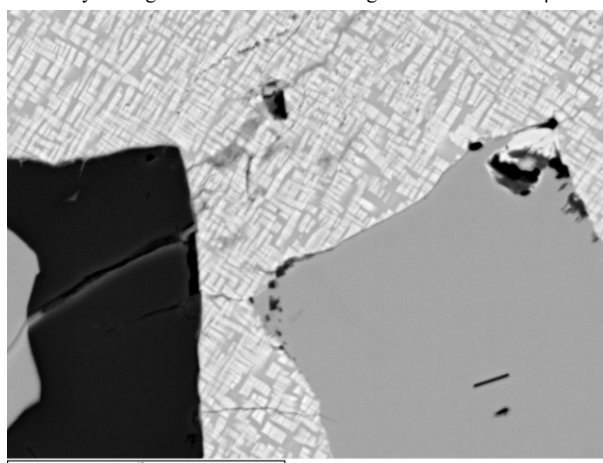
The Kunene Complex, outcropping between SW Angola and NW Namibia, is one of the biggest Proterozoic anorthositic complexes in the world [1]. It is cut by a set of Ti-Fe oxide dykes or lenticular bodies, that are hectometric to kilometric in length and metric to decametric in width.

The mineral associations of four oxide bodies have been studied: Dongue Sul, which presents a concentric structure with a nelsonitic core; the massive decametric ore bodies of Tchimbueio and Tchinguanganda; and Chiange Velho, a kilometric dike, that may show millimetric foliations due to shear deformation.

The main mineral assemblage is composed by ulvöspinel, ilmenite and spinel (s.s.), in order of abundance (Fig. 1). These minerals coexist with apatite and minor graphite, phlogopite, and olivine. Most grains exhibit evidences of orthomagmatic textural equilibria in grain borders. The proportions of these minerals in the ore have been obtained by quantitative X-ray diffraction using the Rietveld fitting profile method. In average, they are: 60% Usp, 25% Ilm, 5% Spl, and 10% (Ap+Hem+Gt).

Ulvöspinel is rich in V (up to 0,15 wt%) and presents characteristic laminar or patchy micrometric double exsolutions of a Ti and Fe-richer phase and spinel (s.s.) lamellae. In ilmenite the geikielite component is 14-21 wt%, and does not contain exsolutions. Spinel is rich in the hercynite component (14-35 wt% Fe).

Fig. 1. Equilibrium texture between ulvöspinel (patchy texture), ilmenite (light grey), spinel (dark grey); exsolutions in ulvöspinel are clearly distinguishable. SEM-BSE Image. Field width: 100 μ m.



Furthermore, when equilibrium can be assumed on the basis of textural and compositional evidences, the temperature of crystallization and the oxygen fugacity can be estimated using reported geothermobarometers [2, 3]. For instance, in the case of Tchimbueio deposit, the temperatures obtained range from 973 to 1026 °C, and the f_{O_2} from 10^{-12} to 10^{-10} .

[1] Ashwal L.D. and Twist D. (1994) *Geol. Mag.*, **131(5)**, 579-591. [2] Spencer K.J. and Lindsley D.H. (1981) *Am. Min.*, **66**, 1189-1201. [3] Andersen D.J. and Lindsley D.H. (1985) *Am. Geoph. Union*, **66(18)**, 416.