

## **CATHODOLUMINESCENCE STUDY OF THE CARBONATITE SUITES OF THE KOLA PENINSULA (RUSSIA)**

OHNENSTETTER<sup>1</sup>, D., VERHULST<sup>2</sup>, A., BLANC<sup>3</sup>, Ph., BALAGANSKAYA<sup>4</sup>, E., KIRNARSKY<sup>4</sup>, Y. and DEMAÏFFE<sup>2</sup>, D. 1CNRS-CRPG, B.P. 20, Vandoeuvre les Nancy Cedex, France, 2 Geol CP 160/02, Univ. Bruxelles, Belgium; 3CNRS 1761, Univ. P. et M. Curie, Paris, France; 4Kola Scientific Centre, Apatity, Russia

Cathodoluminescence (CL) investigations were performed on carbonatites and related alkaline rocks from the Paleozoic (~380 Ma) Kovdor and Khibina complexes, Kola Peninsula.

CL microscopy appears to be a powerful tool to unravel the growth history of minerals or to enhance the observations of subsolidus changes and/or hydrothermal alteration. CL spectra and images of minerals (carbonates, apatite, alkali feldspars, götzenite, pectolite, mosandrite, lorenzenite and burbankite) were collected using a SEM coupled with a CL spectrometer in a wide wavelength domain (200-900 nm).

CL images of apatites provide important textural information (oscillatory zoning, complex patchy zoning, resorption and overgrowth) that are not always detected by BSE images. The spectra show a broad Ce<sup>3+</sup> emission peak centred in the UV domain, at 363 nm. This peak assigned to f-d electronic transitions displays the highest intensity; it is slightly asymmetrical towards the visible domain from 400 to 450 nm which could explain the blue colour often observed in apatites from carbonatites. Other trivalent REEs give narrow emission peaks due to f-f transitions: Pr<sup>3+</sup> (247 and 277 nm), Nd<sup>3+</sup> (874 nm), Sm<sup>3+</sup> (565, 600 and 647 nm) and Dy<sup>3+</sup> (483 and 576 nm). Few ppm of Mn<sup>2+</sup> are sufficient to produce a broad emission band centered at 565 nm. The Dy<sup>3+</sup> and the three Sm<sup>3+</sup> emission peaks are often poorly resolved as they are superimposed to the broad Mn<sup>2+</sup> emission band. The changes of the CL spectra reflect the fractionation of REE during magmatic evolution.