Contribution ID: **32** Type: **Poster**

P76 - Combined PIXE-PIGE measurements of quartz- and topaz-hosted melt inclusions from the Ary-Bulak ongonite massif of Siberia

Friday, 11 July 2014 13:00 (1 hour)

Analysis of melt and fluid inclusions in minerals is an important way to understand ore formation processes. Nuclear microprobe provides direct non-destructive methods to determine their composition. Methodology related to micro-PIXE fluid inclusion analyses has been mastered by the CSIRO-GEMOC nuclear microprobe group [1] and is now available to the users of the GeoPIXE software [2].

We performed simultaneous PIXE-PIGE analyses on multi-phase inclusions (containing glass, crystals, vapour) hosted in quartz and topaz from the Ary-Bulak complex in Mongolia, complementing Raman spectroscopy, EDS-EPMA and LA-ICP-MS analyses. Previous studies of Ary-Bulak rocks have revealed the presence of silicate glass with extremely high F contents (up to 7-8 wt.%) [3]. Given the multi-phase nature of the inclusions, the PIXE-PIGE analysis was the only method possible to analyse the entire inclusions without homogenising them, and to prevent the loss of fluid. PIXE and PIGE spectra (for the detection of F) were collected using the same HPGe detector.

PIXE of topaz-hosted inclusions indicates the presence of K, Rb, Ca, As, Cs, Fe, Mn, Cu and Zn. A combination of PIXE, Raman spectroscopy and EDS allowed the identification of cryolithionite [Na3Li3Al2F14], mica, alkali-feldspar, and an Fe-Mn mineral (possibly an oxide) as daughter phases (formed after melt entrapment), and Nb-Ta-W oxides co-trapped with the melt. The obtained results revealed that the two melts with different F contents were trapped at different stages by quartz and topaz phenocrysts, and bear important implications on the magmatic evolution of F-rich silicic magmas and the deposition of Nb-Ta-W ores.

[1] C.G. Ryan et al. Nucl. Instr. Meth. B 181 (2001) 570.
[2] C.G. Ryan. Int. J. Imag. Syst. Tech. 11 (2000) 219.
[3] I.S. Peretyazhko and E.A. Savina. Russian Geol. Geoph. 51 (2010): 1110.

Primary author: Dr PRZYBYLOWICZ, Wojciech (Materials Research Department, iThemba LABS, Somerset West, South Africa)

Co-authors: Dr AGANGI, Andrea (University of Johannesburg); Prof. HOFMANN, Axel (Department of Geology, University of Johannesburg,)

Presenter: Dr PRZYBYLOWICZ, Wojciech (Materials Research Department, iThemba LABS, Somerset West, South Africa)

Session Classification: Poster Session with Cheese and Wine