Evaluation of some feldspar specimens as candidates to be characterized as Reference Materials for their minor and trace element contents

M. AMELIA V. LOGAN

Smithsonian Institution, Department of Mineral Sciences, P.O. Box 37102, NHB-119 Washington DC, 20013, USA (logana@si.edu)

Four feldspar specimens from the Smithsonian Microbeam Reference Materials Collection (Jarosewich *et al*. 1980) are being evaluated for their suitability as candidates to be characterized as RMs for their trace element contents: Lake County plagioclase, Ab_{33} $An_{66}Or_1$ (NMNH 115900); Kakanui anorthoclase, New Zealand, Ab_{71} An_5Or_{24} (NMNH 133868); Great Sitkin anorthite, Ab_5 An_{95} (NMNH 137041); and microcline from an unknown locality, Ab_{12} An_0Or_{88} (NMNH 143966). Preliminary results of Ti, Fe and Sr contents by electron microprobe (20 kV, 200 nA, 20 µm) are reported in table 1 as ppm ± σ; n = grains; N = analyses.

Table 1

NMNH	N	N	Ti	Fe	Sr
115900	15	30	250±10	3300 ± 100	250±50
133868	4	80	b.d.l.	1100 ± 100	2000±300
137041	4	80	60± 10	3500 ± 90	360±40

XRF analysis on 1.5 g of NMNH 133868 indicated 1900±50 ppm Sr. Ti, Fe and Sr contents in microcline (NMNH 143966) were below the detection limit of the electron microprobe. These results indicate that Lake County plagioclase (NMNH 115900), Great Sitkin anorthite (NMNH 137041) and Kakanui anorthoclase (NMNH 133868) are good candidates for further characterization by other microbeam techniques.

[1] Jarosewich, Nelen & Norberg (1980) Reference samples for electron microprobe analysis. *Geostandards Newsletters* **4**, 43–47.

REE fractionation during low-temperature water-mineral interaction

A. LOGES[1]*, S. GÖB[1], D.E. JACOB[2], M. BAU[3], T. WAGNER[4] AND G. MARKL[1]

[1]Institut für Geowissenschaften, Tübingen University, D-72070 Tübingen, Germany, (*correspondence: anselm.loges@uni-tuebingen.de)

[2]Institut für Geowissenschaften, Universität Mainz, D-55099 Mainz, Germany

[3]Earth & Space Sciences Program, Jacobs University, D-28725 Bremen, Germany

[4]Institute of Geochemistry and Petrology, ETH Zurich CH-8902 Zurich, Switzerland

We have investigated the factors that control REE redistribution during low-temperature water-mineral interaction, using the Clara fluorite-barite mineral deposit (Schwarzwald, Germany) as a case study. In this deposit, fracture hosted secondary minerals (secondary fluorite, goethite, and Mn oxides) were formed during water-mineral interaction and remobilization of the primary mineral assemblage (fluorite, barite). The trace element and REE distribution (including Y) of a representative set of mineral and water samples have been analyzed by LA-ICP-MS and solution ICP-MS.

Prominent Y anomalies and Y-Ho fractionation have been found in many samples in addition to redox sensitive anomalies like Ce and Eu. There is good correlation between La, Gd, and Y anomalies in our goethites and Mn oxides, where REE incorporation is controlled by sorption. La and Gd anomalies can be used as a quantitative expression for the tetrad effect and Y-Ho fractionation is related to the (usually weaker) tetrad effect, as it is known from other geochemical systems. In primary and secondary fluorites these anomalies show no correlation. This suggests that sorption on oxides and hydroxides has large influence on the REE behaviour during low-temperature mineral-water interaction and remobilization even if they are only minor phases. Conversely, secondary fluorites apparently have REE patterns closer to those of the waters they have precipitated from. Combined with apparent distribution coefficients calculated from co-genetic mineral pairs, this allows a better reconstruction of the chemical composition of waters from mineral REE patterns and improves understanding the impact of different parameters that control REE incorporation in complex natural systems.