Atypical SHRIMP II REE data in zircons: A positive Eu anomaly

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Distribution of REE depends on some factors:

- temperature and pressure of melt
- interaction with enclosing strata
- sequence of crystallization
- crystalchemistry of the host mineral

Enrichment in HREE as well as depletion in LREE with contrast negative Eu and positive Ce anomalies are typical for zircon structure in common case (fig.1a).

Unusual REE distribution patterns were recorded in zircons at recent investigations. They show a positive Eu anomaly with portion of LREE entichment (fig.1b)

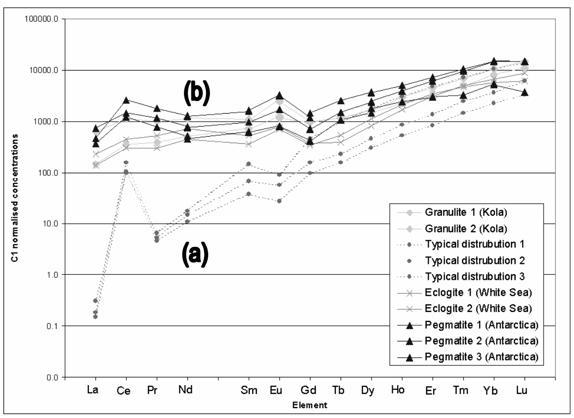

Figure 1: Chondrite normalised REE patterns: a. typical for zircon; b. atypical REE distribution.

Such REE distribution patterns were observed in the following cases: 1) in zircons from low crustal eclogitic xenoliths from an eruption pipe at Elovy Island (White sea), 2) in zircons form Kalaknda massif granulites (Kola peninsula), 3) in zircons from Antarctic alkaline pegmatites. The U-Pb data show the discordant ages of these zircons as well as high magnitude Th/U ratio variation. Thus, the effects of REE pattern deviations are connected with metasomatic and metamorphic processes. These influences have an effect in Eu and LREE increaseng. Hence, these REE patterns could be considered as secondary processes affecting.

References

Lokhov K.I. *et al*. (2006) *Areal Geology and Metallogeny* **28**, 89-100.

Paul W.O. Hoskin and Urs Schaltegger (2003) *Reviews in Mineralogy and Geochemistry* **53**, 27-62.

Rubatto D. (2002) *Chemical Geology* **184**, 123-138.

Laser ablation study of trace elements in chromite: Thetford Mines ophiolite chromitite ores

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This study aims to identify compositional contrasts between chromitite ores from the Thetford Mines Ophiolite (TMO), Canadian Appalachians, which contains more than 30 chromitite deposits grouped into 3 principal types, and to better understand the mechanisms of their formation.

The 3 types of chromitite are: 1) podiform chromitite found in mantle peridotite, 2) stratiform chromitite from rocks formed at the base of the crust, and 3) intracrustal discordant chromitite close to, or in crustal pyroxenites. Fractional crystallization, magma mixing, country rock assimilation, melt-rock reaction, or a combination of these processes have been proposed as important in chromitite formation. There is also a relationship between chromitite deposits and platinum-group elements (PGE) deposits.

Chromitite deposits from ultramafic-mafic layered intrusions are frequently associated with high concentrations of PPGE (Rh, Pd, Pt). Ophiolite chromitite deposits contain intermediate levels of IPGE (Os, Ir, Ru) and laser ablation analysis of PGE in chromite allows us to verify that these elements are not incorporated in chromite structure (solid solution) with the exception of Ru with concentrations from 38 to 134 (± 20) ng/g. The high PGE concentrations of ophiolite chromitites are principally related to the observed platinum-group minerals (laurite – erlichmanite series) included in chromite grains.

Our trace element analysis include Mn, Ni, Co which appear to have reequilibrated with the olivine of host dunitic rocks as have Fe and Mg, therefore it is difficult to determine whetter fractional crystallization or contamination (magma mixing or host rock assimilation), processes trigger chromite precipitation. On the other hand, our preleminary analysis of Ti, V, Ga and Zn, which are less sensitive to reequilibration with olivine, show an evolutionary trend compatible with fractional crystallization (negative correlation with Cr#).