# TRACE ELEMENT BEHAVIOUR DURING ECLOGITISATION – A CASE STUDY FROM FLEMSØY, WESTERN GNEISS PROVINCE, NORWAY

JACOB, D.E.

Institut für Geowissenschaften, Universität Mainz, Becherweg 21, D-55099 Mainz
e-mail: jacobd@uni-mainz.de

The Sandvikhaugane olivine-gabbro on the island of Flemsøy (Nordøyane Islands, Norway) shows well developed transitions from gabbro to eclogite recording metamorphic conditions of 1.5 - 2 GPa and 750 ± 60 °C (MØRK, 1985). MØRK divided the eclogitisation process into three stages based on petrographic evidence: an initial corona gabbro stage (I) is followed by a transitional coronitic eclogite stage (II) and an eclogite stage (III) in which the gabbro is completely transformed into eclogite. In this study, trace element concentrations of relict igneous as well as newly formed minerals were measured in situ by laser ablation ICP-MS (using an Agilent 7500ce equipped with New Wave UP213) to record the changes in trace element budgets and partitioning throughout the process of eclogitisation. Relict igneous minerals (cpx and fsp) preserved in stage I still show essentially unchanged REE element patterns despite petrographic signs of decomposition. Garnets newly formed at the expense of feldspar, on the other hand, have trace element concentrations and REE patterns far off their experimentally determined equilibrium trace element patterns (Fig. 1). Sc concentrations of newly formed garnets are close to those of the precursor feldspar (5 ppm), but increase throughout stage I and II towards concentrations that are closer to equilibrium partitioning values for garnets.

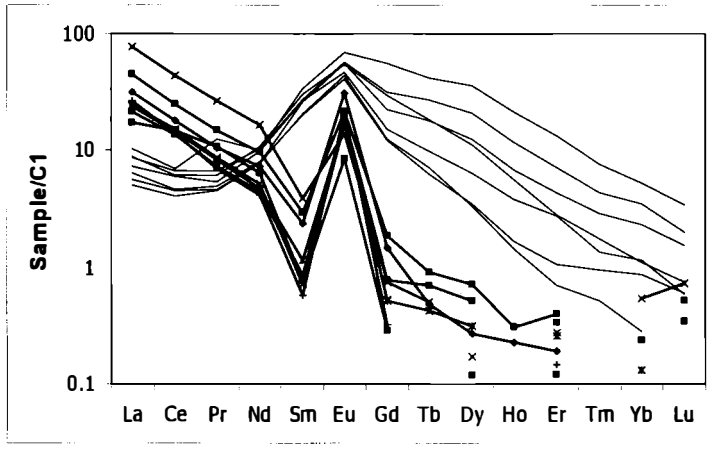


*Fig. 1. REE element patterns of relict feldspar and newly formed garnet pairs in stage I and II gabbro-eclogite. Garnet inherits the typically depleted heavy rare earth (HREE) signature from its precursor and only gradually approaches more typically HREE enrichment with increasing degree of eclogitisation.*

**References**

MØRK, M. B. E. (1985): Chemical Geology, 50, 283-310.