

Phlogopite/matrix, Cpx/matrix and Cpx/phlogopite trace element partitioning in true lamprophyres

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Introduction

Partition coefficients for true lamprophyres (i.e. in their original sense [1]) are poorly known. Therefore, mineral/matrix and mineral/mineral partition coefficients were determined by LA-ICP-MS for clinopyroxene (Cpx) and phlogopite crystals from a Variscan calc-alkaline (agpaitic index = 0, 6) lamprophyre of minette-type from the Bohemian Massif (Křížanovice locality, Bohemium). Quantification was performed using the glass reference material NIST SRM 612 as external standard, and microprobe analyses of Si as internal standard.

Results

Cpx/matrix partition coefficients (D) for 23 trace elements have values ~1 (0.9-1.1) for the HREE only. This suggest that HREE can be concentrated in clinopyroxene during crystallization from lamprophyre melts [2]. The coefficients differ significantly from published D-values for HREE (~0.3-0.4) in clinopyroxenes growing from 'lamprophyric' melt of alkaline composition [3].

In phlogopite, only 14 elements had concentrations above detection limit. Phlogopite/matrix partition coefficients have average values higher than 1 for Ba (D = 1.1), Rb (D = 1.7) and Ti (D = 1.5). On the other hand, D-values for LREE are extremely low (D < 0.02) and it was not possible to determine D-values for the majority of HREE.

During simultaneous crystallization of clinopyroxene and phlogopite phenocrysts, Th, Zr, Hf and REE are preferentially partitioned into clinopyroxene. The main reason for the behaviour of these elements may be found in the lack of a suitable crystallographic site in the phlogopite structure [5].

[1] Krmíček (2011) *MinMag*, this volume. [2] Plá Cid *et al.* (2005) *Contrib Mineral Petrol* **148**, 675–688. [3] Foley *et al.* (1996) *Geochim. Cosmochim. Acta* **60**, 529–538. [5] Schmidt *et al.* (1999) *Earth Planet. Sci. Lett.* **168**, 287–299.

Chronology of climate archives – A never-ending story

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Accurate dating of climate archives is essential for the reconstruction of past climate and to infer rates of climate change. Of special interest is the time range of the last Glacial and the transition into the Holocene, during which strong climate fluctuations are evident. Chronology of these archives is based on a number of dating systems, such as radiocarbon, U/Th and layer counting. Each clock has its strengths and limitations, and in the past decade important progress has been achieved to resolve inconsistencies within a dating method and between the methods. This keynote lecture will focus on this fascinating venture and the current status of establishing firm and consistent chronologies in the past 50.000 years.