

Behaviour of lanthanides in sorption process at the thermodynamic prospect

J.B. BELLINE^{1*}, R.V. CONCEIÇÃO², M.L.L. FORMOSO²,
E. TERTRE³ AND G. BERGER⁴

¹Programa de Pós-Graduação em Geociências da Universidade Federal do Rio Grande do Sul, Brasil

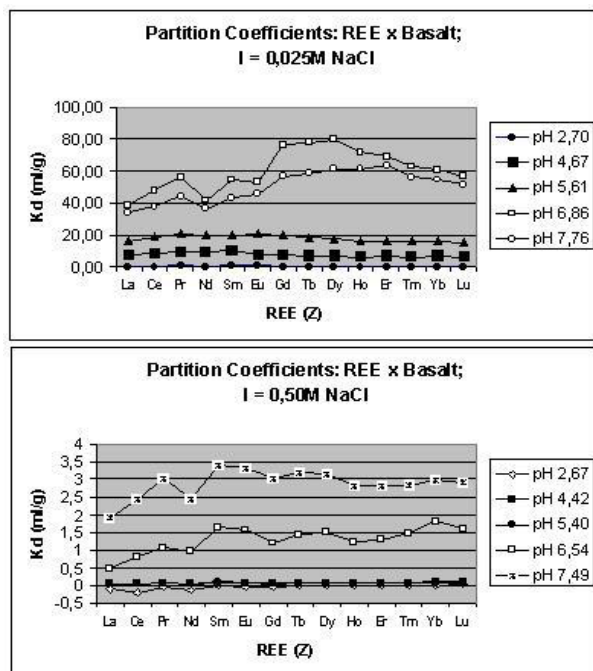
(*correspondence: jean.belline@ufrgs.br)

²Instituto de Geociências, Universidade Federal do Rio Grande do Sul, Brasil

³Université des Sciences et Technologies de Lille1, Villeneuve d'Ascq, France

⁴Université Toulouse III, Toulouse, France

The aim of this work is to investigate the geochemical behaviour of lanthanides in sorption process under controlled conditions of pH, temperature and ionic strength in sodium chloride solutions ($I=0,025M$ and $I=0,50M$). A thermodynamic datas of complex formation were evaluated without helpful computer code, however the several datas in the literature contributed for this evaluation, in special, of the carbonate, oxalate and phosphate complexes using free-energy relationships with the stability constants according to the review of Wood [1] and Milero [2]. In our work, the most important range of pH for lanthanides sorption is the interval between 5.6 at 7.6, where the pH was adjusted by addition of HNO_3 . Fig. 1 shows the partition coefficients calculated by batch experiments for each ionic strength.



[1] S.A. Wood. (1990) *Chem. Geol.* **82**, 159-186. [2] F.J. Millero (1992) *Geochim. Cosmochim. Acta* **56**, 3123-3132. [3] Y.R. Luo & R.H. Byrne (2004) *Geochim. Cosmochim. Acta* **68**(4) 691-699.

Melt and fluid transport in mantle wedges: evidence from bulk-rock and mineral geochemistry of mantle section rocks from Voykar Ophiolite (Polar Urals)

I.A. BELOUSOV¹, V.G. BATANOVA¹
AND A.V. SOBOLEV^{1,2}

¹Vernadsky Institute of Geochemistry and Analytical Chemistry, Moscow, Russia

²Max-Planck-Institut fuer Chemie, Mainz, Germany

We have studied in detail whole-rock and mineral geochemistry of mantle section rocks of Voykar Ophiolite – residual harzburgites and network of dunitic and pyroxenitic veins. The following conclusions are based on trace and major elements compositions of clinopyroxenes and olivines as well as Os-Re isotope data on bulk rocks [1].

Harzburgites display evidence of two separate stages of evolution. Initial melting occurred about 2 Ga [1]. Later (about 0.6 Ga) these peridotites have been involved in supra-subduction zone environment (SSZ) [1], where part of harzburgites had undergone hydrous melting, and modification by SSZ melts or fluids.

Melts made by hydrous melting of harzburgites are olivine saturated and thus moved to the surface via porous flow through dunitic channels (e.g. [2]). Cpx from dunites display wide range of compositions likely representing melts, originated by different degrees of hydrous melting.

High silica melts/fluids made by melting of subducting plate reacted with surrounding mantle rocks producing veins of pyroxenitic composition with various clinopyroxene/orthopyroxene ratios, which depends on silica/fluid ratio of through-passing melt/fluid. Websterites and orthopyroxenites are typically olivine-free and therefore are formed by metasomatic olivine consuming reaction [3, 4]. Olivine is present in trace amounts in clinopyroxenites and few websterites. It has lower Mg-number (mostly For_{84-87}), Mn and Sc contents, but higher Ni contents compared to olivine in harzburgites and dunites. Our data suggest that such pyroxenitic lithologies could serve as a potential pyroxenitic mantle source [3, 4], which could be formed already during early stages of subduction and disseminated by mantle convection in the mantle wedge.

[1] Batanova *et al.* (2007) *GCA* **71**, A64-A64. [2] Kelemen *et al.* (1995) *Nature* **375**, 747-753. [3] Sobolev *et al.* (2005) *Nature* **434**, 590-597. [4] Sobolev *et al.* (2007) *Science* **316**, 412-417.