LANTANIDES IN THE PEGMATITES FROM ROMANIA

T. MURARIU[1] and U. H. KASPER[2]

[1]*University "Al.I.Cuza" Iassy, Romania, tmurariu@uaic.ro*
[2]*Geological Institut of University of Köln, hu.kasper@uni-koeln.de*

In the Romanian Carpathian area it is known a large pegmatite Province (CPP), consisting of several subprovincies, as follows: Preluca (PPS), Rodna (RPS), Gilău-Muntele Mare (G-MMPS), and Getică (GPS). The pegmatites (lenses, concordant veins, nests, dykes) are hosted within Precambrian metamorphic rocks, typical of amphibolitic facies: paragneises, micaschists, amphibolites, crystalline marbles, usually associated with migmatites, which belong to the mesometamorphic series: Rebra, Baia de Arieş, Someş, Sebeş-Lotru.

The pegmatites from the Carpathian Province have a simple mineralogy and low rare-elements contents, which are characteristic of the metamorphic type pegmatites.

The main mineral phase of the pegmatites consists of quartz + acid plagioclase + microcline + muscovite + spodumene. As accessory minerals occur: biotite, garnets, tourmaline, beryl, apatite, columbit + tantalite, montebrasite, rutil, purpurite, cassiterite, ilmenite, kyanite, sillimanite etc.

On the basis of mineralogical and geochemical features, the pegmatites from Carpathian Province belong to the following classes: (1) feldspar pegmatites; (2) mica-bearing pegmatites and (3) rare –element pegmatites, which include two types: (3a) beryl type and (3b) albit – spodumen type (Murariu, 2001).

The REE content (ICP-MS analyses) of pegmatites is controlled by their mineralogy, especially by the contents of plagioclase and some accessory minerals (apatite, garnets, biotite etc). The REE contents between the limit values of isomorphic accumulation .

In the CPP, the lanthanides contents (ppm REE+Y) are evidently increasing from the graphic pegmatites (5.25), mica-bearing pegmatites (25.53) to feldspar (Na-Ca) pegmatites (58.8). The pegmatites examined are low concentrations of HREEs and negative Eu anomalies.

The geochemical distribution of REE+Y (ppm) in the pegmatitic minerals revealed the higher values in apatite (4547.37), almandine-spessartine garnets (540.75), biotite (520.27) and lower content in muscovite (101.31). The presence of lanthanides in the analyzed pegmatitic minerals is the result of the following isomorphous substitutions: REE Si (Ca, P)$_{-1}$; REE Na (Ca)$_{-2}$; YREE Al (Mn Si)$_{-1}$; REE Si (Ti, Al)$_{-1}$. In the apatite and in the mica, LREE > HREE, while in the garnets, LREE < HREE. The negative Eu anomalies in pegmatitic minerals as well as the low oxidation ratio can be explained by a low oxygen fugacity during crystallization.

The REE concentrations in the country rocks (75.24 – 278.01 ppm) are higher as well as in the pegmatites. The values are typical of sedimentary rocks and their metamorphosed equivalents.

Reference:

Murariu, T. (2001) The Geochemistry of the pegmatites from Romania. Ed. Academiei, 356p