# The REE and trace elements potential of the Albeşti Granite, Argeş County, Romania

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The Albeşti granite, of Early Ordovician age, was formed by crustal anatexis, experienced a medium temperature and medium-to-high pressure metamorphic event and is now hosted by the crystalline formations of the Leaota Mountains (South Carpathians), where it forms stratigraphically concordant lenses. Its most striking feature, similar to other European granites of comparable age and metamorphic history (*e.g.*, the Rumburk granite), is the blue quartz content. It has a peraluminous-calc-alkaline character and its CIPW normative composition plots in the monzogranite field. The purpose of this preliminary study is to determine the REE-bearing mineral content, both for academic and economic purposes, and to contribute to the overall geologic understanding of the Albeşti Granite.

Preliminary microscopic observation performed on thin sections has shown the presence, as accessory minerals, of epitaxial rutile on biotite, zircon, monazite and fluorapatite. Monazite is particularly important to the topic of the study because its capacity to incorporate trace and rare earth elements. Biotite crystals present a significant density of pleochroic halos indicative of radioactive mineral inclusions. The heavy mineral fraction was separated using bromoform and then used for polished sections. The sections were then investigated using Micro Raman and SEM. Granite samples have also been analysed for radioactive nuclide content using low-background gamma spectrometry. Based on SEM imaging, SEM-EDS analysis and Raman spectra, the following minerals of interest have been identified: uraninite, xenotime-Y, zircon, monazite–Ce, fluorapatite, thorite, rutile and ilmenite. The SEM imaging has shown monazite alteration halos made up of epidote, allanite and apatite (potential indicator of monazite instability during amphibolite facies metamorphism); uraninite has been observed associated with pyrite and galena. Low-background gamma spectrometry indicates the presence of $^{212}$Pb, $^{214}$Pb, $^{212}$Bi, $^{214}$Bi, $^{226}$Ra, $^{208}$Tl, $^{228}$Ac and $^{40}$K radioactive nuclides. The $^{212}$Pb - $^{212}$Bi - $^{208}$Tl sequence is consistent with the $^{232}$U decay chain; $^{214}$Pb and $^{214}$Bi are products of $^{226}$Ra, itself a product of $^{238}$U radioactive decay; $^{228}$Ac is a “granddaughter” isotope of $^{232}$Th.