Oceanic Zircon as A petrogenetic indicator

Aranovich L.Y. [1], **Bortnikov N.S.** [1,2], **Borisov A.A.** [1,3]
123

[1] Institute of Geology of Ore Deposits, Petrography, Mineralogy and Geochemistry RAS, Staromonetnyi per. 35, 119017 Moscow, Rassia, lyaranov@igem.ru
[2]bns@igem.ru
[3] aborisov.igem@gmail.com

Morphology and geochemical features of zircon separates from a variety of rocks from Mid-Atlantic Ridge have been studied with a variety of methods. Magmatic zircon (*Zrn*) in the gabbroids crystallized from differentiating magmatic melt in a number of episodes, as follows from the systematic rim-ward increase in the Hf concentration, which is related to the Zr-Hf fractionation during *Zrn* growth [Aranovich, Bortnikov, *Petrology*, *2018, **26**, 115–120.*]. These tendencies are also discernible in *Zrn* from the OPG. *Zrn* in the OPG is depleted in REE compared to the least modified *Zrn* in the gabbro, suggesting that the OPG were derived via partial melting of gabbro in the presence of seawater-derived concentrated aqueous salt fluid. Another reason for the REE depletion might be simultaneous crystallization of zircon and apatite. The CL-dark sectors, which are found in practically all magmatic *Zrn* grains, have Y/P (a.p.f.u.)>>1, most likely resulted from OH accommodation in the *Zrn* structure, a fact suggesting that the OPG parental melt contained water. High-temperature hydrothermal processes induced partial to complete recrystallization of *Zrn* (via dissolution – re-precipitation), a process that was associated with ductile and brittle deformations of the zircon-hosting rocks. The morphology of the hydrothermal *Zrn* varies depending on the pH and silica activity in the fluid. The early hydrothermal transformations of the *Zrn* resulted in enrichment in La and other LREE, except only Ce, whose concentration, conversely, decreases compared to that of the unmodified magmatic *Zrn*. Reduction in both bulk Ce and Ce* is related to the reducing nature of the hydrothermal fluid. *The work is supported by the Russian Scientific Fund (project № 18-17-00126)*