U-Pb SHRIMP dating of zircons from the ore-bearing Kharaelakh intrusion (Talnakh district, Russia)

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World-class platinum-group-element (PGE)-Cu-Ni Oktyabr'skoe deposit closely linked to the Kharaelakh ultramafic-mafic intrusion is located in the northwestern corner of the Siberian Craton, Russia. In spite of its significant metallogenic potential, no age constraints for the rocks of the Kharaelakh intrusion are available. Consequently, duration of the ore concentration process responsible to form an economic deposit have never been evaluated quantitatively.

This report presents the first results of uranium-lead dating of 19 grains of zircon, which were extracted using *ppm-mineralogy* technique (NATI Research JSC, St. Petersburg, Russia) from drill core samples of the Kharaelakh intrusion. Rocks investigated include olivine-containing gabbro, olivine gabbro, melanotroctolite and plagioolivinite. Isotope geochemical data (24 analyses) were determined with secondary ion mass spectrometer SHRIMP-II at VSEGEI.

Petrographic inspection revealed two groups of zircon (i.e., ZR-1 and ZR-2). Rare grains of ZR-1 represent colourless corroded *cores*, whereas ZR-2 occur as (1) rims on ZR-1 and (2) single subeuhedral beige crystals. Both zircon groups yield solid mineral inclusions, but only ZR-2 host melt inclusions that predominantly contain glass. Zircons are characterized by a fuzzy cathode luminescence, frequently with a total absence of zoning.

Grains of ZR-1 are characterized by relatively low concentrations of thorium and uranium (411-509 and 393-427 ppm, respectively), whereas contents of Th and U in ZR-2 vary in the range 1758-9510 and 1025-3571, respectively. On the binary Th-U diagram ZR-2 grains (Th/U=1.92-4.86) are clearly distinct from ZR-1 (Th/U=1.08-1.23) but overlap with the field of mantle metasomatic derivates (MARID).

A significant time gap represented by two groups of zircon ages (ZR-1, 347 ± 16 Ma and ZR-2, 265 ± 11 Ma) likely represent the timing of magmatic crystallization of two distinct zircon populations. Indeed, geochemical and mineralogical evidences allow to suggest that older zircons may have been formed at high temperatures, whereas younger zircons crystallized more rapidly at relatively lower P-T parameters.

Our new findings are in a good agreement with assumption about the interaction of distinct magmatic sources and a prolonged duration of component fractionation in the magmatic system.