

Ar-Ar dating of K-richterite from the Bab'e Leto (An-134) kimberlite pipe, East Ukukit field, Siberian craton

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K-richterite is an extremely rare mineral in Siberian kimberlites, as compared with South African kimberlites. In Lower Devonian Bab'e Leto (An-134 [1]) kimberlite pipe (East Ukukit field), K-richterite occurs as metasomatic mineral assemblages, coexisting with phlogopite, apatite, zircon, ilmenite, and rutile. The Bab'e Leto pipe is characterized by unusually high abundance of megacrysts of zircon, apatite and K-richterite. The kimberlites from the East Ukukit field yield whole-rock—phlogopite Rb-Sr isochron age of 409 ± 15 and 410 ± 4 Ma and SHRIMP U-Pb zircon age of 408 ± 14 , 408 ± 19 , 419 ± 10 , and 429 ± 29 Ma [1].

Six gem-quality K-richterite grains (3-7 mm in size) were collected from a heavy mineral concentrate of the kimberlite, with a purpose to date a formation age using Ar-Ar step-heating method. The K-richterites yielded plateau ages of 387.7 ± 4.2 , 398.9 ± 5.3 , 407.1 ± 5.4 , 413.1 ± 5.5 , 418.8 ± 4.0 and 432 ± 4.4 Ma. Most of them are in a good agreement with the eruption age of the pipe previously dated by Rb-Sr and U-Pb methods. We interpreted the youngest age (387.7 ± 4.2) as a partial reset (argon-depletion) of Ar isotope system, due to Devonian igneous activity to have formed numerous mafic dyke swarms in the eastern part of the Siberian craton.

Our new Ar-Ar results indicate that K-richterite and zircons started to form in Silurian (~429-432 Ma) by a mantle metasomatism in SCLM beneath the East Ukukit kimberlite field; the metasomatic events might have continued to a time of the final eruption of the Bab'e Leto (An-134) kimberlites at ca ~408 Ma and lasted for at least ~20 Ma.

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[1] Griffin *et al.* (1999) *Tectonophysics* **310**, 1–35.