



U-Pb and Lu-Hf isotopes and geochemistry of zircons from Siberian kimberlites

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We have studied a suite of mantle zircon from several kimberlite pipes of different ages for U-Pb and Lu-Hf isotopes and trace elements composition. Grains that selected for study are transparent, light yellow or light brown in color, over 1 mm in size and have rounded or irregular shape. All studied zircon has a low concentration of trace elements and typical mantle zircons REE pattern without Eu anomaly.

Devonian age Mirny field. From the Mir pipe 15 zircons analyzed in 1 spot each gives concordant U-Pb age of 363.5 ± 4.0 Ma. Lu-Hf isotopes give a range of model ages from 598 to 685 Ma. Initial Hf isotope composition at the time detected by U-Pb isotopes are in the range of 5.6-9.6 Hf t units. U-Pb ages for the Amakinskaya and Inter pipes (one grain from each analyzed) give ages of 359 ± 15 and 365 ± 17 respectively. Hf isotope composition of Zircon from the Amakinskaya pipe similar to that of Mir pipe with 5.6 Hf t and model age of 666 Ma. However, zircon from the Inter pipe has distinct Hf isotope composition with negative Hf t (-16.5) and model age of 1554-1611 Ma.

Silurian age Chomurdakh field. A suite of 10 grains from Khairygastakh pipe gives U-Pb age of 418.8 ± 4.7 . Hf model ages of those zircons are 788-869 Ma and Hf t are 3.8-5.9 units. Zircons from Druzba pipe have two U-Pb age population averaged as 426 ± 9.1 and 361 ± 9.0 with Hf model ages 828-911 Ma and initial Hf isotope composition of 1.6-5.0 Hf t units.

Triassic age Kuranakh field. A suite of 10 zircons from the Ryatanka pipe gives concordant U-Pb age of 231.8 ± 3.1 . Hf model ages are in the range of 429-499 Ma with the initial Hf isotope composition of 9.3-11.2 Hf t units. Combined U-Pb and Lu-Hf isotope system in mantle zircons indicate periodical asthenospheric melt input into lithospheric mantle which shortly after results in kimberlite magmatism. However, not always. Chomurdakh field formed by two episodes of kimberlite activity, but from the same source reactivated after 60 Ma without new asthenospheric input. Inter pipe zircon have crystallized from old enriched material, or fully reset their Pb isotopes at pre -kimberlite thermal event. The research was supported by the Russian Foundation for Basic Research, grants № 18-05-70064-y.