

LIPs timing by U-Pb ID-TIMS dating of calcic garnets

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Advances in Micro- to Nanoscale Analytical Geochemistry and Multimodal Chemical and Structural Imaging

Traditional approaches for timing of high volume, short lived, intraplate-type magmatic events like LIPs can provide scattered age information due to absence of reliable geochronometers or their later alteration. At the same time, calcic garnets like the andradite, schorlomite, morimotoite, grossular, kimzeyite occur as widespread accessory minerals in alkaline igneous silicate and carbonate rocks. Until recently these minerals were not considered as U-Pb geochronometer minerals despite of Ca-Fe-Ti garnets contain essentially high U and negligible common Pb and usually yield U-Pb concordant or subconcordant ages. Besides, no postmagmatic alteration usually affected the U-Pb isotopic system of these minerals.

On the examples of dozens alkaline and carbonatitic massifs from LIP-carbonatite associations ranging from Paleoproterozoic to Cretaceous (namely Western-Aldan, South-Mongolian, Maimecha-Kotui, Kola Alkaline province, Eastern-Sayan, pan-Superior province) we demonstrate high advantage of U-Pb ID-TIMS geochronological dating of calcic garnets. Obtained high precision age data allow us not only provide reliable geochronological information for unknown massifs but also bracket events of magmatic activity within the very narrow age interval for the well-studied LIPs like Kola Alkaline Province to at 373 ± 2 Ma to 377 ± 1 Ma (instead 360-380 Ma) as well as for the Maimecha-Kotui province at 247 ± 6 Ma- 250 ± 1 Ma.

The study is supported by RFBR, grants 17-05-00912, 18-55-18011