

论文

原位微区同位素分析在花岗岩成因研究中的应用

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摘要:

花岗岩及其伴生的镁铁质岩石是构成大陆地壳的重要组成部分,是大陆形成演化的标志物。花岗岩的成因研究,包括花岗岩的岩浆源区及成岩过程,蕴含着大陆地壳生长、岩石圈演化等重要信息。随着二次离子质谱仪(SIMS)和激光多接收电感耦合等离子体质谱仪(LA MC ICPMS)的问世,原位微区(in situ)元素和同位素分析方法开发以及应用使花岗岩成因研究,尤其是花岗岩的岩浆源区和成岩过程等方面得到长足的进展。在仔细阅读相关文献的基础上,结合笔者近年来相关研究工作,综述花岗岩成因研究中原位微区同位素源区示踪和成岩过程的最新进展,以期推动我国花岗岩及原位微区同位素分析方法等相关研究。

关键词: [原位微区同位素分析](#); [花岗岩](#); [岩石成因](#)

Application of in situ isotopic analysis to granite genesis.

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Abstract:

Granitoids and related mafic rocks are the main components of continental crust and are important in understanding the formation and evolution of continental crust. The origin of granitoids, i.e., the sources of magma and the petrogenetic processes, is the key to studying the geodynamics of continents and to understanding the processes of continental crust growth and lithospheric evolution. In recent years, in situ analysis shows the elemental and isotopic heterogeneity within a single mineral scale. The minerals should have the same isotopic compositions as their host magma. If the chemical and/or isotopic compositions of host magma changed, the compositional zones can record it. It is the heterogeneity of a single grain that makes the in situ mineral geochronology and isotopic analysis be a useful tracer to constrain the age, source and petrogenetic process of granites. With the development of secondary ion mass spectrometry (SIMS) and multiple collector inductively coupled plasma mass spectrometry (MC ICPMS) equipped with laser, the applications of in situ elemental and isotopic analysis advanced the studies of origin of granitoids, especially the source of magma and the petrogenetic process. At present, the widely used methods of in situ analysis are Hf O isotopes of zircon, Nd isotope of apatite and titanite, and Sr Pb isotopes of apatite and plagioclase. On the basis of updated references and our recent work, this paper summarized the applications of in situ isotopic analysis to the study of the origin of granitoids, i.e., tracing the sources of magmas and petrogenetic processes, in order to promote the research on in situ analytical method and the study of granitoids in China.

Keywords:

[in-situ isotopic analysis](#); [granitoid](#); [petrogenesis](#)

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