Petrography and Geochemistry of Mafic Granulites of the Ubendian Belt: Contribution to Insights into the Lower Continental Crust of the Paleoproterozoic

Author(s)
N Boniface

Abstract

Mafic granulites of the Ubendian Belt have geochemical signature, trace and REE patterns, similar to that of the lower continental crustal rocks. A SHRIMP U-Pb single zircon date at 1977±40 Ma indicates that these rocks belong to the Paleoproterozoic Ubendian orogenic cycle, which was followed by the Mesoproterozoic tectonic disturbance that contributed to their exhumation. Orthopyroxene, clinopyroxene, garnet, hornblende, plagioclase and quartz is a frequent mineral assemblage for the mafic granulites of the Ubendian Belt, and garnet frequently form corona between plagioclase and clinopyroxene. Geothermobarometric calculations have revealed the equilibration of these rocks at a temperature range between 650 and 740 °C and pressure between 7 and 10.2 kbar equivalent to the geothermogradient of 22-28 °C/km and a depth of 23-33 km. Garnet coronas between plagioclase and clinopyroxene suggest a typical isobaric cooling P-T path for granulite terranes. The absence of preserved earlier (prograde) mineral assemblage suggests deep burial for these granulites, more than 33 km, and long stay for re-equilibration at relatively shallower crustal levels at 23-33 km deep.

Keywords:

Mafic granulite,
Isobaric cooling,
Zircon,
Ubendian Belt