Spinel-quartz association in the Androyen granulite terrain in the southern part of Madagascar


As located in the junction of East- and West-Gondwana, Madagascar is one of the key areas for understanding the Gondwana evolution during the Pan-African event. The present study focuses upon the ultra high temperature (UHT) granulite terrain in the southern part of Madagascar. The lithological units of this granulite terrain comprise three main terrains from the west to east (Besairie, 1964); the Graphite, the Vohibory and the Androyen terrain, which is the base of the succession. We examined petrological characteristics of the metapelites from the Androyen terrain, which occupies the eastern part of the terrain. It is composed of charnockite, leptynites, pyroxenite, granite and metapelites. This terrain is bounded by two major shear zones: to the north by the SW-SE trending Bongolava-Ranotsara shear zone and to the west by NS Betroka shear zone. The previous works reported the local occurrences of Spl-Qtz assemblage, one of the index mineral assemblages of UHT metamorphism (Lacroix, 1921; Rakotondrazafy, 1992; Nicollet and Martelat, 1998). In this study we mapped Spl-Qtz occurrences in the metapelites over strikingly wide areas extending ~100km. The Spl-Qtz rocks are distributed along the two shear zones (Bongolava Ranotsara shear zone and Betroka shear zone).

The spinel-quartz metapelites are characterized by the mineral assemblages of Spl ± Sill ± Crn ± Kfs ± Pl ± Qtz ± Crd. The series of mineral reactions are identified as; Sp+Qtz=Crd, Sp+Qtz=Crd+Grt+Sil, Sp+Crd=Grt+Sil+Qtz, Bt+Sil+Kf=Grt+Crd+melt, Sp+Qtz+O2=Sil+Mgt, Sp+O2=Crn+Mgt. The Sp-Qtz rock has hogbonite-hercynite composite grains in magnetite. The Spl-Qtz metapelites probably represent the roots of the continental crust uplifted during the Pan African collision event.

Key words: Gondwana, Southern Madagascar, metapelites, spinel-quartz, UHT
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