

## P-T evolution of the Sri Lankan granulites — petrographical constraints

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With respect to the P-T evolution of the Sri Lankan granulites, relict kyanite ( $\pm$  quartz) and staurolite have been reported in khondalites (garnet-sillimanite-graphite gneiss), which suggests clockwise P-T-t trajectories for the Highland Series and the Southwestern Group rocks, at least for the metasediments. The prograde history of the granulites is also suggested by the growth zoning of some garnets in khondalites and other pelitic gneisses from the central part of the Highland Series.

In addition, we describe here other rocks which give petrographical constraints on the P-T evolution.

Relict-kyanite + sapphirine + spinel  $\pm$  biotite in garnet (Sp. 88112401A): This rock contains garnet, orthopyroxene, biotite, sillimanite, kyanite, sapphirine, spinel, cordierite, magnetite, hematite, plagioclase, K-feldspar and quartz. Secondary spinel, corundum and rutile are associated with magnetite. In this rock, kyanite + sapphirine + spinel  $\pm$  biotite are interlocked with each other and they are totally included in garnet porphyroblast. Because they are never present in the matrix, it is interpreted that these minerals are relict phases formed after staurolite locally in the absence of quartz. A retrograde process is suggested by the breakdown of garnet to form biotite + sillimanite + quartz and orthopyroxene + cordierite + magnetite, respectively.

Secondary andalusite (Sp. 88120403, 89090303, K89082407): Andalusite occurs in cordierite-rich pelitic rocks, cut extensively by pink granitic veins that usually contain cordierite and are sometimes highly mylonitic. Andalusite often coexists with siderite and partially replaces cordierite together with siderite. Andalusite has been revealed to occur not only in the Southwestern Group rocks but also in the Highland Series rocks. All the modes of

occurrence of andalusite indicate that it is a secondary mineral formed clearly after the widespread formation of sillimanite at the peak of regional metamorphism.

The petrographical evidence mentioned above further gives constraints on the P-T-t trajectory of the Highland Series granulites, i.e., clockwise P-T-t path. Moreover, in view of the close spatial relationship between the localities of andalusite and the sites of local charnockitization, it is inferred that local charnockitization has taken place in relatively shallow levels in the crust at a later stage of the metamorphic evolution.

As a possible counterpart of the Highland Series and the Southwestern Group in the Gondwana reconstruction, a relict kyanite + sapphirine + biotite association is also reported from the Lutzow-Holm Bay region, East Antarctica. Because this association is unique in the East Antarctic Shield, it suggests further evidence of this juxtaposition.