

**AN ISOTOPIC STUDY OF THE PONMUDI INCIPIENT CHARNOCKITE,
SOUTH INDIA**

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Sm-Nd garnet-whole rock ages of gneisses and associated charnockites from an incipient charnockite locality in Kerala, Southern India, range between 1804 and 559 Ma with ages broadly correlated with Nd concentrations in the garnet separates. The spread in ages is interpreted as mixed ages between garnet and REE-bearing inclusions. The youngest age provides a maximum constraint on garnet-whole rock isotopic equilibration during granulite metamorphism, whereas the older ages provide a minimum constraint on detrital material now included in the garnet. The data therefore indicate that the period of incipient charnockite formation from Kerala was Pan-African in age (<560 Ma). Biotite-whole rock ages of gneisses associated with the incipient charnockites are somewhat younger (485 Ma).

Late Archaean model Nd ages suggest that the gneisses and the charnockite protoliths were derived from Late Archaean source material of similar age to that of the high-grade terrains in both South India and Sri Lanka. However both Rb-Sr and Sm-Nd ages suggest that granulite metamorphism and subsequent uplift occurred between 560 and 485 Ma, comparably with the tectonothermal evolution of the Highlands Group in Sri Lanka, and in contrast to the Late Archaean/Early Proterozoic ages for granulite metamorphism and uplift determined from gneisses and charnockites north of the Moyar shear zone in South India.

The similarity between Nd and Sr model ages indicates that no significant Rb/Sr fractionation has occurred during the crustal history of the incipient charnockites from Ponmudi, and thus argues against melt extraction during granulite formation. Pb isotopic ratios suggest that whereas U/Pb ratios were greatly fractionated during charnockite formation Th/U enrichment did occur.