

## **AGE & PETROGENESIS OF GRANULITES FROM NAGERCOIL BLOCK, SOUTH INDIA**

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The Southern Granulite Terrain (SGT), South India is a collage of highly reworked crustal blocks with spatial and temporal evolution history ranging from Archaean to Neoproterozoic. The Nagercoil Block (NB) situated at the southern tip of the SGT is regarded as an igneous litho-unit comprised dominantly of massive and homogeneous charnockite, minor amount of supracrustal rocks, norite and syenite intrusives. The charnockites are seen intruded by mafic granulites with preservation of chilled margins. Charnockite is composed of Opx+Pl+Kfs+Qz+Il±Bt/Grt/Hbl while mafic granulite is of Cpx+Opx+Pl+Kfs+Qz+Il+Hbl±Bt. Cpx within mafic granulites shows exsolution lamellae.

Charnockite shows a range in SiO<sub>2</sub> (61-75%), TiO<sub>2</sub> (0.07-1.07) and high alumina (12.4-17.3); while mafic granulites display constant SiO<sub>2</sub> (51.7-49.6), TiO<sub>2</sub> (0.82-1.4) and similar alumina content as charnockite. In TAS diagram, charnockites plot in granodiorite to granite field whereas mafic granulites plot in gabbro field. Mafic granulites are metaluminous displaying high Fe tholeiitic trend while charnockites are metaluminous to marginally peraluminous and display calc-alkaline trend. Both are LREE enriched, but mafic granulites display feeble negative Eu anomaly and less fractionated HREE compared to the charnockite.

The zircons within charnockites preserve igneous cores and metamorphic rims. CL images of zircons in mafic granulites show they are homogeneous with weak fir tree or sector zonings, interpreted as metamorphogenic. LA-ICPMS analyses of zircons within charnockites yield an upper and lower-intercept ages of ca. 1.97 Ga and ca. 0.53 Ga interpreted as magmatic protolith crystallisation and metamorphism respectively. Mafic granulites yield concordant ages of ca. 0.55 Ga representing the pervasive Pan African metamorphism. The study presents detailed geochemistry and geochronology of granulites within NB. The mafic granulites are interpreted to have formed during the final stages of Pan-African orogeny involving large scale intra-crustal melting processes within a thickened crust and have implications on tectonic evolution of the terrain.