

Ultrahigh temperature metamorphism of Mg-Al granulites from Godalpadu, Eastern Ghats Belt : Implications for the assembly of Indo-Antarctic metamorphic terrains

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FeTi-sapphrine granulites at Godalpadu, Eastern Ghats Belt, preserve polymineralic corona and resorption textures that are interpreted to document a metamorphic trajectory utilizing the sequence of prograde and retrograde reactions in addition to dehydration melting and oxidation reactions. Mineral - chemical data indicate high Al_2O_3 content (8-9 wt.%) in orthopyroxenes, high TiO_2 -content in phlogopites (4.5 wt.%) and sapphrine (2.43 wt.%) and almandine-pyrope garnet with 0.50 Xmg. The coexistence of sapphirine , spinel & quartz with opaque lamellae of magnetite - ilmeno-hematite attest prevalence of high oxidation state. Combination of mineral textures, assemblages and compositions in terms of phase diagrams in FMAS system provide powerful forward modeling approach on mineral evolution history. Extreme P-T estimates (9 kbar, 960°C) extracted from thermobarometric sensors integrated with textural imprints and field criteria indicate that the high grade granulites from Godalpadu evolved along a clockwise P-T-t path with a positive, post peak metamorphic dP/dT slope accompanying substantial decompression (c.4 kbar). The comparable P-T histories from Indo - Antarctic metamorphic terrains provide important constraints on the assembly of these fragments within the East Gondwana framework.