**Inherited Monazites and Zircons in ~1.6 Ga Ultrahigh-Temperature Granulites from the Southern Margin of the Central Indian Tectonic Zone: Implication for Sedimentary Provenance and Central Indian Orogenesis**

A. Bhandari[1], S K. Bhowmik[1], S.A. Wilde[2] and N.C. Pant[1]
[1]*Department of Geology & Geophysics, IIT, Kharagpur-721 302, India*
[2]***Department of Applied Geology, CUT, Perth, WA, 6845, Australia***

In this study, the inherited components of monazite and zircon in the ultrahigh-temperature (T~900-1000$^{o}$C at 8-9 kbar) granulites of the Bhandara-Balaghat granulite (BBG) domain, at the southern margin of the Central Indian Tectonic Zone (CITZ) have been constrained using Th-U-Pb monazite geochronology and cathode-luminescence (CL) imaging of zircon. Four metasedimentary granulites, namely Grt+Opx+Crd+(Ilm+Rt), Grt+Crd+Sil, Grt+Sil and Grt+Opx migmatites, have been selected for this purpose. Mineral abbreviations are after Kretz (1983).

Bulk of the monazite crystals from the investigated rocks display an older, inherited core, which is variously resorbed, recrystallised and compositionally reset. The Y-rich ($Y_2O_3$=1.5-2.1 wt%) and Th-poor ($ThO_2$ =1.0-2.4 wt%) cores in the Grt+Crd+Sil granulite record characteristic Palaeoproterozoic spot chemical ages in the range of 1700 to 1894 Ma, with an weighted mean of 1794±44 Ma (error in 2 sigma). In contrast, Th- ($ThO_2$=5.0-8.9 wt%) and Y-rich ($Y_2O_3$=0.2-2.0 wt%) compositional domains yield mean age populations at 1624±21 Ma (Grt+Crd+Sil granulites), 1601±21 to 1597±15Ma (Grt+Crd+Opx granulite) and 1596±20 Ma (Grt+Sil granulite). These ages are indistinguishable from those in the monazite rims or inclusion-free, compositionally homogeneous monazites: 1593±12 to 1589±12 Ma in Grt+Crd+Opx granulite, 1582±13 Ma in Grt+Crd+Sil granulite and 1603±12 Ma in Grt+Crd granuites.

CL imaging of insitu zircon crystals from the different textural domains of the Grt+Opx granulites reveal three distinct stages of zircon growth, which are correlated with (a) an early inherited core of generally ovoid shape, (b) crystallisation/recrystallisation at UHT metamorphic condition and (c) a late metamorphic overgrowth. SHRIMP U-Pb zircon dates indicate Palaeo- to Neoarchaean age for the inherited zircon cores and ~1.6 Ga age for the type (b) zircons.

The findings are consistent with a detrial origin of predominantly Archaean provenance of the pre-1.6 Ga inherited zircon and monazite cores. These cores were differentially re-equilibrated during the ~1.6 Ga UHT thermotectonic event, referred to here as the Central Indian Orogeny. The significance of the development and closure of a Palaeoproterozoic sedimentary basin on the leading edge of the South Indian Block, due to ~1.6 Ga hot orogenesis has been discussed.

## References

[1] R. Kretz, R., *Am. Mineral.* **68,** 277-279 (1983).