Geochronology of high-grade metamorphic rocks from central Madurai Block, southern India

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The tectonic framework of southern India is defined by an Archean granite-greenstone terrain in the north onto which was accreted by several granulite facies blocks in the south along the Palghat-Cauvery suture zone. The southern domain comprises a collage of polymetamorphic terrains with protracted crustal evolution history ranging from Early Archaean to late Neoproterozoic and preserve imprints of multiphase exhumation histories. The Madurai Block bounded by the Palghat-Cauvery suture zone in the north and the Achankovil shear zone in the south is the largest and least studied granulite block in the southern granulite terrain. The high-grade metamorphic rocks occurring in this block include charnockites, hornblende-biotite gneiss, calc-silicates, pelitic and mafic granulites and minor magmatic intrusives. Intercalated sapphirine-bearing lithologies have been reported from several localities in this block. In this study we discuss the CHIME dating of monazites from charnockites and pelitic granulites in the central part of Madurai Block known as Kodaikanal Metapelite Belt; an area subjected to ultrahigh-temperature crustal metamorphism and clockwise P-T regime. The CHIME ages for monazites in the charnockites from the Kodaikanal Metapelite Belt indicate 514+-34 Ma. The monazite from the migmatites indicates an age cluster at 1703+-251 Ma and 540+-47 Ma on PbO vs. ThO2 diagram. The core-age of the monazite from the migmatites have a distinct older meso-Proterozoic age (ca. 1700 Ma) while the extensive overgrown rim and monazites from the charnockites have a neo-Proterozoic-Cambrian age. This clearly indicate the timing of ultrahigh-temperature metamorphic event in the Kodaikanal Metapelite Belt, could takes place during the late neo-Proterozoic to Cambrian period while the sediments of Kodaikanal Metapelite Belt might have been derived from an older metamorphic province with a meso-Proterozoic age. The results can be thus interpreted that the sedimentation must be younger than ca. 1700 Ma and the irregular nature of the core might indicate a nearer source of sedimentation. We will also present the results of our ongoing research on the cooling age studies (K-Ar method) of these granulites.