

is coarse grained and characterised by the presence of iridescent labradorite. The mafics noticed are amphibole, clinopyroxene and orthopyroxene in widely varying proportions. Garnet is sparse and irregular in its distribution and is often surrounded by well developed symplectite coronas of orthopyroxene and plagioclase. The anorthosite body is generally massive except in the eastern and western marginal zones where faint foliation imparted by the mafic schlierens is observed (Narasimha Rao, 1964). However, recent studies have shown that the anorthosite body also shows the effects of three phases of folding deformations as observed in the host granulites (Singaram and Bhaskaran, 1996). Several bands and lenses of mafic granulites occur within the anorthosite and these bands show stretching and boudinaging.

The anorthosite is made up of plagioclase (95%) with minor hornblende, ortho/cclinopyroxenes and accessory garnet, apatite and biotite. The composition of the plagioclase ranges from andesine to labradorite. The plagioclase grains show distinct play of colours in shades of blue, green and copper yellow. Development of garnet with coronas is noticed within the anorthosite in several places. In the garnetiferous anorthosite, symplectitic

intergrowth of orthopyroxene and plagioclase is observed indicating isothermal decompression (ITD) path. The An-content of the plagioclase in these symplectites is highly calcic (An_{85} to An_{94}). The mineral assemblages indicate that the anorthosite has undergone upper amphibolite to granulite facies metamorphism. Based on the mineralogical and chemical characters, Janardhan and Wiebe (1985) opined that the Oddanchatram anorthosite belongs to Proterozoic massive type. U-Pb (Zircon) dating of the anorthosite has yielded an age of 560 ± 12 Ma (Ghosh, 1995). The lower age of 350 ± 16 Ma obtained by Sm-Nd (Gt-WR) method (Jayananda et al 1995) might indicate the time of uplift of the Kodaikanal massif.

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References

- GSI (1995) Geological and mineral map of Tamil Nadu and Pondicherry Geol Surv of India, Kolkata, 1:5,00,000
- GHOSH, J G, ZARTMAN, R E and DE WIT M J (1998) Re-evaluation of tectonic framework of southernmost India: new U-Pb geochronological and structural data and their implication for Gondwana reconstruction. In Gondwana 10: Event Stratigraphy of Gondwana. Jour African Earth Sciences, 27/1A, 86
- NARASIMHA RAO, P V (1964) Anorthosites of Oddanchatram, Palni Taluk, Madras State, Indian Mineralogist, v 5, No 2 pp 99-104
- JANARDHAN, A S and WIEBE, R A (1985) Petrology and Geochemistry of the Oddanchatram anorthosite and associated basic granulites, Tamil Nadu, South India. Jour Geol Soc India V 26, pp 163-176
- JAYANANDA, M, JANARDHAN, A S, SIVASUBRAMANIAN P and PEUCAT, J J (1995) Geochronologic and isotopic constraints on granulite formation in the Kodaikanal area, southern India. Mem Geol Soc India, no 34, pp 373-390
- SINGARAM, N and BHASKARAN, R (1997) Structural and tectonic studies around Oddanchatram, Dindigul Anna district, Tamil Nadu, Rec Geol Surv India, v 130, pt 5, pp 99-101

ROLE OF BACTERIA IN THE FORMATION OF NUGGETS OF GOLD

While engaged in prospecting for the occurrence of alluvial gold, I was very much intrigued to find nuggets of gold in odd shapes and sizes. A large nugget had weighed as much as 140 gms. A recent note by R A Kerr appearing in *Science* (14th July 2006, p 159) describes the role of special bacteria *Ralstonia metallidurans* known for its ability to precipitate some heavy metals from solutions. Narayanaswamy of CESS, Trivandrum had collected small nuggets of gold in the Cheliyar river and also in laterite

profiles. The role played by bacteria in the precipitation of gold and its concentration in the form of nuggets is a subject of great economic interest worthy of further study by both geologists and biologists. A detailed paper on '*Biomining of Gold: Biofilms on Bacterioform Gold*' by Frank Reith and others appears in the same issue of *Science* at pp 233-236. Such studies should be pursued by our research groups in India.

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