

CURRENT UNDERSTANDING ON THE GENESIS OF LODGE GOLD MINERALIZATION IN THE SOUTHERN GRANULITE TERRAIN, PENINSULAR INDIA.

R. Krishnamurthi

Department of Earth Sciences, Indian Institute of Technology, Roorke

E-mail: krishfes@iitr.ernet.in

Abstract

Lode-type of gold mineralization has been reported from several places of Wynad, Malappuram and Attappadi areas in the Southern Granulite Terrain of Peninsular India. The gold-quartz lodes are hosted by strongly deformed metamorphosed sequences of mafic volcanic rocks, chemical sediments (BIF), and felsic plutonic rocks. The auriferous reefs consist predominantly of massive, milky white to partly translucent quartz containing pyrite + pyrrhotite + chalcopyrite + arsenopyrite. Chloritization, biotitization, sericitization and carbonatization characterize the alteration of host rocks around the auriferous quartz veins in all the gold provinces. The alteration is most widespread in Wynad, whereas it is restricted to very narrow halos around veins in the other provinces. The temperature of formation of the main period of mineralization varies from 300 to 350°C, as derived from the fluids with low salinity (3-8 wt% NaCl equiv.) after pressure correction. The high gold content in the Fe-rich tholeiitic metavolcanic rocks in the SGT are a likely gold source. The circulating hydrothermal fluid leached gold from mafic rocks and the fluids were focused along major structural discontinuities provided by Moyar and Bhavani shear zones.

Current understanding on gold mineralization in Southern Granulite Terrane indicates that (1) the hydrothermal fluids preferentially transported gold as $Au(HS)_2^-$, (2) primary gold deposition took place due to destabilization of the dissolved gold complexes either due to wallrock interaction or phase separation and (3) the genesis of gold mineralization has been linked to the structural and thermal events of Pan-African orogenic cycle in the Southern Granulite Terrain.

Keywords: Lode gold, Southern granulite terrain, Wall rock alteration and Fluid inclusions.