

Paper Number: 336

Fluid inclusion studies of shear – controlled gold mineralization of G.R.Halli area, Chitradurga Schist belt, Dharwar Craton.

Gopalakrishna, G¹ and Nagesh, P.C².

¹Geological Survey of India, NCEGR, Bengaluru, India; Email:gopalakrishnageo@rediffmail.com

²Dept of Geology Bangalore University, Bengaluru, India

A 26 km long shear zone hosting gold mineralization is occurring along the central part of Chitradurga schist belt [1,2]. It extends from west of Gonur, through east of G.R.Halli and C.K.Halli to east of Honnemardi, roughly parallel to stratigraphic units [1]. The NNW-SSE trending shear zone has a width of 0.5 to 1.5 km and is largely confined to the contact of predominantly metasedimentary upper Hiriyr Formation of Chitradurga Group [2]. The extensive carbonatization of metabasalts and the associated lithologies recorded throughout the “shear corridor” besides the access of mineralization fluids suggest that this structure is transcrustal extending in to the lower crust and upper mantle. Mineralized zone in G.R.Halli is associated with NNW – WNW trending arcuate brittle – ductile zone [2]. They splay off from or indirectly connected to first order regional NNW-SSE shear. The sheared and silicified contact zones between carbonaceous argillite and schistose metabasalt forms the potential sites for localization of mineralization.

Gold occurs associated with arsenopyrite, pyrite, galena and minor sphalerite. Quartz and ankerite are the main non metallic minerals in the mineralized veins. There is a positive correlation of the arsenopyrite and galena with gold and silver, respectively, however. It is observed that the fine grained arsenopyrite is much more enriched in gold than the coarse crystalline arsenopyrite. The narrow wall rock alteration is marked by the association of quartz with minor ankerite, high – Fe- chlorite, sericite and pyrite, representing the assemblage ideally produced from the circulation of slightly acidic reducing fluids at temperatures of 300°C and 2 kb pressure. Fluid inclusion studies shows T_h range from 125 °C to 256°C (Average 199.14°C) with an average density of CO₂ of 0.91 gms/cm³. Low to moderate salinity is recorded for these inclusions having T_m ranging from -8.2°C to -1.2°C with an average of -4.7°C. These properties of fluids are akin to gold bearing areas in greenstone belts elsewhere.

References:

[1] Mohakul, J.P., and Babu, P.H. (2001) GSI Sp. Pub. 58: 263-270

[2] Khan, S. A., (2001) GSI Sp. Pub. 58: 251-261

