Banded sulphididc cherts of Sandur greenstone belts, Dharwar Craton, India: constraints on hydrothermal processes and gold mineralization

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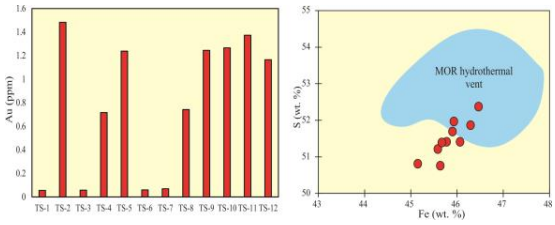
The sulphide facies banded iron formations are the second largest host rocks for gold mineralization in the greenstone belts. The western Dharwar Craton has abundant banded iron formations (BIFs) which consists of gold at some places compared to the gold deposits of eastern sector that are hosted in volcanic rocks. These rocks are predominantly characterized as mixed oxide-sulphide facies BIFs, owing to their composition consisting alternating mesoscale bands of silica and iron rich layers with sulphides such as pyrite, chalcopyrite, galena, arsenopyrite and sphalerite occurring as minor-opaque phases. Mineral chemical analyses of pyrite having high Fe/(S+As), Co/Ni and Pb/As ratios suggests hydrothermal source. Native gold occurs as disseminations and lenses in these sulphides with its concentrations ranging from 0.05 to 1.48 ppm.



Gold mineralization is sediment hosted variety, epigenetic, epithermal-hydrothermal in origin, where the sulphidic-auriferous fluids formed at MOR-hydrothermal system were transported and deposited in an oxygen-deficient environment. Low CaO, MgO, K_2O and ΣREE contents suggests minor detrital input while enrichment in transition metals like Cr indicate slight volcaniclastic input from mixed sources. Low K/Rb and Th/U illustrate negligible effects of weathering in these samples. Geochemical proxies such as superchondritic Y/Ho ratios along with PAAS and MUQ normalized REE +Y patterns with depleted LREE and positive Eu, La and Y anomalies infer that these BIFs were derived by the chemical precipitation of iron and silica in sea water with significant contributions from hydrothermal fluids and biological activity in a continental margin setting which had suboxic to anoxic paleo-redox conditions.

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