

Gold mineralisation in BIF at Channapura area of Yedyur – Karighatta Schist Belt, Mandya District

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Abstract: Channapura area is located on a part of southern extension of Chitradurga schist belt known as Yedyur-Karighatta belt. Banded iron formation (BIF) is defined as a finely bedded or laminated sedimentary rock with anomalously high iron content and sometimes, but not always, interbedded with chert; even when they are metamorphosed, the relict banding is usually still evident. The study area consists of predominantly volcano sedimentary sequence represented by amphibolites, quartzite, and garnet ferrous quartz-mica schist. Based upon the field work data and the detailed investigation consisting of close spaced sampling followed by drilling in Channapura area in Yedyur - Karighatta schist belt which could prove another size able gold deposit in BIF rock formation.

Keywords: BIF, Gold, Schist, Quartz.

I. INTRODUCTION

Channapura area is located on a part of southern extension of Chitradurga schist belt known as Yedyur-Karighatta belt. The Yedyur-Karighatta belt is the N-S trending narrow schist belt sandwiched between gneiss on both sides and is composed of predominantly a volcano sedimentary sequence represented by amphibolites, quartzite, garnetiferous quartz-mica schist/phyllite intruded by metagabbro dykes and younger quartz veins. The belt represents a large synformal keel (FD2) with complimentary antiform present in the gneisses on both sides.

The schist belt underlain by gneisses consists of quartzite band in the east within thin veneer of amphibolites. Schistose amphibolites is the dominant unit with ultramafites, quartzites and BIF bands occurring in it. The amphibolites is overlain by metapelite unit represented by quartz-chlorite schist occurring mainly in the core of synform. The BIF band occurs at the contact between amphibolites and quartz-chlorite schist has become repetitive due to folding.

II. DESCRIPTION OF ROCK TYPES IN CHANNAPURA AREA

The different rocks types occur in the area are given as follows.

Granite Gneisses: are the dominant rocks types occur surround the schist belt rocks. The gneisses are migmatitic gneisses composed of alternate bands of biotite rich and quartzofeldspathic bands with varying degrees of migmatitisation, partial melting of gneisses is evident from the presence of bands of leucosome, melanosome or restites and mesosome. The mineral constituents recorded are quartz, plagioclase, K-feldspar and biotite.

Amphibolite: is the predominant unit well exposed on both sides of the investigated area. It is fine grained to medium

grained, well schistose, bluish to greenish grey in colour and comprises of actinolite, chlorite, and plagioclase. Schistosity is defined by the parallel alignment of actinolite and chlorite grains. The mineral composition suggests that their derivation from basis volcanic rocks by metamorphism.

Ultramafites: ultramafic rocks occur as small lensoid enclaves and thin layers in association with amphibolites.

Quartzite: it occurs as a prominent marker horizon occurring in the margins of the schist belt. It is fine to medium grained, hard, compact, greenish to yellowish grey in colour and well bedded. Foliation is represented by subparallel alignment of mica flakes.

Quartz-mica-phyllite schist: The politic schists/phyllites are represented by quartz- mica schist occupying the core of synformed keel. It is soil covered due to easy-weathering and fissile nature. It is medium grained, dull grey in colour, weathered and altered. It composed of quartz, muscovite, biotite and minor chlorite shows dull greenish grey appearance and phyllitic luster.

Banded Ferruginous Quartzite: Banded ferruginous quartzite occurs as bands at the contact of amphibolites and quartz-mica schist and defines the major synformal folds. The repetition of bands is due to folding and very shallow to sub horizontal plunging nature of the large folds resulted in the occurrence of more than one subparallel band as limbs of folds. There are six bands occur in the area. It is hard, steel to whitish grey in colour, compact shows rhythmic layering of ferruginous and siliceous matter vary in thickness from a few mm to 2 cm at a stretch. It is oxidized and limonitised at places looks reddish brown in colour. The width of the BFQ bands varies from 2 to 20 m. The bedding attitude in BFQ trends in N-S with steep dips of 75-85° towards east and

Composition of major elements:

The elements like Fe₂O₃, Al₂O₃ and FeO are analysed by volumetric method. CaO and MgO are analysed by complexotitrimetric method. Silica is analysed by gravimetric method. TiO₂ and MnO are analysed by calorimetric methods.

Parameters	Composition of major elements	
	Sample No. 1	Sample No. 2
SiO ₂	47.14	49.78
Al ₂ O ₃	03.19	02.63
FeO	03.72	04.19
Fe ₂ O ₃	38.48	36.59
CaO	00.98	00.56
MgO	00.42	00.39
Na ₂ O	00.84	00.79
K ₂ O	00.42	00.34

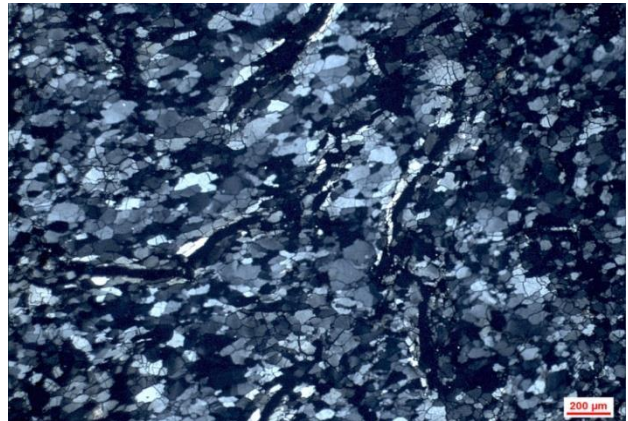


Indicator plant for gold occurrence

Petrography Studies of Thin Section

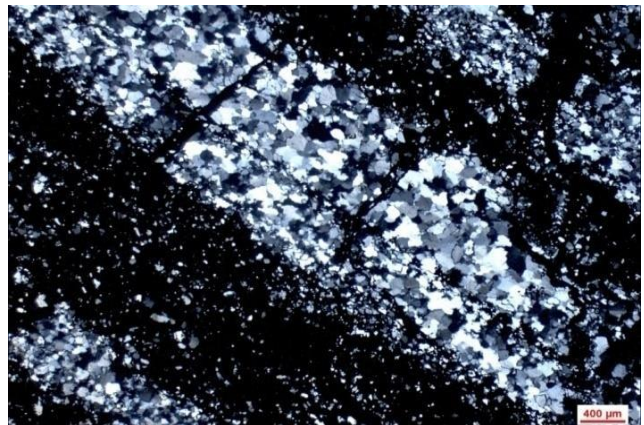
Section No-1

Granoblastic texture: - Quartz occurs as porphyroblast with interlocking partial triple point between the grain can be noticed, show undulose extinction, colour grey to greyish in thin section



Section No-2

Thin section show banded texture (alternate Iron and quartz grains).The quartz exhibit granular texture with interlocked grains, fibrous growth of Iron minerals along the fracture can be noticed in the band of quartz.



Field Photographs



Weathered and fractured phyllites in Channapura area



Iron formation altered to limonite (yellow colour) in the out crops

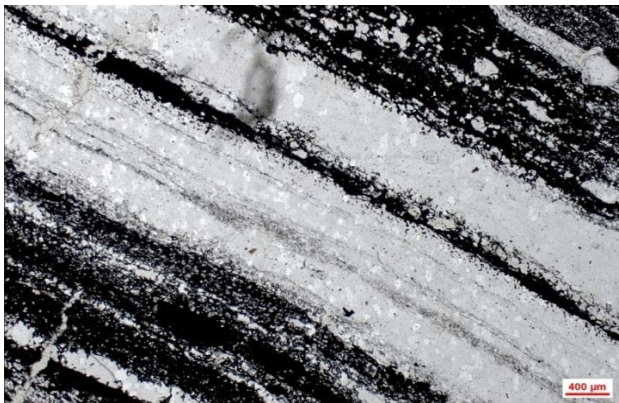
Section No-3

Alternative BIF bands



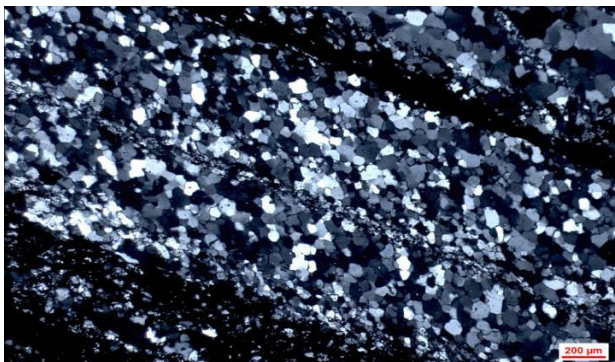
Section No-4

A well-developed Banded texture of Iron minerals and quartz grain are exhibited by the section. In broad quartz band the iron minerals occur as thin lamination in linear fashion.



Section No-5

Quartzite: - The quartz occur as granoblastic texture or Polygonal texture with well-developed grain boundaries, Partial triple point between the grains can be seen they exhibit undulose extinction.



Section No-6

Quartzite: - The quartz occur as granoblastic texture or Polygonal texture with well-developed grain boundaries, Partial triple point between the grain can be seen. They exhibit undulose extinction

IV. CONCLUSION

Yedyur-Karighata schist belt is a prominent, linear, narrow schist belt. The study area consists of predominantly volcanosedimentary sequence represented by amphibolite, quartzite, and garnetiferous quartz-mica schist.

The BIF Of the area mainly consist of Magnetite, Hematite and quartz with inclusion of traces pyrite. They show the S2 Deformation in the form of folding and microfolding can be evident from the thin section. The magnetite show alteration to martite and hematite and also altered to goethite.

From the analysis of GSI, it is found that all the BIF bands occurring in the Channapura area is auriferous with assay values from 25 ppb to 1.30 ppm. The grade of the mineralized zones varies from 0.025 g/t to 1.3 g/t over width vary from 2.50 to 11.50 m. The mineralization is richer in the westernmost BIF band and easternmost BIF bands with lean zones occur in the central BIF bands.

As the surface samples collected with strike interval of 250-300 m had analyzed gold values as mentioned above, it is a potential area for gold mineralization.

So it is recommended to take up this area for detailed investigation consisting of close spaced sampling followed by drilling which could prove another size able gold deposit in BIF rock.

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