

Quartzite Hosted Sulphide Mineralisation in the Proterozoic Shillong Group of Rocks, Meghalaya, India.

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Abstract

The Shillong - Mikir massif represents NE prolongation of the Chotonagpur Gneissic belt of the Indian continent. This consists of a basement complex made up of gneisses and migmatites with enclaves of amphibolites, rarely 'BIF' and patchy distribution of high-grade granulitic supracrustals. The basement rocks are unconformably overlain by siliciclastic Proterozoic cover of the Shillong Group.

Search for sulphide mineralization within the Shillong Group spanned mostly around Tyrsad – Barapani belt – a 40 km stretch of the shear zone. Details prospecting and drilling was carried out by GSI between 1974- 1980 to study the basemetal potentiality, *without encountering economically significant sulphide mineralization*. Studies indicated that the sulphide mineralization occurs as specks, disseminations, patches and stringers along the foliation, joints and fissures. Pyrite is the dominant mineral with subordinate amounts of arsenopyrite, pyrrhotite, chalcopyrite, sphalerite and galena in the phyllites and carbonaceous slates.

Argentiferous galena and subordinate auriferous arsenopyrite, loellignite, gersdorffite and safflorite occur as bed like or lens like ore bodies along the compositions bands of the white quartzite of the Lower Shillong Group (4 km away from the Tyrsad-Barapani shear zone). Surface geochemical prospecting revealed Pb values of (maximum) 29%, silver values (maximum) of 0.3%, gold values ranging from 50 to 260 ppb.

The Pb/(Pb+Zn) ratio of 0.93 along with co-existence of monazite and zircon suggests deposition of the sediments in shallow marine condition. The S – isotopic analysis of the samples have revealed $\delta^{34}\text{S}$ values with an average of +9.3 permil. The positive $\delta^{34}\text{S}$ value shows fairly a wide separation, in general characters derivation of sulphur due to sulphate reduction within a limited reservoir in a sedimentary domain and bears no mantle signature.

A genetic model (quartzite-hosted), Bjorlykke. and Songster. 1981, comprising the lithological, stratigraphic and structural control of the sulphide mineralization has been established. Detailed structural analysis reveals that the syn-sedimentary/ syn-genetic Pb (+Ag) mineralization was remobilized during the F1 fold (Mitra, 1999) . Test drilling has intersected mineralization in three levels and corroborates with the borehole geophysical anomalies.

Most of the ore minerals (sulphide) are crystalline and unzoned, indicating crystallization under an equilibrium condition. Mineral assemblage of the host rock as well as arsenopyrite-loellignite pyrrhotite/pyrite association indicates a biotite-grade of regional metamorphism. Pb-Pb age of the galena being between 1530-1550 Ma fixes the age of the mineralization in this sector.

Key words :

Shillong Group, Sulphide Mineralisation.

References:

Bjorlykke. A. and Songster. D.F.. 1981. *Eco. Geol.* 75th Anniv.. Vol. pp. 179-213

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