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A Preliminary Geological Investigation of Sisakhan Base Metal Occurrence of Higher Himalayan Yamuna Valley, U.P.

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Sisakhan base metal deposit is likely to be a workable mineral deposit in rather poorly mineralised Himalaya. The mineralised quartz vein contains mainly galena and small quantity of chalcopyrite and sphalerite. The mineralised vein is structurally controlled at the contact of chlorite schist and biotite schist and probably emplaced in the later part of Neogene as no evidence of deformation is found in the vein. The preliminary investigation suggests that the mineralisation took place in relatively dry and low temperature condition.

Introduction: Base metal mineralization is reported from several areas in the Himalaya but collisional orogens, like the Himalaya, are regarded as rather poorly mineralised (Sinha, 1991 and Thakur, 1992). In this context the Sisakhan polymetallic basemetal deposit appears to be a promising prospect. The mineralization is associated with vein quartz having length of 12m and thickness of 1.0 - 1.5m. Jairath *et al.* (1982) have described the sulphide mineralization from the same area but their field and mineralogical descriptions do not tally with the actual occurrence.

Location : The Sisakhan deposit is situated 1.5km SW of Pindki village at a height of 2800m on the left bank of Yamuna river, in Barkot tehsil of Uttarkashi district, Uttar Pradesh. The deposit is accessible by a 4.5km long mule track from the nearest bus station at Hanumanchatti.

Geological setting : The ore deposit is hosted in the Proterozoic Yamuna Formation, regionally known as Central Crystalline, of Higher Himalaya. Geologically, the area is situated between Rana Brittle Shear Zone (RBSZ) and Hanumanganga Normal Fault (HNF) (Fig.1). The Main Central Thrust is passing 10km SE of the Sisakhan deposit. A 8km wide ductile shear zone named as Yamuna Mylonite Zone (YMZ), mainly made up of cataclastic quartzite and granite is found between RBSZ and MCT, 1 km SE of the base metal deposit.

The local lithological succession is as follows (Biyani, 1995) :

Hanumanchatti Metabasic rock
Mylonitic Granite
Biotite Schist and Gneiss
Chlorite Schist

The basemetal mineralization is found in a quartz vein (Fig.2) which is emplaced between biotite schist (Hanging wall) and chlorite schist (Footwall). The mineralisation runs

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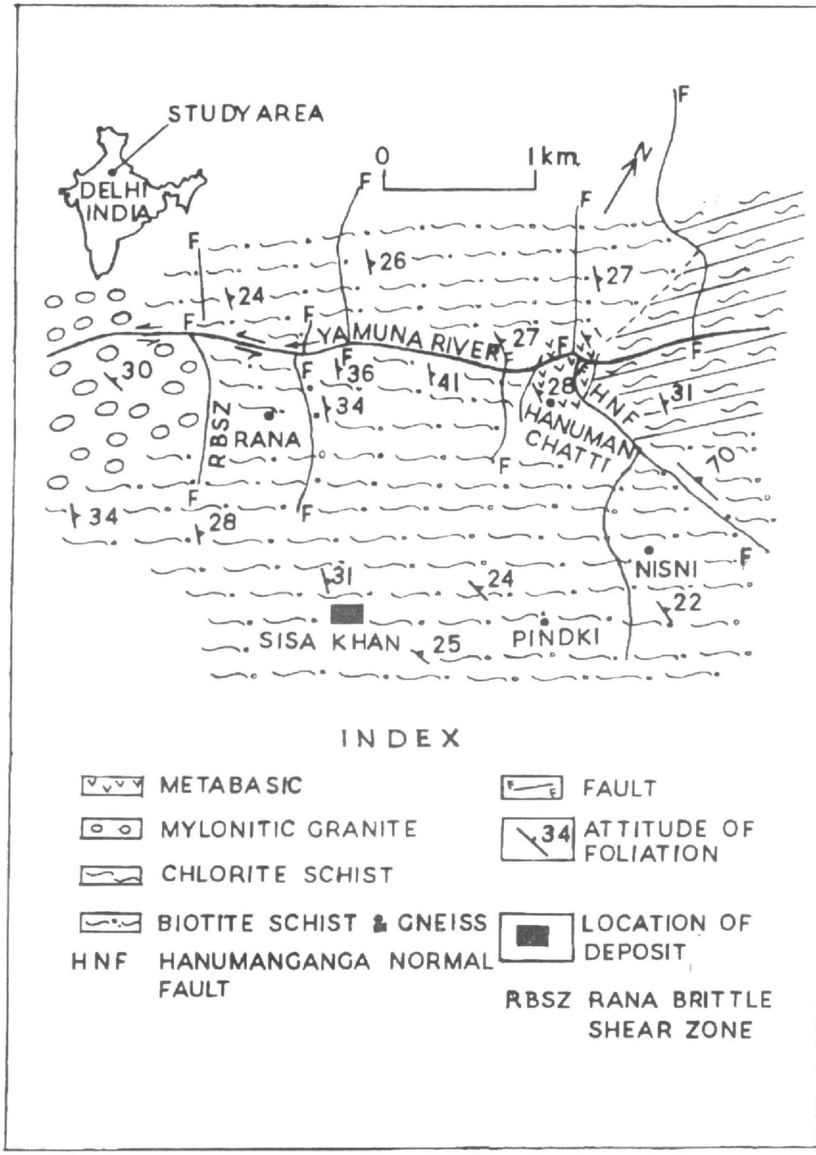

Fig.1. Geological map of Sisakhan base metal deposit.

parallel to the contact of these rocks as well as to the foliation (S_1). The foliation dips at 25-34°NNW. The metapelite country rocks bear impress of two episodes of deformation and metamorphism.

Nature of mineralisation : The mineralised quartz vein is exposed on an oval shaped small vertical scarp of 15m length and 1-5m height. The vein appears to continue further along the dip direction but its actual extension is concealed due to change in slope of the scarp. The vein is composed of mainly galena, chalcopyrite and sphalerite. The quartz vein is milky-

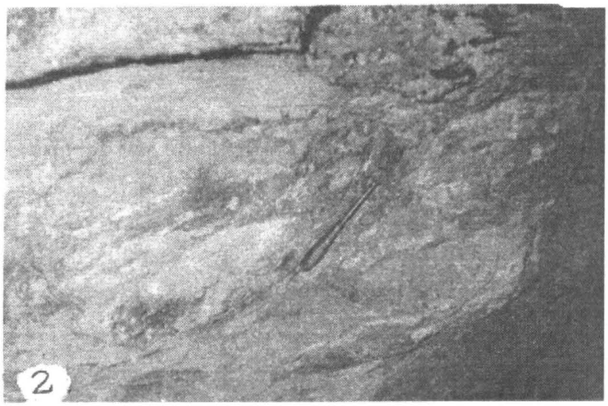

Fig.2. A view of the outcrop of mineralised quartz vein.

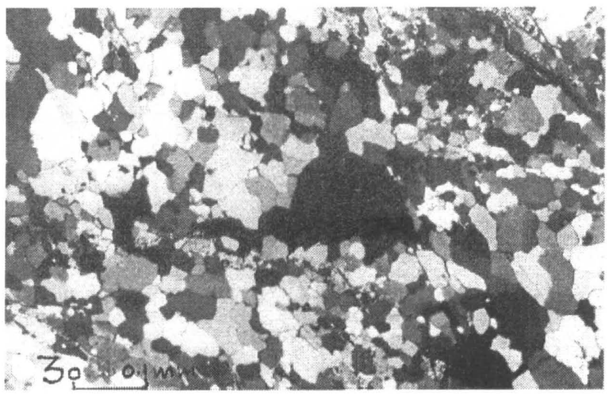

Fig.3. Photomicrograph showing quartz and galena (dark), 79 X.X PL. Note sharp contact between quartz and ore mineral and undeformed nature of the grains.

white in colour; however, the weathered surface appears orange, maroon, brown and green. The concentration of ore minerals varies between 15 to 60% (Table I). Wall rock alteration is not observed.

Table I. Concentration of ore minerals in quartz vein (%).

Sample No.	Quartz	Galena	Sphalerite	Chalcopyrite
2	74	23	-	3
3	60	35	0.5	3.5
6	70	30	-	-

Field evidence such as localisation of the mineralised quartz vein parallel to foliation indicates structural control of mineralisation. Absence of preferred orientation and presence of straight extinction in quartz grains of the mineralised vein (Fig.3) indicate that the mineralization post dates deformation of the host rocks.

The deposit is worth investigating in detail.

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