SHORT SCIENTIFIC NOTES

A Note on the Occurrence of Cubanite and Pyrargyrite in the Sulphide Ores of Ingaldhal, Chitradurga District, Mysore State

Sulphide ore mineralisation of the nature of polymetallic ore deposition is known in the vicinity of Ingaldhal (Lat. 14° 11', Long. 76° 27'), a village situated on the Chitradurga schist belt. Sulphide ore deposits here are found associated with traps, schists and chert bands. In recent years sulphide ore deposits of this region are being investigated by a number of workers[1-4]. The authors during their recent visit to Ingaldhal copper mines collected a few samples from the prospecting shaft at about a depth of 100 meters. The study of polished ores so collected revealed the presence of cubanite and pyrargyrite, which have been identified by minerographic studies and a quantitative determination of microhardness. This brief note reports the occurrence of these two new minerals in this locality.

Cubanite is a light pink to cream coloured mineral with very weak pleochroism. Anisotropism is distinct but not as strong as pyrrhotite. Anisotropic colours are brownish and bluish grey. The mineral takes very good polish and its hardness is very close to chalcopyrite (210–230 kg/mm^2). It is difficult to distinguish this mineral from chalcopyrite since both the minerals have close resemblance. The hardness of these minerals is also very close to each other, hence relief between the two minerals is not very distinct. But under crossed nicols cubanite is very distinctly anisotropic, as contrasted to the weak anisotropism of chalcopyrite.

The mineral occurs as small veinlets in chalcopyrite and also as anhedral aggregate of small grains. While the occurrence of cubanite as exsolution lamellae is a common feature, its occurrence as individual grains or aggregate is not very common[5].

Pyrargyrite is a white coloured mineral with blue shades. It is pleochroic in shades of blue but pleochroism is very weak. Under crossed nicols the colours are dark blue and grey, which is not very distinct, because of the red internal reflection. This mineral takes very good polish and it is very soft with hardness in the range of 104–122 kg/mm^2. It occurs as unoriented grains in chalcopyrite.

Cubanite has been reported from liquid magmatic, pegmatitic, pneumatalytic and hydrothermal veins. In hydrothermal veins it has been reported from deeper zones. Chalcopyrrhotite, a cubic high temperature chalcopyrite, is the usual product from a solution of FeS dissolved in $CuFeS_2$ at high temperature. This, upon cooling can break into chalcopyrite + cubanite, chalcopyrite + pyrrhotite or chalcopyrite + mackinawite. The unmixing with the formation of cubanite is estimated to occur at temperature between 250°–300° C (Ramdohr, 1969). The presence of this mineral in the sulphide assemblage of Ingaldhal, therefore, supports the view of the authors[3] that the polymetallic ore deposition in this region is by hydrothermal process formed at temperature range above 250° C.

The mineral pyrargyrite identified in these sulphide ores occurs as unoriented grains included in chalcopyrite. This mineral is regarded as a product of hydrothermal (mostly epithermal) deposition. The mode of occurrence of this mineral and its texture in the sulphide ores of Ingaldhal indicate that the mineral pyrargyrite is an earlier mineral formed through hydrothermal process.

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New Records of Aphids (Homoptera : Aphididae) from Nepal

Nepal bounded on the north by Tibet, on the south by Bihar and Uttar Pradesh, on the east by Sikkim and West Bengal and on the west by Uttar Predesh received rather little attention by the aphidilogists. However, stray reports from the area by Rana and Sharma[1], Eastop[2], Sharma[3], Ghosh *et al.*[4] reveal occurrence of 64 species distributed over 39 genera. Recently a trip was undertaken for aphid fauna by one of the authors

S. Chakrabarti mainly in and around Aghore (*c* 2070), Daman (*c* 2530) and Kathmundu (*c* 1400). The collections made have revealed 22 species distributed over 14 genera. Of these species 9 species distributed over 7 genera are new records from Nepal. 3 of the genera were not known to occur there so far from the area. Thus the total number of species from Nepal stands at 73 distributed over 42 genera.

A list of the newly recorded species together with their host plants wherever possible and relevant data is given below. All the material is deposited in the collection of Entomology Laboratory, Department of Zoology, University of Calcutta.

1. *Aphis craccivora* Koch, apterous viviparous females and nymphs from an unidentified Leguminoceae, Kathmundu, 4–10–1971.
2. *Aphis euphorbiae* Thomas, apterous viviparous females and nymphs from *Euphorbia hercta,* near Aghore, 30–9–1971.
3. *Aphis nasturtii* Kaltenbach, apterous viviparous females and nymphs from an unidentified plant, Kathmundu, 2–10–1971.
4. *Eutrichsiphum passaniae pseudopassiniae* Szelegiewicz, alate viviparous females from yellow pan water traps, Kathmundu, 1–10–1971.
5. *Grecnidea longirostris* Basu, apterous viviparous females and nymphs from *Schima wallichi,* Kathmundu (near Kalibari), 1–10–1971.

   Note: The species was so far recorded only from North-East Himalayas.
6. *Macrosiphoniella pseudoartimisae* Shinji, apterous viviparous females and nymphs from *Artemisia vulgaris,* near Daman, 30–9–1971.
7. *Matsumuraja capitophoroides* Hille Ris Lambers, apterous viviparous females from *Euphorbis hercta,* near Daman, 30–9–1971.

   Note: The species was so far reported from the different host plants belonging to family Rosaceae. This is a new host family (Euphorbiaceae) for this aphid.
8. *Oedisiphum soureni* Basu, apterous viviparous females and nymphs from *Gnaphalium leutoalbum* and from an unidentified Compositae, near Aghore, 30–9–1971.

   Note: This species was described from North-East Himalayas and recently reported also from North-West Himalayas by Chakrabarti *et al.*[5]. The specimen at disposal reveals that both the antennal segment III and siphunculi show gradation in respect of imbrications.
9. *Paratrichosiphum tattakanum* Takahashi, apterous viviparous females and nymphs from *Quercus dialbata,* Daman, 30–9–1971.

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Cohesive Energies of Alkali Halide Crystals

Cohesive energy per ion pair in an alkali halide crystal is composed of coulombian and non-coulombian contributions. The latter contribution is usually expressed according to two different force laws, *viz.,* inverse power representation B/r^n, frequently used by Pauling[1] and exponent power representation B exp $(-r/\rho)$ used by Born and Mayer[2] and Huggins and Mayer[3]. In these representations B and n or B and ρ are constants to be determined from crystal data and r is the inter-ionic distance.

One can conclude from the work on cohesion of ionic crystals[4] that the cohesive energy is not much sensitive of the form of the function used to represent the non-coulombian part. But the studies on equation of state of NaCl[5] following Raman's theory of crystal vibrations[6] and other thermodynamical properties depend more intensively upon the nature of the force law to describe the non-coulombian interaction.

We suitably choose a more specific function B exp $(-r^n/\rho)$ which can probably explain a wider range of properties of ionic crystals. From our work on silver halide crystals[7] the value of n can be taken approximately as ½, and as a first attempt we can utilize the function B exp $(-\sqrt{r}/\rho)$ to calculate the cohesive energy of NaCl type alkali halide crystals employing the equilibrium conditions of Hildebrand[8]. The results are listed in Table I and show a general agreement with the experimental values[1] within nearly 5%.