

High-pressure phase transition in microwave synthesised (CuFe₂S₃): Resistivity studies up to 9 GPa

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In nature occurrences of cubanite (CuFe₂S₃) generally is found in sulfide deposits, which has a metamorphic temperature in the range of 200 to 210°C, with orthorhombic crystal structure. At higher temperature more than 220°C, cubanite transforms to more stable form of isocubanite with fcc Fm3m structure [1]. Earlier high-pressure studies have shown that cubanite in its orthorhombic Pcmn phase is stable up to 3.6 GPa at room temperature [2]. The Cu-S bond length is found to be decreased dramatically at high-pressures, and the Fe-S bond length remains almost pressure invariant indicating the rapid electron transfer of Fe²⁺- Fe³⁺ pairs at high-pressures. Rozenberg *et al.* [3] has shown that cubanite undergoes pressure-induced insulator-to-metal transition in the pressure range of 3.4 to 5.8 GPa. An *in situ* electrical resistivity study of cubanite (CuFe₂S₃) was performed using four-probe method and opposed anvil cell technique, up to 9 GPa, using solid pressure transmitting medium. The calibration and the experimental details of the high-pressure system have been discussed elsewhere [4]. The normalised electrical resistivity ($\rho(P)/\rho(1\text{ bar})$) of the cubanite decreases continuously with the increase of pressure from 1.0 at room pressure to 0.32 at 4.15 GPa, where there is a discontinuous decrease to the value of 0.11, at 4.48 GPa, indicating a pressure induced first order phase transition from cubanite to NiAs (B8) structure at 4.5 GPa.

[1] Cabri (1973) *Econ. Geol.* **68**, 443–454. [2] McCammon (1992) *Am. Min.* **77**, 937. [3] Rozenberg *et al.* (1997) *Phys. Chem. Miner.* **24**, 569. [4] Parthasarathy (2006) *J. Applied Geophys.* **58**, 321.

Geochemical evidences for Lancang ShangYun-copper polymetallic ore metallogenic district, Yunnan, China

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Yunnan Lancang ShangYun-copper polymetallic ore exploration area located in the text of Wen Dong-Fubon eastern fold beam to that Naruan-Bangnwei fault zone is bounded by the western exposed Lower Proterozoic (Pt1), and the epiproterozoic Lancang Qun to ManLai Group (Pt3ml), and Huimin group (Pt3h) metamorphic rock types, as well as Jurassic Commission flowers left group (J2h) clastic rocks; widely distributed in eastern Indosinian biotite-granite rocks, porphyritic biotite monzogranite and late Yanshan period two-mica granite or containing muscovite-granite, alkali-feldspar granite, altered granitic and other small rock mass and all kinds of acidic porphyry, granitic pegmatite, aplites, dykes, more along the fault zone with the distribution of clusters. Through the strata of rock geochemistry, and geochemical analysis of samples collected after the test, statistical analysis of the data obtained to determine the background values of ore-forming elements, analog crustal abundances of chemical elements in the value of that: Sn background crustal abundance values higher than the value of an order of magnitude, Pb background values of the abundance of the crust above the value of 3 to 7 times, W, Cu, Zn background value and crustal abundance close. That Naruan-Bonwei Reservoir fault zone mineralization concentration area from south to north, respectively, and that Naruan, Dajian Mountain, Shuiping zhai, Bonwei shang zhai and Bonwei reservoirs, Sn, W, Cu, Pb, Zn content of elements as a whole showed a positive correlation between, The content of rock late Yanshan period than the Indo-Chinese rock in the content is relatively high; the latter part of the element contents in quartz reefs also higher than the rock mass, fracture zones in the local sections of the former two are higher.