## D-29: Graphite-sulphide intergrowth: implication for the genesis of Sri Lankan-type vein graphite

K V Wilbert Kehelpannala
*(Geological Survey and Mines Bureau, Dehiwala)*

Sulphide minerals such as pyrite, chalcopyrite, pyrrhotite, sphalerite and marcasite were found in the graphite veins of the Kahatagala-Kolongaha Graphite Mines (KKGM). Pyrite, chalcopyrite and pyrrhotite are more abundant than sphalerite and marcasite. Ore petrographic study showed that the first 3 sulphides and graphite had intergrown into each other. Sphalerite (ZnS) was reported for the first time, in graphite veins, as very fine patches (6 x 18$\mu$m to 8 x 30$\mu$m) within chalcopyrite and pyrite. No ZnS was seen in large crystals of pyrite and pyrrhotite away from graphite. It was likely that the actual abundance of ZnS may be greater than the levels found in this study.

Pyrite, chalcopyrite and pyrrhotite occurred as thin layers, nodules or spherulites and as lensoid and irregular bodies within graphite veins. The size of these bodies varied from sub-microscopic to some centimetres. The sulphide layers were generally parallel to the graphite vein walls. The thickness of the sulphide layers varied from a few $\mu$m to ~5 mm, and locally ~2 to 5 cm. In almost all graphite veins the thin central layers consisted of sulphides, and in veins that showed multi-stage opening, sulphides may be found as very thin films or layers separating different graphite bands. Irregular and thick sulphide bodies were also found at sites where 2 co-planar

graphite veins coalesce, at jogs of graphite veins and within pull-apart structures. In addition to these, sulphide occurred also as thin veins, with or without graphite, and some graphite veins grade into sulphide veins along their strike. Very fine (micro-scale) vein-like pyrite and chalcopyrite bodies, some of which grew from the sulphide layers, paralleling the (0001) of graphite, were found between graphite crystals.

In some central sulphide bodies in graphite veins an unusual association of graphite-carbonate-pyrite-chalcopyrite-pyrrhotite was observed. No pyrrhotite coexisting with pyrite had been reported upto now. The growth of sulphide minerals and graphite within veins appeared to be similar to that of hydrothermal ore minerals. The intergrowth of graphite and the above sulphides, their growth habits and the above mineral association indicate that this type of vein graphite may have precipitated from a hydrothermal solution of magmatic origin.

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