

CHARACTERISATION OF SELECTED SULPHIDES ASSOCIATED WITH THE GRANITIC PEGMATITES OF NAGAMALAI-PUDUKOTTAI AREA, MADURAI DISTRICT, TAMIL NADU, INDIA.

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Abstract

The Nagamalai-Pudukottai area, forming part of the Southern Granulite Terrain, is mostly covered by different types of gneisses, quartzite, granites and migmatites. The mineralogical characters and field relations point to the presence of A-type of granites. The granites and gneisses are mainly intruded by two varieties of pegmatites viz., gray-feldspar bearing and pink feldspar bearing pegmatites. The important minerals constituting the gray feldspar pegmatites are feldspars (both white and gray), quartz, biotite, magnetite, calcite and sulphides. The pink feldspar-pegmatites contain quartz, feldspar, biotite and hornblende as essential minerals and are mostly devoid of sulphide minerals.

Sulphides in gray-feldspar pegmatites are seen both in the massive form and as small individual euhedral crystals/crystal aggregates. The massive sulphides which show different colours like whitish gray, brownish yellow and light brown are mostly magnetic. The present study attempts characterization of selected sulphides with the help of XRD and SEM-EDS techniques. Three sulphide samples were subjected to XRD analysis for identification and cell refinement parameters. Of these, the diffraction values of one correspond with pyrite and the other two show a match with pyrrhotite. The pyrrhotite pattern shows excellent agreement with Fe_7S_8 composition. The cell refinement parameters and composition point to the 4C monoclinic character of pyrrhotite. The morphological and chemical study of one pyrrhotite sample, with the help of SEM-EDS analysis, also supports this inference. The monoclinic pyrrhotite is stable only below a temperature of 254°C. The inversion of hexagonal pyrrhotite to monoclinic pyrrhotite is possible by hydrothermal alteration. The association of pyrrhotite with pyrite indicates sulphur richness in the stability field.

Keywords: Southern Granulite Terrain, Granitic pegmatites, Pyrite, Pyrrhotite.