

1984/13. Fuchsite* from Moores Pimple

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Abstract

Chromian muscovite ($\text{Cr}_2\text{O}_3 = 0.97\%$) from Moores Pimple, western Tasmania, has been analysed by electron microprobe, by optical means, and by X-ray diffraction. It is a fine grained variety of muscovite, distinct from the mixed layer hydromuscovites and from phengites that may contain up to $\sim 0.8\%$ Cr_2O_3 (mariposite). Chromian muscovite is usually formed by hydrothermal activity, commonly in pyroclastic rocks, and is often associated with intense fracturing and carbonate veining. Association with Cr-rich ultramafic rocks is a common but not a necessary condition for formation. Clasts derived from such a variable provenance would therefore form an uncertain basis for stratigraphic correlation.

INTRODUCTION

Fuchsite* is the name given, informally, in Tasmania to massive varieties of muscovite containing in excess of 1% Cr_2O_3 and with a characteristic bright green to apple green colouration. This variety is relatively widely distributed through the West Coast mineral fields and the recorded Cr_2O_3 content may reach 3% (Department of Mines, 1970). The varietal name chromian muscovite is preferred in the international literature where 'fuchsites' carry between 0.8 to 4.8% Cr_2O_3 - the upper limit corresponding to 1 atom of Cr per unit cell (Whitmore *et al.*, 1946). The substitution of Cr for Al occurs in the octahedral site of the mineral lattice but takes place without the replacement of tetrahedral Al by Si (and octahedral Al by Mg, Fe^{2+}) seen in the Cr-bearing phengites (cf. mariposite, $\text{SiO}_2 > 53\%$, Cr_2O_3 up to 0.8%).

The sample supplied (by Dr K. Corbett) consists of irregular clasts from a carbonate-rich conglomerate exposed on a bulldozed track on the saddle on the east flank of Moores Pimple [CP744642]. The sample was analysed by XRD, electron microprobe, and by optical means. The XRD trace is indistinguishable from that of $2M_1$ muscovite. The crushed powder shows very slight apple blue-green pleochroism and $n_\alpha = 1.56$, $n_\gamma = 1.59$.

CHEMISTRY

	Broad area scan	Spot mode
SiO_2 (%)	47.72	48.06
Al_2O_3 (%)	33.39	34.33
Cr_2O_3 (%)	0.94	0.97
FeO (%)	0.47	0.38
MgO (%)	0.80	0.67
K_2O (%)	9.70	9.72
Na_2O (%)	0.28	0.33
Others including		
H_2O^+ (%)	6.68	5.54

* see Introduction for discussion of validity of the term 'fuchsite'.

DISCUSSION

These results suggest that the fuchsite from Moores Pimple is a chromian muscovite. There is no evidence of the high FeO (>2%) characteristic of the phengitic white micas of the mineralised and hydrothermally altered Central Belt rocks (e.g. Prince Lyell; Hendry, 1981), the footwall beds (Primrose Pyroclastics) at the Hercules Mine (D.C. Green, work in progress), or at Rosebery (G.R. Green, pers. comm.), and it is distinct from the hydromuscovite group on the basis of high refractive indices, 2M₁ structural type, and high K₂O content. Hydromuscovites (≡ illites) have been recorded with up to 0.6% Cr₂O₃ ('avalite' - Kerr and Hamilton, 1958) but they are mixed layer 2M₁ and 1M mica polymorphs with lowered refractive indices.

Because of the importance of fuchsite clasts in correlation of Rosebery and Dundas Group rocks (Williams et al., 1976), their origin is important and a close examination of the fuchsite clasts from the Salisbury Conglomerate (west of Rosebery) is warranted. The association of serpentinitised dykes near the margin of the fuchsitic conglomerate at Moores Pimple (Blissett, 1962) is consistent with other areas where the development of fuchsite is associated with the demonstrated breakdown of chromite from ultramafic rocks. Some occurrences in Tasmania from Zeehan (Blissett, 1962) and the Razorback area (Macleod and Jack, 1963) are associated with serpentine but reports exist from Gold Hill (near Que River) (Henderson, 1937) and from Barrier Creek, King Island (Blake, 1935) where 'fuchsite' is said to be associated with sulphide lenses in quartz sericite schist.

As far as is known, chrome micas, like sericites or phengites, are most commonly formed under hydrothermal conditions and often in what Whitmore et al. (1946) describe as an ankerite-quartz-sulphide-gold association. The rock type in which chrome mica is developed is generally of volcanic origin, often a pyroclastic rock, and commonly contains abundant carbonates in fractures. Most descriptions in the literature give a hydrothermal or replacement origin for chrome mica. For this reason, the development of fuchsite may be a reflection of structurally induced permeability in the host rock and not necessarily a firm ground for correlation on the basis of possible derived clasts.

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3/3

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