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Triplite from East Kemptville, Nova Scotia

THE manganese fluor-phosphate, triplite, has been found for the first time in Canada, in the East Kemptville greisen-hosted tin deposit near East Kemptville, Yarmouth County, Nova Scotia, where it occurs with apatite and sulphides in glassy quartz veins.

The geology of the East Kemptville tin deposit has been summarized by Richardson *et al.* (1982). It is an example of a large tonnage, low grade, greisen-hosted tin deposit in an endocontact zone of a granite pluton. The mineralized zone occurs within an extension of the south-west end of the 300 × 60 km South Mountain Batholith, which has been termed the Davis Lake monzogranite by Shell Canada Resources Limited who discovered the deposit in 1978. The property was subsequently acquired by Riocanex Incorporated in October 1982. The deposit is located near East Kemptville, Yarmouth County, Nova Scotia at latitude 44° 16′ N and longitude 65° 41′ W. The tin mineralization occurs in pods of massive greisen and zoned greisen selvages flanking thin (0.5 to 2.5 cm) hydrothermal veins. Cassiterite is associated with topaz, white mica, quartz, pyrite, pyrrhotine, sphalerite, chalcopyrite, arsenopyrite, columbite-tantalite, and minor amounts of a member of the wolframite group, probably ferberite.

The triplite occurs in quartz–sulphide–phosphate veins and is also present in quartz–phosphate veins. Both these vein types cross-cut the greisen-bordered veins and massive greisen zones. A complex sequence of carbonates, phosphates, and silicates was precipitated later in open spaces, on regional joint surfaces, and within shear zones. Among the mineralogically interesting species that occur in this sequence is a member of the childrenite–eosphorite series, stilbite, siderite, pyrite, and fluorite. For a summary of the paragenetic sequence, see Table 4.1 of Richardson *et al.* (1982). This is the second occurrence of a member of the childrenite–eosphorite series in Canada, childrenite having been recorded from the Big Fish River area, Yukon Territory, by Mandarino and Sturman (1976).

Triplite occurs as creamy-pink, anhedral grains, 3 to 10 mm in diameter. The main associated minerals are apatite, quartz, pyrite, and sphalerite. An X-ray powder diffraction pattern was prepared in a Debye-Scherrer camera of 114.6 mm diameter using Cu-$K\alpha$ X-radiation. Because the powder data for East Kemptville triplite do not differ significantly from those of other triplites, they are not given here. The cell parameters refined from the powder data are a 12.134, b 6.546, c 9.939 Å, β 106.08°, V = 758.56 Å^3 and $Z = 8$.

An electron microprobe analysis yielded the data given in Table I. The analysis was performed using an ARL-SEMQ electron microprobe utilizing an operating voltage of 15 kV and a sample current of 0.025 μA, measured on brass. The standards used were hornblende (for Fe, Mg, and Ca), fluorite (for F), manganite (for Mn), and maricite (for P). The data were corrected using standard Bence-Albee factors.

A thermogravimetric analysis of 41.6 mg was carried out in a Mettler Thermoanalyzer equipped with a high-vacuum system and a quadrapole mass spectrometer to determine if the mineral contained hydroxyl. No quantitative data could be obtained

TABLE I. *Results of an electron microprobe analysis of triplite from East Kemptville, Nova Scotia*

	Wt. %	Mol. ratios	Anion ratios	Cation ratios	Ions	
MnO	46.8	0.6597	0.6597	0.6597	Mn	1.43
FeO	14.2	0.1976	0.1976	0.1976	Fe	0.43
MgO	2.2	0.0546	0.0546	0.0546	Mg	0.12
CaO	0.7	0.0125	0.0125	0.0125	Ca	0.03
P_2O_5	31.9	0.2247	1.1237	0.4495	P	0.97
F	10.0	0.5263	0.5263	—	F	1.14
					O	3.86
Total	105.8		2.5744			
Less O≡F	4.2		0.2625			
	101.6		2.3119			
			f = 2.1627			
			MW = 219.73			

Notes: Analyst: Pete J. Dunn (see text for operating conditions). Accuracy of data: ±15% of the amount present for F, ±3% for all other constituents. Number of ions calculated on the basis of oxygen + fluorine = 5.

regarding the evolved gases because more than one product was evolved at any given time. Between 100° and 675 °C a weight loss consisting of CO_2 and H_2O amounted to 0.4 wt. %. The run was continued to 1000 °C, but the weight loss was not complete at this temperature. Between 675° and 1000 °C the weight loss was 3.3 wt. % and H_2O, HF, and POF_2^+ were detected by the mass spectrometer. Additional substances with masses of 28, 47, 76, and 104 were also detected. The presence of fluorine is thought to promote the evolution of unusual products during thermal analysis. The TGA data suggest that water and carbon dioxide are very minor constituents of the triplite.

Consequently, the empirical formula of the triplite was derived from the analytical data assuming only oxygen and fluorine as anions and is

$$(Mn_{1.43}Fe_{0.43}Mg_{0.12}Ca_{0.03})_{\Sigma 2.01}P_{0.97}O_{3.86}F_{1.14}$$

or, ideally, $(Mn,Fe,Mg,Ca)_2PO_4F$. The density calculated from the unit cell contents and parameters following the procedure outlined by Mandarino (1981) is 3.847 g/cm^3. The density measured by means of the Berman microbalance is 3.83(1) g/cm^3 at 22 °C.

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A new occurrence of suolunite, from Oman

SUOLUNITE, $Ca_2Si_2O_5(OH)_2H_2O$, is an extremely rare mineral previously reported only from Yugoslavia (Stojanovic *et al.*, 1974) and Mongolia (Huang, 1965; X-ray Laboratory, Hupeh, 1974). Here we report a third well-preserved example which, in common with the previous occurrences, is associated with faults within arid or semi-arid ultramafic environments. The suolunite is exclusively restricted to a prominent narrow fault zone in basalt and gabbro which overlies ultramafic