SHORT COMMUNICATIONS

Occurrence of scorodite in a pegmatite in Bhilwara District, Rajasthan, India[1]

A LIGHT greyish green vitreous mineral resembling chalcedony was recorded from 1 Km south of Gudha village (25° 9′ 30″ N., 74° 14′ 30″ E.) in the Laxmi No. 2 mine in the Bhilwara district of Rajasthan. The mineral occurs in a lenticular concordant body of zoned pegmatite emplaced within steeply dipping garnetiferous mica schist trending N. 40° E.–S. 40° W. The pegmatite body is bizonal with a central quartz-perthite core, flanked by quartz–plagioclase–perthite–mica (green) pegmatite. The mineral occurs as a massive lump in pockets within the latter. The associated perthite is vein-type and the green muscovite is strongly ruled.

The specific gravity of the mineral was found to be 3·30. Under the microscope the mineral appears in discrete inequant xenomorphic grains without any clearly defined cleavage; in places it is intergrown with muscovite and quartz. The refractive indices are: α 1·784±0·003, γ 1·805±0·003; $2V_\gamma$ 65°±2°. The mineral, powdered to a size −80+100 mesh, was separated by bromoform and pure grains were hand picked for chemical and X-ray analyses:

SiO_2 5·58, Fe_2O_3 34·80, As_2O_5 44·53, CaO tr., MgO tr., Al_2O_3 0·20, P_2O_5 0·04, S 0·31, H_2O 13·80 (at 200°±5° C), total 99·26.

The total iron is reported as Fe_2O_3.

An X-ray powder pattern of the purified mineral was taken in a Nonius Guinier camera with Cu radiation. There were only slight variations in the interplanar spacings and intensities from those already reported for scorodite by Allen and Fahey (1948). All the lines of the pattern were indexed as far as 2·05 Å in terms of an orthorhombic cell with *a* 10·36, *b* 10·05, *c* 8·98 Å (all ±0·01); see table I.

The chemical analysis can be recast as: $FeAsO_4.2H_2O$ 90 %, SiO_2 5·58 %, Fe_2O_3 3·80 %, S 0·31 %. Presumably some iron is present as sulphide and the rest as a silicate or oxide. However, X-ray analysis of the sample used for the analysis showed only scorodite and quartz, and the nature of the remaining impurities remains uncertain.

[1] Published by the kind permission of the Director General, Geological Survey of India.

TABLE I. Powder data for scorodite

		$1/d^2$					$1/d^2$		
I	*d*	obs.	calc.	*hkl*	*I*	*d*	obs.	calc.	*hkl*
vs	5·654 Å	0·0313	0·0315	111	w	2·324 Å	0·1852	0·1854	331
vvw	5·210	0·0368	0·0368	200	vvw	2·266	0·1948	0·1944	303
m	5·050	0·0392	0·0396	020	vvw	2·245	0·1984	0·1984	004
vvs	4·495	0·0494	0·0492	002	vvw	2·190	0·2085	0·2083	412
m	4·110	0·0592	0·0594	211	vvw	2·145	0·2173	0·2176	114
m	3·821	0·0685	0·0684	112	vvw	2·118	0·2229	0·2224	332
vvw	3·353	0·0889	0·0891	221	vvw	2·050	0·2380	0·2380	233
			0·0888	022	vvw	2·011			
vs	3·195	0·0980	0·0981	122	vvw	1·954	The high angle lines were not indexed because of the large number of possible indices.		
s	3·074	0·1058	0·1059	311	vvw	1·871			
s	3·013	0·1102	0·1107	131	vvw	1·846			
vvw	2·769	0·1304	0·1300	113	vvw	1·833			
m	2·695	0·1377	0·1383	032	vvw	1·805			
s	2·601	0·1478	0·1472	400	vvw	1·760			
m	2·511	0·1586	0·1584	040					

The chemical, optical, and X-ray data show that the present mineral is the pure iron–arsenic end-member. This appears to be the first reported occurrence of scorodite in India.

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ALLEN (V. T.) and FAHEY (J. J.), 1948. Amer. Min., vol. 33, p. 122.

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The axial-ratio-inversion effect in Jahn–Teller distorted ML_6 octahedra in the epidote and perovskite structures

IN field-free space, transition metal (M) ions have five degenerate (equal energy) d-electron orbitals, which split under the influence of an octahedral crystal field into three low energy (t_{2g}) and two high energy (e_g) orbitals. The t_{2g} orbitals are directed along the diad axes of the octahedron, i.e. between opposite pairs of ligand (L) ions, whilst