SHORT COMMUNICATIONS

An occurrence of axinite in Ventersdorp lavas from Kinross, Transvaal, South Africa.

AXINITE-BEARING veins were found in diamond-drill cores of Ventersdorp andesitic lavas from the Kinross area, which lies approximately seventy miles east of Johannesburg. Apart from an occurrence in the greenstones of Southern Rhodesia,[1] there is no published record of axinite from elsewhere in southern Africa. The lavas are dark green and fine-grained, diabasic in texture and occasionally amygdaloidal. Thin section shows laths of plagioclase with subangular leucoxene in a fine-grained chloritic ground-mass. Amygdales contain chlorite, quartz, and calcite. In the immediate vicinity of veins the lava has been altered, bleached, and epidotized, with magnetite granules concentrated towards the vein margins.

The central parts of the veins consist of axinite with the main cleavage trace apparently perpendicular to the marginal quartz mosaic. Thin late quartz veinlets in the axinite are often cut by stringers of calcite, which is also frequently seen as small euhedral crystals. There are fine radiating needles of actinolite in the axinite, and small grains of chalcopyrite and pyrrhotine are sparsely scattered throughout the veins. Axinite was also observed in a quartz–orthoclase vein, which carries columnar epidote, clinozoisite, and a little prehnite in typical 'bow-tie' structure. The occurrence resembles that in a diabase described by Steinwachs.[2]

The axinite was cleaned for physical measurements and chemical analysis by careful hand-picking of coarsely-crushed material. After further crushing the sample was freed of impurities by electro-magnetic treatment, heavy liquid separation, and acid washing. An analysis by C. E. G. Schutte, of the Division of Chemical Services, Pretoria, gave I; for comparison, two recent analyses of axinite from Kongsberg, Norway,[3] and the sub-polar Urals[4] are given (II and III):

	SiO_2.	Al_2O_3.	Fe_2O_3.	FeO.	MnO.	MgO.	CaO.	Na_2O.
I.	45·80	17·29	2·34	6·03	0·93	2·19	18·62	0·22
II.	42·40	18·22	0·53	5·83	4·42	0·83	19·72	0·14
III.	42·60	17·04	0·47	7·56	3·52	1·84	19·28	0·42

	K_2O.	B_2O_3.	TiO_2.	P_2O_5.	H_2O+.	H_2O-.	Sum.	Sp. gr.
I.	0·20	3·85	0·20	0·26	1·65	0·05	99·63	3·23
II.	0·03	6·05	—	—	1·60	—	99·77	3·299
III.	—	5·43	0·08	—	1·04	0·36	99·64	3·33 to 3·35

The formula calculated on the basis of 17 (O,OH) atoms suggests an excess of silica, probably as extremely fine quartz veinlets in the axinite.

Refractive indices for sodium light were determined as α 1·677, β 1·684, γ 1·687 (all $\pm$0·002). Similar values were obtained for red and green light. The axial angle was measured on the universal stage; except for one direct measurement, all the crystals investigated showed one axis only. The average of readings by four observers gave for different wave-lengths: $2V_\alpha$ 73·0° (650 mμ), 73·5° (580 mμ), 72·5° (520 mμ), 72·5° (470 mμ), and 72·0° (daylight). These results do not really indicate any dispersion. $2V_\alpha$ calculated from the refractive indices is 74·5°. Comparison of the values of the optic angle with the chemical composition of various axinites suggests that there is no relationship between composition and optic angle. A slight pleochroism was observed in thicker sections and varied from lilac-pink to yellow-pink; but no pleochroism could be detected in sections of standard thickness. No fluorescence was observed in ultra-violet light of various wave-lengths.

In conclusion it is suggested that the pneumatolytic stage of the Bushveld granite may have contributed to the formation of axinite-bearing veins at Kinross.

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