

SHORT COMMUNICATIONS

MINERALOGICAL MAGAZINE, JUNE 1974, VOL. 39, PP. 715-16.

Tabular zircon from an adamellite in the New England Batholith, New South Wales

ZIRCON appears to be a prime example of a tetragonal mineral that is usually elongate parallel to its [001] crystallographic direction. In addition, basal sections ideally show a square outline. This habit arises from the development of elongate prisms terminated by bipyramids (Dana, 1892; Deer, Howie, and Zussman, 1962; Mason and Berry, 1968). For zircons in igneous rocks Poldervaart (1956) calculated the largest elongation ratio as 32, but recently Gupta (1973) found zircon with a ratio of over 69. The ratio has been used to help characterize granite plutons.

Separation of zircon crystals from biotite and hornblende in the Undercliffe Falls Adamellite from the New England Batholith (Phillips, 1968, p. 172) gave a crop of euhedral, well-zoned grains almost all of which have a length (parallel to [001]): breadth (normal to [001]) ratio of close to 2:1. However, a small percentage of the zircons show an unusual habit contrasting markedly with the acicular crystals described by Gupta (1973). They are euhedral tabular grains (fig. 1) flattened along a pair of faces of the form {hko}. The identification of the mineral as zircon was confirmed by X-ray powder photographs and the orientation and habit were checked by using interference flash figures and by rotating the crystals in an immersion oil. Commonly the longest intercept in the crystal normal to [001] is larger than the intercept parallel with the [001] axis, thus giving an 'elongation' ratio of less than 1. It is possible that the flat tabular faces were oriented parallel with the basal cleavage in the biotite. However, the reason for the distinct difference in habit between the tabular crystals and the predominant 'normal' prismatic grains remains uncertain.



FIG. 1. A concentrate of tabular zircons showing an 'elongation' ratio of less than 1. The white lines drawn across some of the grains indicate directions of the [001] axes. Zoning and inclusions are apparent. Plane-polarized light, $\times 60$ approximately.

*Department of Geology,
The University of Wollongong,
Wollongong, N.S.W. 2500,
Australia*

EVAN R. PHILLIPS

REFERENCES

- DANA (E. S.), 1892. *The system of mineralogy*. 6th edn, New York (Wiley).
 DEER (W. A.), HOWIE (R. A.), and ZUSSMAN (J.), 1962. *Rock-forming minerals*, 1, *ortho- and ring silicates*. London (Longmans).
 GUPTA (L. N.), 1973. *Min. Mag.* **39**, 253-5.
 MASON (B.) and BERRY (L. G.), 1968. *Elements of mineralogy*. San Francisco (W. H. Freeman).
 PHILLIPS (E. R.), 1968. *University of Queensland, Dept. of Geology Papers*, **6**, 159-206.
 POLDERVAART (A.), 1956. *Amer. Journ. Sci.* **254**, 521-54.

[Manuscript received 29 October 1973]

© Copyright the Mineralogical Society.

MINERALOGICAL MAGAZINE, JUNE 1974, VOL. 39, PP. 716-18.

The unit-cell and twin of bayldonite

BAYLDONITE shows usually mamillary crusts often mixed with other secondary minerals (duftite, mimetite). Recently, rather well-shaped crystals were discovered at Tsumeb and a new crystallographic study was undertaken.

TABLE I. *Composition and unit cell data of bayldonite*

CuO	34.9 %	Cu	0.439	} 3.1	Tsumeb	La Rabasse, Hérault	
ZnO	1.1	Zn	0.013		(present study)	(Guillemin, 1956)	
PbO	32.1	Pb	0.144	1	<i>a</i>	10.152 ± 0.004 Å	5.03 ± 0.02 Å
As ₂ O ₅	29.0	As	0.252	1.8	<i>b</i>	5.893 ± 0.002	5.97 ± 0.05
H ₂ O	2.8	H ₂ O	0.155	1.1	<i>c</i>	14.083 ± 0.005	6.93 ± 0.02
Total	99.9				β	106° 06' ± 05'	103° ± 1°
					Space group	C 2/c or Cc	
					<i>V</i>	809.6 Å ³	202.8 Å ³
					<i>Z</i>	4	1

These crystals present two different facies, giving identical X-ray powder patterns: as micaceous stackings of grass-green flattened crystals or like sharp dark-green 'scalenoedra', built in fact from three crystals in twin position.

The first X-ray powder diagrams showed that these crystals were probably bayldonite; a new chemical analysis (Table I) gave results corroborating the earlier analysis by Guillemin (1956), and leads to the formula (Cu, Zn)₃Pb(AsO₄)₂(OH)₂. According to the differential thermal analysis curve, the loss of water does not begin before 500 °C: obviously water is present as hydroxyl groups, its loss being indicated by two endothermic peaks at 520 and 570 °C.

Analytical method: Cu by atomic absorption spectrophotometry and gravimetry