

## ADDITIONAL DATA ON BRAZILIANITE

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Brazilianite, the new phosphate,  $\text{Na}_2\text{Al}_6\text{P}_4\text{O}_{16}(\text{OH})_8$ , is described by Pough and Henderson\* as follows: monoclinic,  $\beta=97^\circ 22'$ , perfect {010} cleavage; specific gravity 2.94; axial ratios  $a:b:c=1.1056:1:0.6992$ .

Dr. Pough sent several small crystals of brazilianite to the Department of Mineralogy at Harvard University for  $x$ -ray analysis. The following data obtained on them are presented to make the description of the mineral more complete.

Two sets of rotation and Weissenberg photographs were taken (1) on a small fragment mounted so that the axis of rotation was normal to the {010} cleavage; (2) on an elongated crystal rotated about the axis of elongation, which proved to be [101]. From the Weissenberg photographs (about [010])  $d_{001}=7.00 \text{ \AA}$ ,  $d_{100}=11.10 \text{ \AA}$ , (about [101])  $d_{010}=10.08 \text{ \AA}$ . Using Pough and Henderson's  $\beta=97^\circ 22'$  the cell dimensions are  $a_0=11.19 \text{ \AA}$ ,  $b_0=10.08 \text{ \AA}$ ,  $c_0=7.06 \text{ \AA}$ . These give the axial ratios of  $a_0:b_0:c_0=1.1102:1.07004$ , which is in good agreement with Pough and Henderson's morphological ratios and validates their choice of the unit form.

The extinction criteria determined from the Weissenberg photographs conform to the space group  $P2_1/n$ .

The specific gravity of three small fragments (15–20 milligrams) of brazilianite was determined on the Berman density balance. Two of these gave a value of 2.977 and the third 2.975, slightly higher than that given by Pough and Henderson. Using the lattice constants given above and the deduced cell content of two molecules to the unit cell, the calculated specific gravity is 3.025. This is in closer agreement to our value than 2.94 given by Pough and Henderson.

*Optical properties*

The indices of refraction given by Pough and Henderson were confirmed and in addition  $2V$  and the optical orientation were determined on the universal stage.

	$n_{\text{Na}}$	
$X=b$	1.598	Biaxial (+)
$Y \wedge c=15^\circ$	1.605	$2V=80^\circ$
$Z$	1.617	$r < v$ , weak

\* Pough, Frederick H., and Henderson, Edward P., Brazilianite, a new phosphate mineral: *Am. Mineral.*, **30**, 572–582 (1945).