Senegalite $Al_2(PO_4)(OH)_3 \cdot H_2O$

Crystal Data: Orthorhombic. *Point Group:* $mm2$. Crystals, to 1.5 mm, are flattened on [010], showing large {001}, {010}, {101}, {111}, small {100}, {011}, {021}.

Physical Properties: *Cleavage:* On {010}, poor. Hardness = 5.5 D(meas.) = 2.552(7) D(calc.) = 2.551

Optical Properties: Transparent. *Color:* Colorless to pale yellow; colorless in transmitted light. *Luster:* Vitreous.
Optical Class: Biaxial (+). *Orientation:* $X = c$; $Y = a$; $Z = b$. *Dispersion:* $r > v$, weak.
$\alpha = 1.562(2)$ $\beta = 1.566(2)$ $\gamma = 1.587(2)$ 2V(meas.) = 53(4)° 2V(calc.) = 48°

Cell Data: *Space Group:* $P2_1nb$. $a = 7.675(4)$ $b = 9.711(4)$ $c = 7.635(4)$ Z = 4

X-ray Powder Pattern: Kouroudiako deposit, Senegal.
3.834 (10), 2.990 (9), 3.610 (8), 2.348 (8), 5.41 (7), 2.070 (7), 1.929 (7)

Chemistry:

	(1)	(2)
P_2O_5	31.83	32.56
Al_2O_3	46.23	46.78
Fe_2O_3	0.28	
H_2O	21.00	20.66
Total	99.34	100.00

(1) Kouroudiako deposit, Senegal; by electron microprobe, total Fe as Fe_2O_3, H_2O by TGA, $(OH)^{1-}$ and H_2O confirmed by IR; corresponds to $Al_{1.98}(PO_4)_{0.98}(OH)_{3.08} \cdot H_2O$.
(2) $Al_2(PO_4)(OH)_3 \cdot H_2O$.

Occurrence: In the oxidized zone of a magnetite iron ore deposit.

Association: Turquoise, augelite, wavellite, crandallite.

Distribution: From the Kouroudiako iron deposit, Falémé river basin, Senegal.

Name: For Senegal, the country in which it was first found to occur.

Type Material: National School of Mines, Paris, France.

References: (1) Johan, Z. (1976) La sénégalite, $Al_2(PO_4)(OH)_3 \cdot H_2O$, un nouveau minéral. Lithos, 9, 165–171 (in French with English abs.). (2) (1977) Amer. Mineral., 62, 595–596 (abs. ref. 1). (3) Keegan, T.D., T. Araki, and P.B. Moore (1979) Senegalite, $Al_2(OH)_3(H_2O)(PO_4)$, a novel structure type. Amer. Mineral., 64, 1243–1247.