Kapundaite $CaNaFe^{3+}_4(PO_4)_4(OH)_3 \cdot 5H_2O$

Crystal Data: Triclinic. *Point Group*: $\bar{1}$. As cavernous aggregates of flattened fibers to several centimeters across.

Physical Properties: *Cleavage*: None. *Tenacity*: Flexible. *Fracture*: Irregular. Hardness = ~3 D(meas.) = 2.93(3) D(calc.) = 2.917

Optical Properties: Translucent to transparent. *Color*: Pale to golden yellow. *Streak*: Yellow. *Luster*: Silky.
Optical Class: Biaxial (+). $\alpha = 1.717(3)$ $\beta = 1.737(3)$ $\gamma = 1.790(3)$ 2V(calc.) = 64.7°
Orientation: $Z = b$, $Y \approx c$. *Pleochroism*: Weak, X = nearly colorless, Y = light brown, Z = pale brown. *Absorption*: $Y > Z > X$.

Cell Data: *Space Group*: $P\bar{1}$. $a = 6.317(5)$ $b = 7.698(6)$ $c = 9.768(7)$ $\alpha = 105.53(1)°$ $\beta = 99.24(2)°$ $\gamma = 90.09(2)°$ Z = 1

X-ray Powder Pattern: Toms phosphate quarry, Kapunda, South Australia, Australia.
9.338 (100), 2.753 (64), 5.173 (52), 2.417 (48), 3.828 (45), 7.442 (37), 3.123 (34)

Chemistry:

	(1)	(2)
Na_2O	3.43	3.84
K_2O	0.01	
CaO	7.40	6.95
MgO	0.05	
MnO	0.25	
Fe_2O_3	35.53	39.54
Al_2O_3	0.11	
P_2O_5	32.35	35.16
H_2O	14.22	14.51
Total	93.35	100.00

(1) Toms phosphate quarry, Kapunda, South Australia, Australia; average of 7 electron microprobe analyses, H_2O by CHN, corresponds to $(Ca_{1.13}Na_{0.95})_{\Sigma=2.08}(Fe^{3+}_{3.83}Mn_{0.03}Al_{0.02}Mg_{0.01})_{\Sigma=3.89}P_{3.92}O_{16}(OH)_3 \cdot 5H_{2.11}O$. (2) $NaCaFe_4(PO_4)_4(OH)_3 \cdot 5H_2O$.

Occurrence: In a phosphorite deposit that has undergone metamorphism, followed by weathering and secondary enrichment.

Association: Leucophosphite, natrodufrenite, meurigite-Na.

Distribution: From Toms phosphate quarry, 8 km east-southeast of Kapunda, South Australia, Australia.

Name: For the town nearest to the quarry, *Kapunda*, which is in turn derived from the Australian Aboriginal word "*cappie oonda*," which was applied to a spring near the present town site.

Type Material: Mineral Sciences Department, Natural History Museum of Los Angeles County, Los Angeles, California, USA (62495), and Museum Victoria, Melbourne, Australia (M51138).

References: (1) Mills, S.J., W.D. Birch, A.R. Kampf, A.G. Christy, J.J. Pluth, A. Pring, M. Raudsepp, and Yu-Sheng Chen (2010) Kapundaite, $(Na,Ca)_2Fe^{3+}_4(PO_4)_4(OH)_3 \cdot 5H_2O$, a new phosphate species from Toms quarry, South Australia: Description and structural relationship to mélonjosephite. Amer. Mineral., 95, 754-760.