Spheniscidite \((\text{NH}_4, \text{K})(\text{Fe}^{3+}, \text{Al})_2(\text{PO}_4)_2(\text{OH}) \cdot 2\text{H}_2\text{O}\)

Crystal Data: Monoclinic. Point Group: \(2/m\). Rimming soil particles and in fine grained aggregates, in the 75–2000 \(\mu\)m size range.

Physical Properties: Hardness = Very soft. \(D(\text{meas.}) = \text{n.d.} \quad D(\text{calc.}) = [3.08]\) Magnetic.

Optical Properties: Translucent. Color: Colorless, brownish. Luster: Dull, earthy. Optical Class: Biaxial; moderate birefringence. \(n = \sim 1.7\)

Cell Data: Space Group: \([P2_1/n]\) (by analogy to leucophosphite). \(a = 9.75(1) \quad b = 9.63(2) \quad c = 9.70(1) \quad \beta = 102^\circ 34(7)' \quad Z = 4\)

X-ray Powder Pattern: Elephant Island.

6.79 (100), 5.99 (90), 3.053 (45), 7.62 (40), 4.75 (35), 4.26 (35), 3.358 (35)

Chemistry:

\[
\begin{align*}
P_2\text{O}_5 & \quad 32.42 \\
\text{Al}_2\text{O}_3 & \quad 9.33 \\
\text{Fe}_2\text{O}_3 & \quad 30.10 \\
\text{MgO} & \quad 0.30 \\
\text{CaO} & \quad 0.50 \\
\text{K}_2\text{O} & \quad 4.45 \\
(\text{NH}_4)_2\text{O} & \quad 3.27 \\
\text{H}_2\text{O}^+ & \quad 13.79 \\
\text{H}_2\text{O}^- & \quad 5.84 \\
\text{Total} & \quad [100.00]
\end{align*}
\]

(1) Elephant Island; by X-ray fluorescence, presence of \text{NH}_4 confirmed by IR, recalculated after deduction of SiO\(_2\) 9.93\%, TiO\(_2\) 0.91\%, with (OH)\(^{1−}\) calculated for charge balance; then corresponding to \([\text{(NH}_4)_{0.55}\text{K}_{0.41}\text{Ca}_{0.04}\text{Mg}_{0.03}]\Sigma=1.03(\text{Fe}^{3+}_{1.65}\text{Al}_{0.80})\Sigma=2.45(\text{PO}_4)_{2.00}(\text{OH})_{2.45}\cdot2.12\text{H}_2\text{O}\).

Occurrence: Formed by interaction of phosphate solutions derived from guano with micaceous and chloritic minerals in soil under a penguin rookery.

Association: Micas, chlorites.

Distribution: On Elephant Island, South Shetland Islands, about 800 km southeast of Cape Horn, British Antarctic Territory, Antarctica.

Name: For Sphenisciformes, the Latin order name for penguins.
