Kanonerovite $MnNa_3P_3O_{10}\cdot 12H_2O$

Crystal Data: Triclinic. *Point Group:* $\overline{1}$. Wedgelike crystals are tabular on {001}, also showing {111}, {$\overline{1}$11}, to 2 mm, in sprays.

Physical Properties: Hardness = Soft. D(meas.) = 2.35 D(calc.) = 2.379

Optical Properties: Transparent to translucent. *Color:* Colorless, white, beige.
Streak: White. *Luster:* Vitreous.
Optical Class: Biaxial (–). $\alpha = 1.566$ $\beta = 1.574$ $\gamma = 1.582$ 2V(meas.) = n.d.
2V(calc.) = 91°–95°

Cell Data: *Space Group:* $P\overline{1}$. $a = 7.0102(3)$ $b = 10.2050(7)$ $c = 10.5040(7)$
$\alpha = 71.82(1)°$ $\beta = 89.62(1)°$ $\gamma = 69.90(1)°$ Z = 2

X-ray Powder Pattern: Waidhaus, Germany.
9.917 (100), 4.957 (50), 6.541 (36), 3.001 (30), 3.095 (28), 1.653 (25), 3.312 (23)

Chemistry:

	(1)
P_2O_5	37.96
Al_2O_3	24.49
FeO	6.07
MnO	11.30
MgO	0.64
H_2O	[19.54]
Total	[100.00]

(1) Waidhaus, Germany; by electron microprobe, total Fe as FeO, total Mn as MnO, H_2O by difference; corresponds to $(Mn_{0.66}Fe_{0.35}Mg_{0.06})_{\Sigma=1.07}Al_{2.00}(P_{1.12}O_4)_2(OH)_2\cdot 3.56H_2O$.

Polymorphism & Series: Dimorphous with mangangordonite.

Occurrence: A rare secondary mineral in a zoned granite pegmatite.

Association: Variscite, paravauxite, albite, mica, quartz.

Distribution: From the Silbergrube quarry, near Waidhaus, and at Hagendorf, Bavaria, Germany.

Name: To honor Jürgen Kastning, mineral collector and dealer, Reinbek, near Hamburg, Germany, who found the original material.

Type Material: Mineralogical Museum, University of Hamburg, Hamburg, Germany.

References: (1) Schlüter, J., K.-H. Klaska, K. Friese, and G. Adiwidjaja (1999) Kastningite, $(Mn, Fe, Mg)Al_2(PO_4)_2(OH)_2\cdot 8H_2O$, a new phosphate mineral from Waidhaus, Bavaria, Germany. Neues Jahrb. Mineral., Monatsh., 40–48. (2) (1999) Amer. Mineral., 84, 1465–1466 (abs. ref. 1).