Kanonerovite \( \text{MnNa}_3\text{P}_3\text{O}_{10}\cdot 12\text{H}_2\text{O} \)

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**Crystal Data:** Triclinic. Point Group: \( \bar{T} \). Wedgelike crystals are tabular on \( \{001\} \), also showing \( \{111\}, \{1\bar{T}1\} \), to 2 mm, in sprays.

**Physical Properties:** Hardness = Soft. \( D(\text{meas.}) = 2.35 \) \( D(\text{calc.}) = 2.379 \)

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

**Cell Data:** Space Group: \( \bar{P}1 \). \( a = 7.0102(3) \) \( b = 10.2050(7) \) \( c = 10.5040(7) \)

\( \alpha = 71.82(1)^\circ \) \( \beta = 89.62(1)^\circ \) \( \gamma = 69.90(1)^\circ \) \( Z = 2 \)

**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:**

| \( \text{P}_2\text{O}_5 \) | 37.96 |
| \( \text{Al}_2\text{O}_3 \) | 24.49 |
| \( \text{FeO} \) | 6.07 |
| \( \text{MnO} \) | 11.30 |
| \( \text{MgO} \) | 0.64 |
| \( \text{H}_2\text{O} \) | [19.54] |
| **Total** | [100.00] |

(1) Waidhaus, Germany; by electron microprobe, total Fe as FeO, total Mn as MnO, H\(_2\)O by difference; corresponds to \((\text{Mn}_{0.66}\text{Fe}_{0.35}\text{Mg}_{0.06})\Sigma=1.07\text{Al}_{2.00}(\text{P}_{1.12}\text{O}_4)\Sigma=2(\text{OH})\Sigma=2\cdot3.56\text{H}_2\text{O}\).

**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.