

**Turtmannite****Mn<sub>25</sub>O<sub>5</sub>(VO<sub>4</sub>)<sub>3</sub>(SiO<sub>4</sub>)<sub>3</sub>(OH)<sub>20</sub>**

**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3} 2/m$ . As flakes to 200  $\mu\text{m}$ .

**Physical Properties:** *Cleavage:* Perfect on {0001}. *Tenacity:* Very brittle. *Fracture:* n.d.  
Hardness = n.d. D(meas.) = 3.6-4.0 D(calc.) = 3.80(4) Nonfluorescent.

**Optical Properties:** Transparent. *Color:* Bright yellow. *Streak:* Colorless. *Luster:* Vitreous.  
*Optical Class:* Uniaxial (-).  $\omega = 1.787(3)$   $\varepsilon = \text{n.d.}$   $n(\text{calc}) = 1.80(2)$

**Cell Data:** *Space Group:*  $R\bar{3}c$ .  $a = 8.259(2)$   $c = 204.3(3)$   $Z = 12$  (variant 2)

**X-ray Powder Pattern:** Turtmann Valley, Valais, Switzerland.

1.561 (100), 2.69 (80), 2.38 (80), 2.43 (60), 2.99 (40), 2.83 (40), 2.93 (20)

|                                |        |
|--------------------------------|--------|
| <b>Chemistry:</b>              | (1)    |
| V <sub>2</sub> O <sub>5</sub>  | 8.09   |
| As <sub>2</sub> O <sub>5</sub> | 7.47   |
| SiO <sub>2</sub>               | 8.61   |
| CaO                            | 0.08   |
| MgO                            | 5.27   |
| MnO                            | 57.29  |
| BaO                            | 0.05   |
| CoO                            | 0.13   |
| NiO                            | 0.21   |
| ZnO                            | 0.06   |
| Al <sub>2</sub> O <sub>3</sub> | 0.69   |
| H <sub>2</sub> O               | [8.06] |
| Total                          | 96.05  |

(1) Turtmann Valley, Valais, Switzerland; average electron microprobe analysis, H<sub>2</sub>O calculated for 20.5 H pfu.

**Occurrence:** In metamorphosed (upper greenschist facies) jacobsite-rich Fe-Mn ores in paleokarst.

**Association:** Jacobsite, kutnohorite, baryte, tephroite, spessartite.

**Distribution:** In the Turtmann Valley, Valais, Switzerland.

**Name:** For the *Turtmann* Valley that hosts the type locality.

**Type Material:** "Musée Cantonal de Géologie," Lausanne, Switzerland (MGL53593, MGL58732).

**References:** (1) Brugger, J., T. Armbruster, N. Meisser, C. Hejny, and B. Grobety (2001) Description and crystal structure of turtmannite, a new mineral with a 68 Å period related to mcgovernite. *Amer. Mineral.*, 86, 1494-1505.