

**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3} 2/m$ . As irregularly shaped crystals dominated by {101} and {012}, to ~0.2 mm, often with stepped faces.

**Physical Properties:** *Cleavage:* n.d. *Fracture:* n.d. *Tenacity:* n.d. Hardness = 3-3.5  
D(meas.) = n.d. D(calc.) = 3.503

**Optical Properties:** Transparent. *Color:* Emerald green to bright green. *Streak:* n.d.  
*Luster:* Vitreous. *Pleochroism:* Slight, green to faintly green.  
*Optical Class:* Uniaxial (+).  $\omega = 1.749(6)$   $\epsilon = 1.766(7)$

**Cell Data:** *Space Group:*  $R\bar{3}m$ .  $a = 6.8377(7)$   $c = 14.088(2)$   $Z = \text{n.d.}$

**X-ray Powder Pattern:** Calculated pattern.

2.764 (100), 5.459 (88), 2.266 (54), 1.709 (26), 3.419 (22), 1.820 (19), 2.898 (15)

<b>Chemistry:</b>	(1)	(2)	(3)
CuO	65.90	66.78	61.52
MnO	0.94		
MgO	6.61	6.12	10.39
Cl	16.79	17.05	18.28
H <sub>2</sub> O	13.84	13.52	13.94
<u>-O=Cl</u>	<u>3.79</u>	<u>3.85</u>	<u>4.12</u>
Total	100.29	99.62	100.00

(1) Vesuvius, Italy; average of 15 electron microprobe analyses, H<sub>2</sub>O calculated from stoichiometry assuming Cl<sup>-</sup> and OH<sup>-</sup> as the only anions; corresponding to Cu<sub>3.29</sub>Mg<sub>0.65</sub>Mn<sub>0.05</sub>(OH)<sub>6.11</sub>Cl<sub>1.89</sub>.

(2) Santo Domingo Cu Mine, Chile; average of 20 electron microprobe analyses, H<sub>2</sub>O calculated from stoichiometry assuming Cl<sup>-</sup> and OH<sup>-</sup> as the only anions; corresponding to Cu<sub>3.38</sub>Mg<sub>0.62</sub>(OH)<sub>6.06</sub>Cl<sub>1.94</sub>. (3) Cu<sub>3</sub>Mg(OH)<sub>6</sub>Cl<sub>2</sub>.

**Occurrence:** A secondary mineral in vesicles in phonolitic tephrite (Vesuvius); a secondary oxidation product of chalcocite, bornite and chalcopyrite in an environment rich in Cl in andesitic porphyric lavas and lava tuff (Chile).

**Association:** Leucite, sodalite, nepheline, sanidine, Fe oxides and hydroxides (Vesuvius); haydeelite, anhydrite, atacamite (Chile).

**Distribution:** From Vesuvius volcano, Italy, and from the Santo Domingo Cu Mine, Caleta Vitor district, Arica Province, Chile.

**Name:** Honors Matteo Tondi (1762-1835), an Italian mineralogist and co-author with R.J. Haüy of the classic *Traité de Minéralogie*.

**Type Material:** Collezione Vesuviana of the Real Museo Mineralogico, University of Naples, Italy (# 1178R), labeled as "1906 lava", and at the Mineralogical Museum, University of Hamburg, Germany (MD480).

**References:** (1) Malcherek, T., L. Bindi, M. Dini, M.R. Ghiara, A. Molina Donoso, F. Nestola, M. Rossi, and J. Schlüter (2014) Tondiite, Cu<sub>3</sub>Mg(OH)<sub>6</sub>Cl<sub>2</sub>, the Mg-analog of herbertsmithite. *Mineral. Mag.*, 78(3), 583-590. (2) (2015) *Amer. Mineral.*, 100, 662-663 (abs. ref. 1).