

## Mn<sub>33</sub>(Si<sub>2</sub>O<sub>5</sub>)<sub>14</sub>(OH)<sub>38</sub>: A NEW MANGANESE PHYLLOSILICATE MINERAL FROM THE TYROL

Krüger, H.<sup>1</sup>, Tropper, P.<sup>1</sup>, Haefeker, U.<sup>1</sup>, Tribus, M.<sup>1</sup>, Kahlenberg, V.<sup>1</sup>,  
Wikete, C.<sup>2</sup>, Fuchs, M. R.<sup>3</sup> & Olieric, V.<sup>3</sup>

<sup>1</sup>Institute of Mineralogy and Petrography, University of Innsbruck, Innrain 52, 6020 Innsbruck, Austria

<sup>2</sup>Material Technology Innsbruck (MTI), University of Innsbruck, Technikerstraße 13, 6020 Innsbruck, Austria

<sup>3</sup>Swiss Light Source, Paul Scherrer Institute, 5232 Villigen, Switzerland

e-mail: hannes.krueger@uibk.ac.at

The mineral was discovered in a Mn-rich carbonate layer sandwiched between a serpentinite body and cherts at the locality Staffelsee, Geier in the innermost Wattener Lizum (Tyrol, Austria). Geologically these rocks belong to an Austroalpine nappe called the Tarntal mesozoic. The serpentinite belongs to the Reckner complex and the cherts are part of the Ruhpolding formation. The sample was collected during the diploma thesis of KLIER (2005). Small fragments of crystals have been extracted from a thin-section, and investigated using single-crystal synchrotron diffraction experiments at the X06DA beamline at the Swiss Light Source (Paul Scherrer Institute, Villigen, Switzerland). The crystal structure was solved and refined in space group *Cm* ( $a = 17.2760(19)$ ,  $b = 35.957(5)$ ,  $c = 7.2560(8)$  Å,  $\beta = 91.359(7)^\circ$  and  $Z = 2$ ). The structure can be described as a 1:1 single layer silicate (monophyllosilicate), which exhibits a new layer topology. The layers are built from 8-, 6-, 5-, and 4-membered rings in a ratio of 2:9:2:1, respectively (Fig. 1). The unbranched fundamental chain has a periodicity of 7. According to the nomenclature of Liebau, the silicate sheets are *siebener* single layers with the symbol  $\{uB, 7, 1^2_\infty\}$  representing the silicate anion. To our best knowledge no other minerals or synthetic structures with *siebener* single layers are known. The free apices of the silicate layer connect to both neighbouring MnO<sub>6</sub> octahedral layers. The hydrogen atoms are bonded to the free oxygen atoms (the ones not bridging between tetrahedra and octahedra) at the surface of the octahedral layers.

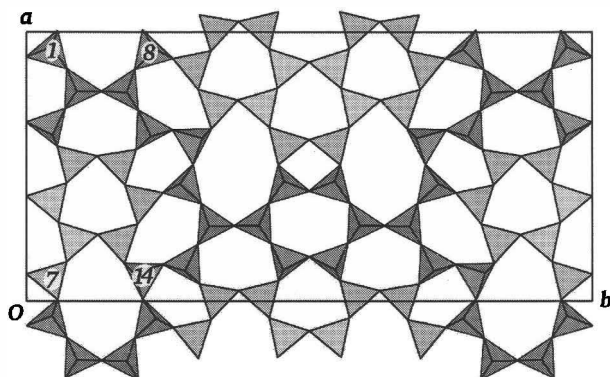


Figure 1: The  $\{uB, 7, 1^2_\infty\}$  silicate layer of  $Mn_{33}(Si_2O_5)_{14}(OH)_{38}$ . The fundamental *siebener* chain is parallel to *a* (numbered tetrahedra 1-7).