Chiavennite revisited: A temperature dependent *in situ* single crystal X-ray diffraction study

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Chiavennite ($CaMnBeSi_5O_{13}(OH)_2 \cdot 2H_2O$, $Z = 4$) is a rare Be-bearing zeolite mineral with an interrupted framework of four-connected [SiO_4] and three-connected [BeO_4] tetrahedra. A sample from the type locality in the Rhetic Alps of Italy has been re-investigated at room temperature in order to clarify the space group ambiguity discussed in the literature [1] and to explore the system of hydrogen bonds. In addition, the thermal stability of this zeolite was tracked by *in situ* single-crystal X-ray diffraction between 25 °C and 425 °C. In spite of the pseudo-orthorhombic cell dimension, the new data indicate that at room temperature chiavennite is truly monoclinic $P2_1/c$ (ß ≈ 90°) and twinned as recently shown for the new mineral ferrochiavennite [2]. The temperature-dependent dehydration experiments under dry conditions showed that chiavennite continuously released water up to at least 425 °C without topological modification. The loss of more than one H_2O molecule at 250 °C, decreases the Ca coordination from eight- to seven-fold. After release of the first H_2O molecule, and strong dynamic disorder of the remaining H_2O, chiavennite evolves into orthorhombic symmetry of space group *Pbcn*. The continuous monoclinic-orthorhombic transition from space group $P2_1/c$ to *Pbcn* upon dehydration is attributed to softening of the system of hydrogen bonds with extraframework H_2O as donor and oxygen at the cavity walls as acceptor.

[1] Tazzoli, V., Domeneghetti, M. C., Mazzi, F., Cannillo, E. (1995), *European Journal of Mineral*ogist **7**, 1339-1344.
[2] Grice, J. D., Kristiansen, R., Friis, H., Rowe, R., Poirier, G. G., Selbekk, R. S., Cooper, M. A., Larsen, A.O. (2013), *Canadian Mineralogist* **51**, 285-296.