XRD and HRTEM Structural Analyses of Antigorite Polysomes

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The modulated crystal structure of two common antigorite polysomes, the "odd" *m*=17 and the "even" *m*=16 polysomes (*m* being the number of tetrahedral modules in a wave), have been recently refined by XRD using single crystals from the Val Malenco Italian Alps. The *m*=17 polysome [1] has *Pm* symmetry, cell constants *a*=43.505(6), *b*=9.251(1), *c*=7.263(1) Å, β=91.32(1)°, and consists of a wavy 1:1 layer, curled on the *b*-axis and modulated along [100]. Sixteen **O**-modules form a continuous **O**-sheet. Seventeen **T**-modules link the **O**-sheet at the concave sides, forming a "short" half-wave, and "long" half-wave with opposite polarities. The **T**-sheet shows 6-membered tetrahedral rings, like in lizardite, which reverse polarity via alternating 6-reversals (6-membered tetrahedral rings) and 8-reversals (8- and 4-membered tetrahedral rings, coupled along **b**).

The "even" *m*=16 polysome has *C*2*m* symmetry, cell constants *a*=81.664(10), *b*=9.255(5), *c*=7.261(5) Å, β=91.41(5)°, and the same structural configuration of the *m*=17 polysome, but for the even number of **T**-modules, which makes the halfwaves symmetric, and the periodic **b**/2 shifting of the 8-reversal position, which makes the cell double and *C*-centered. First neighbors interactions are very similar in the two polysomes, and similar to lizardite [2].

HRTEM investigations carried on the same batch of crystals, confirm the presence of *P* and *C* structures, and show that the scheme depicted above holds also for the *m*=15 (*P*) and the *m*=18 (*C*) polysomes.

[1] Capitani G.C., Mellini M., *Am. Mineral.*, 2004, **89**, 147. [2] Mellini M., Viti C., *Am. Mineral.*, 1994, **79**, 1194.

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