ELECTRONIC ANNNEX

Dissolution-reprecipitation and self-assembly of serpentine nanoparticles preceding chrysotile formation: Insights into the structure of proto-serpentine

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1. Interatomic distances of chrysotile nanotubes

Structural models of chrysotile nanotubes were built by rolling lizardite layers along the [010] direction, and using average diameter dimensions obtained from TEM images, of 7 and 14 nm for the radii of the inner and outer layers, respectively. The curvature induces slight shortening of Si-O interatomic distances and lengthening of Mg-O distances. The minimum and maximum values for these two interatomic distances are given here:

Structure	$d_{Si-O\ min}$ (Å)	$d_{Si-O\ max}$ (Å)	$d_{Mg-O\ min}$ (Å)	$d_{Mg-O\ max}$ (Å)
Lizardite (Auzende et al., 2006)	1.616	1.646	2.021	2.121
Chrysotile model 6.96 nm	1.572	1.645	2.039	2.123
Chrysotile model 15.27 nm	1.612	1.646	2.027	2.124

Si-O distances are shorter in the curved models by a maximum of ~2.7% with respect to the planar model, which represents a. Mg-O distances are less than 1% longer than those from the lizardite model. Both values are within the limits of what can be considered a physically realistic bond length deviation. Similar ranges for bond-length deformations are found in other minerals. For instance, Si-O bonds in wollastonite range from 1.58 Å to 1.648 Å (Ohashi, 1984).

Ohashi, Y., 1984. Polysynthetically-twinned structures of enstatite and wollastonite. Phys. Chem. Miner. 10, 217–229.