# Mineral Surfaces and Growth of Cylindrical Serpentines

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The evolving topology of mineral surfaces of rolled serpentines (chrysotile, conical serpentines, polygonal serpentines) is expected to greatly affect their local crystal growth rates and mechanisms. We contribute to the role of the mean layer curvature which controls the local crystallization driving force.

For chiral or achiral tubes, each advancing growth layer experiences a constant (cylinder) or smoothly varying (scroll) surface curvature. Moreover the attachment energy of a growth unit at the kink site might be modulated around the perimeter of a tube owing to the modulation of the H-bonding itself. Radial (020) surfaces that end sectors of chrysotile alternate F-face and S-face characters during lateral closure of the tube. This could explain the stepwise lateral growth of tube walls we anticipate from electron micrographs.

Conical topology implies rotation of the layers on the normal to the (001) cone surface. Thus any [*uv*0] step might experience a space and time modulation of curvature, and thus growth rate, during conical wrapping.

Discontinuous radial growth rates are expected for chrysotile while converting into polygonal serpentines. Owing to the elastic contribution to the fibril Gibbs free energy and under constant growth environment, the radial growth of chrysotile is expected to decrease and virtually stop at a critical radius of c.a. 25-50 nm. Then a constant, much higher, growth rate would be established after polygonization of the cylindrical lattice.

Electron microscopy observations of natural and synthetic chrysotile will be presented in support of the above considerations .