Abstract: Antigorite in veins from Elba Island, Italy, appears as light-green splintery fibers, discontinuously surrounding the massive dark serpentinite, extending along fractures and deformed by compressive shearing. The chemical compositions cluster around $\text{Mg}_{2.66}\text{Fe}_{0.12}\text{Al}_{0.02}\text{Si}_{2.06}\text{O}_5(\text{OH})_{3.60}$ with the exact value depending upon the polysomatic structural modulations. Electron diffraction shows superperiodicities variable from 33 to 49 Å and changing from vein to vein, with no relation with the metamorphic grade of the surrounding rocks.

Common polysomatic faulting, (001) twinning and parallel association with polygonal serpentine as well as with anomalous (thin wall tubes) chrysotile are the most evident microstructural features.

A complete set of X-ray diffraction, IR, NMR and thermal analyses results is presented for a selected number of specimens.

With respect to massive antigorite serpentinites, antigorite veins show periodicities shorter than expected; this feature is interpreted as due to shearing stress and/or favourable kynetics able to accelerate the sluggish chrysotile-antigorite transformations.

Key-words: serpentine, antigorite, Elba, spectroscopy, diffraction, polysomatism.

Introduction

The thorough understanding of serpentine mineralogy is often hampered by poor crystallinity (small crystal size and faulted structures) and by simultaneous occurrence of several phases (Cresssey, 1979; Veblen and Buseck, 1979). Therefore, even the measurement of unbiased chemical and physical properties constitutes a major problem.

The difficulties are particularly evident while studying massive serpentinites, as the various minerals there form complex associations (for instance, the lizardite-chrysotile mesh texture that forms the matrix of many low-grade serpentinites). On the contrary, veins offer conditions suitable for monomineralic crystallization (e.g., chrysotile in cross veins), in a few cases with crystals useful for accurate structural refinement (Mellini & Zanazzi, 1987; Mellini & Viti, 1994).

Therefore, we thought it useful to collect systematic data for vein antigorites. The first reason was the obtainement of reliable chemical and physical data for -as much as possible- pure antigorite. The second reason was the comparison of structural modulations (i.e. polysomatism) in vein and matrix antigorites (Mellini et al., 1987; Uehara & Kamata, 1994), using a suite of specimens coming from a well constrained geological setting. Ideally, this area, homogeneous in geochemical and petrological features of the pre-serpentinization rocks, should show variable serpentinization conditions.