



Pumpellyite veins in the metadolerite of the Frido Unit (southern Apennines, Italy)

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New mineralogical and chemical data for metadolerite rocks from the Liguride Units are presented in order to constrain their metamorphic evolution. The Liguride Units of Southern Apennine include sequences characterized by an HP/LT metamorphic overprint in the Frido Unit as well as sequences with no kind of orogenic metamorphism in the North-Calabrian Unit.

The metadolerites crop out as dikes cutting through serpentized peridotites and have different kinds of texture reflecting various degree of crystallinity and strain. Metadolerites show intersertal, blastophitic and mylonitic textures. These rocks also show a cataclastic-mylonitic deformation.

Veins with predominantly pumpellyite cutting the mafic rocks show mineral assemblage of the prehnite-pumpellyite metamorphic facies.

The veins are heterogeneous in texture and mineral composition. These are straight, a few millimetres thick, and can be seen isolated or in closely spaced sets. The veins are slightly discordant to the metadolerite foliation, and the vein minerals lack a preferred orientation. This indicates that veins formation was syn- to post-kinematic with respect to the main foliation. Pumpellyite in the veins occurs as felt-radiated aggregates and single crystals with acicular to prismatic habit or in association with other minerals. The crystals show undulose extinction and show ductile deformation. Pumpellyites are generally colourless, or show pale green to pale yellow grey and brown colour, show a marked pleochroism from to green or bluish green, displaying typical birefringence colour in cross-polarized light, sometimes shows anomalous interference colour.

The crystals are different in size, they occur as larger-size at border of the veins in comparison with core of veins, in some cases, there seems to be alternating crystals and coarse-grained.

The chemical analyses of host rocks and the pumpellyite in the veins (EMPA, SEM-EDS) have confirmed that metamorphic evolution recorded by metadolerites from the Frido Unit shows evidence of the entire evolution from their origin in the ocean floor to their emplacement in the accretionary wedge (HP/LT).

Chemical data give evidence of compositional variations of pumpellyite in the veins, FeO_{tot} range between 3.11% - 11.88 %, MgO range between 1.80% - 14.04%, while it is rich in Al (22.68-26.08 wt%), this evidence together with the microscopic observations that the pumpellyite since it is formed under high P and low T, due to the presence of lawsonite in the veins and glaucophane in the host rocks. Al-pumpellyite is formed under the pumpellyite-actinolite and blueschist facies condition. The SEM analysis shows that crystals of pumpellyite are zoned, and compositional variations correspond to the zoning.

Pumpellyite compositions can be related with the metamorphic conditions of the host rocks.