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ABSTRACT BOOK

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Il tempo del pianeta Terra
e il tempo dell'uomo:
Le geoscienze fra passato e futuro



Development of vermicular clinopyroxene-amphibole symplectites replacing garnet in amphibolites of the Peloritani Mountain (Northeastern Sicily)

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The metamorphic history of a rock can be very difficult to be unravelled if a careful analysis of the sample microstructures is not performed. These microstructures, that are the end product of the metamorphic evolution experienced by crystalline basements, can be the result of complicated chemical reactions and often also deformation events, which provide useful information to infer the PT path followed by the rocks.

One of the most peculiar microstructures which can be observed in metamorphic rocks is given by the formation of symplectites. This last can be described as a particular worm-like structure constituted by mineral intergrowths which develop simultaneously in a solid-state reaction (Vernon, 2004). Such reactions are often incomplete as due to slow diffusion rates in growing in crystalline grains, offering, in turn, the chance to observe and study both reactant minerals and solid products allowing realistic chemical equations to be written.

In this work, a detailed petrographic and mineralochemical study was carried out on an amphibolite sample coming from the high-grade metamorphic unit cropping out in the Peloritani Mountains (i.e. Aspromonte Unit), with the aim to preliminarily bracket the PT evolution of the analyzed rock. The metamorphic history of this sample can be traced back to prograde metamorphism developed under granulite facies conditions, as highlighted by a relict assemblage given by the first generation of garnet, amphibole, plagioclase, and pyroxene. The subsequent metamorphic evolution is testified by the widespread presence of clinopyroxene-amphibole-plagioclase symplectites grown as coronas around the relict garnet, as a result of retrograde transformations occurred under amphibolite facies conditions. Six microdomains containing vermicular symplectites were opportunely selected and x-ray elemental maps were processed by using the Q-XRMA software (Ortolano et al., 2018) for obtaining mineral modal abundancies and chemical compositions. Obtained results from image processing were then used to isolate the effective bulk chemistry operative during the development of symplectites, allowing to preliminarily define a PT range of P = 6.8-7.3 Kbar at T = 615-635 °C for the retrograde amphibolite facies metamorphism.

Ortolano G., Visalli R., Godard G. & Cirrincione R. (2018) - A new GIS-based statistical approach to Mineral Image Analysis. *Computers & geosciences*, 115, 56-65.

Vernon R.H. (2004) - A practical guide to rock microstructure. Cambridge University Press, 606 pp.