Calc-silicate assemblages from In Ouzzal terrane (Western Hoggar, Algeria): implications for pressure-temperature-fluid history

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Calc-silicate rocks constitute only a relatively small part of the granulite material of the In Ouzzal terrane (Western Hoggar), but their metamorphism is important. It can be used to determine the pressure-temperature-fluid evolution preserving reaction textures of high-temperature mineral parageneses. These textures are interpreted using activity-adjusted P-T–X_{CO2} sections in the simplified CaO-Al_2O_3-SiO_2-Vapor system. In this process, sequence of reactions has been subdivided into two distinct stages: The early prograde stage is accompanied by significant rise in temperature from about 800°C up to 1050°C around 10 Kbar followed by the decompression later stage from about 9 to 6 kbar (Ouzegane *et al.*, 2003). During prograde stage coarse grained wollastonite is product of the reaction calcite + quartz ➔ wollastonite + CO_2. In the peak pressure temperature stage, the reaction producing wollastonite + scapolite from coarse primary garnet consume CO_2 with increasing temperature from 850°C to 1000°C according to the reaction grossular + CO_2 ➔ 3 wollastonite + 2 calcite + meionite. Late mineral reactions have been produced during a decompression stage from about 10 kbar to 7 kbar and cooling from 1000°C to 800°C. The growth of calcite + quartz around wollastonite and garnet coronas between wollastonite, calcite and scapolite are explained by the reaction calcite + quartz ➔ wollastonite + CO_2 and 3 wollastonite + meionite + 2 calcite ➔ 3 grossular + 3 CO_2 reactions also proceeding in a reverse sense to that given in the prograde stage. The appearance of anorthite around the meionite occurs following a drop in temperature independently of the fluids according to the reaction meionite ➔ 3 anorthite + calcite. All reactions occur in the presence of low pressure of CO_2 estimated between 0.3 and 0.5.

Ouzegane, K., Kienast, J.R., Bendaoud, A., Drareni, A., 2003. A review of Archaean and paleoproterozoic evolution of the in ouzzal granulitic terrane (western Hoggar, Algeria). *J. Afr. Earth Sci.*, 37, 207-227.