MICROSTRUCTURAL EVIDENCE OF MATRIX DISPLACEMENT DURING GARNET GROWTH

1JORDT-EVANGELISTA, H. 1Federal University of Ouro Preto, Ouro Preto, Brazil.

Garnets in amphibolite facies (560±30oC, 5 kbar) schists from the Archean Rio das Velhas Greenstone Belt near Piranga, Minas Gerais, Brazil, show unique inclusion patterns of complex origin. The 3mm large garnets are chemically zoned (nucleus = Alm70Py06Gr17Sp07; border = Alm78Py13Gr08Sp01). Although they have been formed at lower temperatures the cores are inclusion-free and surrounded by films of opaque minerals (ilmenite, pyrite, chalcopyrite). The higher grade outer zone is helicitic with abundant inclusions of opaque Si trails which are discordant to Se. The opaque film around the cores is attributed to the displacement of matrix impurities accompanying the slow growth of the garnet during the initial stages of blastesis. The helicitic Si in the outer zone was incorporated as increasing metamorphic conditions might have accelerated crystal growth, so the impurities were overgrown in a passive manner. Finally, the garnet was rotated in relation to the matrix during the last stages of growth. The opaque film around the nucleus is clearly the result of the displacement of the matrix impurities by the garnet. The displacement could be due either to the pressure exerted by garnet on its surroundings because of forceful growth, or by mechanical accumulation of impurities onto the crystal surface as they were passively swept ahead of the growing garnet embedded in a fluid phase. The second alternative is more consistent with the modern knowledge about mineral growth in metamorphic rocks.