Goldschmidt 2000
September 3rd–8th, 2000
Oxford, UK.

Journal of Conference Abstracts
Volume 5(2), 867
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Fluid Reactions During Formation of Coronitic Textures in Rocks from the Adirondack Complex (USA)

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A formation of the garnet-K-feldspar-quartz coronas in meta-mangerites and meta-anorthosites from the Adirondack Complex (New York, USA) occurred during retrograde stage of metamorphism at T = 700 - 600 °C, P = 7-6 kbar under conditions of low oxygen fugacity (about QFM-1), which corresponds to very low CO_2 activity in the C-O-H fluid. In turn, stability of °px-bearing assemblage and absence of biotite implies low activity of water, as well. Low water activity was related to high concentration of potassium and sodium salts (chlorides) in the essentially aqueous fluid. It is supported by presence of chlorine (up 2 wt.% Cl) rich hornblendes and extensively developed alkali feldspar reaction textures. Alkali feldspar reaction microveins, which accompany garnet and amphibole coronitic textures in the rocks, are the mineralogical indicators of rock interaction with K and Na-bearing fluids during the corona formation. Calcium content of garnet in the rocks systematically increases from the earliest generation of the mineral to the latest, which coexist with newly formed K-feldspar. Reaction An (in plagioclase)+3Qtz+[4/3K^++2/3H_2O] (fluid) =4/3Kfs+1/3 Grs (in garnet)+4/3H^+ (fluid) shows, that the increase of calcium content of garnet corresponds to increase in alkali activity in a fluid (at constant T and P) during the corona's growth.