

Occurrence of microgarnets coring plagioclase crystals in granodiorite of the South Mountain Batholith, Nova Scotia

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We report on the occurrence of microgarnets (<3 mm) occurring in the granodiorite phase of the South Mountain Batholith (SMB), a 370 Ma, polyphase peraluminous batholith that outcrops throughout southern Nova Scotia. Samples come from a diamond drill hole (NSDNR hole # DDH-1) collared in metasedimentary rocks of the Meguma Group near Digby, southwestern Nova Scotia. At depth the hole intersects variably altered, biotite-rich granodiorite which forms a marginal phase of the SMB. Within fresh granodiorite (samples taken from between 12-32 m, 102-104 m and 249-264 m depths) occur deep red microcrystals of garnet, of which some coexist with biotite, consistently occurring in the cores of plagioclase grains. We also noted the presence of small fragments (1-25 cm) of biotite-rich (ca. 30 - 40%) xenoliths scattered throughout parts of the core. Bulk analyses of the granodiorite (n=12) indicate 68.92 wt.% SiO₂, 0.59

wt.% TiO₂ and a peraluminosity (A/CNK) of 1.11. In thin section the rock is hypidiomorphic granular with normal and oscillatory zoned plagioclase (An₁₈₋₄₅), perthitic K-feldspar, dark brown biotite [Fe/(Fe+Mg) = 0.643] with abundant accessory phases, intragranular apatite and rare garnets invariably enveloped by plagioclase. Observations of about 25 garnets indicate anhedral shapes dominate and that reaction rims are totally absent. The majority of garnets analysed occur within close limits of partially digested biotite-rich xenoliths, but in thin section no garnets have been observed in the xenoliths. Electron microprobe analyses indicate spessartine-rich almandine garnet compositions with a core to rim enrichment of Mn (i.e., 3 vs. 7 wt.% MnO). Currently a variety of models are being considered to account for the garnets, including xenocrystic (source yet unknown) and cognate (high- or low-P magmatic).