

The fate of olivine in the lower crust: the petrology of coronitic metagabbro in the western Grenville Province, Ontario

JILLIAN LEIGH KENDRICK*, REBECCA A. JAMIESON, AND GLENN CHAPMAN - *Department of Geology, Saint Mary's University, Halifax, Nova Scotia, B3H 3C3*

The petrology, chemistry, and age of alkaline mafic bodies have been used to differentiate between autochthonous and allochthonous domains in the southwest Grenville orogen. In allochthons, the characteristic mafic suite is a group of coronitic metagabbros intruded at approximately 1170 Ma. The olivine gabbro protoliths were metamorphosed in the lower crust during the Ottawa stage of the Grenvillian orogeny at approximately 1060 Ma. Metamorphism produced spectacular coronitic textures between igneous olivine and plagioclase and other primary minerals. This study examines a 150 m-wide outcrop of one such body in the Algonquin domain, recently exposed by highway construction. Petrographic and microprobe analyses of samples collected along the roadcut are underway to determine the metamorphic reactions and P-T conditions that the body experienced during Grenvillian metamorphism. This study focuses on metamorphic assemblages overprinting primary olivine. Olivine replacement is ubiquitous in these samples, but was previously undocumented in Grenvillian coronitic metagabbros and remains poorly understood in localities where it exists. Orthopyroxene + ilmenite + magnetite form symplectic pseudomorphs of olivine, separated from relict plagioclase by corona assemblages of orthopyroxene ± clinopyroxene, amphibole ± biotite, garnet + amphibole ± clinopyroxene ± orthopyroxene ± plagioclase symplectite. Preliminary P-T estimates of $\geq 800^{\circ}\text{C}$ and ~ 12 kb for coronas correlate with P-T estimates from nearby granulite- and upper-amphibolite-facies gneisses. Determining the reactions responsible for the olivine pseudomorphs and corona assemblages will help constrain P-T conditions and relative timing of their formation, and shed light on the deep crustal processes active during and after gabbro emplacement.

***Winner of the Science Atlantic Award for best overall presentation**