

Northeastern Section - 43rd Annual Meeting (27-29 March 2008)

Paper No. 39-2

Presentation Time: 8:00 AM-12:00 PM

MINERALOGY AND GEOCHEMISTRY OF A MAFIC-ULTRAMAFIC INTRUSION FROM PYRITES, ADIRONDACK LOWLANDS, NEW YORK

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A mafic-ultramafic intrusion at Pyrites, in the Adirondack Lowlands of New York, consists of a lherzolite to pyroxene hornblende peridotite core with peripheral gabbro sequences that transition into amphibolite and hornblende schists. This sequence is cut by narrow lamprophyre dikes, and late, hydrothermal veins of fibrous calcite, and is structurally overlain by rusty gneisses with thin layers of fine-grained quartzite. Zircons, recovered from the lherzolite, yield SHRIMP II U-Th-Pb ages of 1,140±7 and 1,202±10 Ma documenting periods of metamorphism and a minimum age for the mafic-ultramafic intrusion.

Relics of augite (to 1.25 wt % Cr₂O₃), diopside, and magnesiohastingsite yield initial mineral compositions, but most of the original minerals were replaced by serpentine (to 1.56 wt % Cr₂O₃) and other secondary minerals. Magnetite, chromite, in places with magnetite rims, ilmenite, and chlorapatite are accessory minerals.

Geochemically, the rocks range from 33.74 to 52.09 wt % SiO₂, with ultramafic cumulates containing 25-33% MgO and up to 4,243 ppm Cr and 1,588 ppm Ni. In addition, the rocks are characterized by high LOI (to 11.59 wt %) and low (<1.0 wt %) Ti. Normalized REE and incompatible element patterns display enrichment in LREE, LILs, and depletion in some HSFE elements such as Nb, Ti, and Zr relative to chondrites and primitive mantle as a result of the crustal contamination.

Four samples of mafic and ultramafic rocks analyzed for Rb-Sr isotopic systematics yield an errorchron age of 1,231 Ma with an initial ratio (⁸⁷Sr/⁸⁶Sr) of 0.703226. In addition, six samples were analyzed for Sm-Nd isotopic systematics. These samples yield an errorchron age of 1,123 Ma (initial ratio 0.511364, EpsNd = +3.44). Epsilon

NdCHUR (1.21 Ga) range between -0.46 (lamprophyre) to +4.33 (peridotite). Depleted mantle model ages ranged from 1,452 (peridotite) to 2,651 Ma (lamprophyre). Three ultramafic samples gave model ages between 1452-1509 Ma. Carbonate veins (n = 3) cutting the peridotite yield $\delta^{13}\text{CPDB}$ between -6.975 and -7.358 and $\delta^{18}\text{OSMOW}$ values between 15.629 and 15.668 ($^{87}\text{Sr}/^{86}\text{Sr} = 0.708891-0.709748$).

The Pyrites intrusion and associated amphibolitic belts display the features of a highly dismembered slice of oceanic crust and may demark the original suture between the Adirondack Highlands and Lowlands.

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Session No. 39--Booth# 12

[Precambrian Geology \(Posters\)](#)

Hyatt Regency Buffalo: Grand Ballroom C

8:00 AM-12:00 PM, Saturday, 29 March 2008