Sundaralingam N, Linnen RL, Perrouty S, 2017, Relationship of gold and pyrite-hosted veins within the Canadian Malartic footprint, Abstract, PDAC-SMC, Toronto, ON

The main gold mineralization at the Canadian Malartic deposit is associated with disseminated pyrite or fine veinlets, which are related to the D_2 deformation event. The composition of the pyrite within the syn-D_2 veins may therefore record broad-scale fluid circulation, which ultimately may provide evidence for the origin of the deposit. This work focuses on the mineralogical and geochemical analysis of the veins, the pyrite grains within them, and their associated alteration haloes. Over ten vein generations were recognized within the Canadian Malartic footprint during field work. Only the two main generations that contained pyrite were sampled: one formed early- to syn- D_2 and the other formed syn- to late- D_2. Veins were sampled along two main transects, one trending approximately west from the deposit and the other approximately south from the deposit. Four groups of primary vein mineralogy can be distinguished from petrographic analyses: 1) Qz-Ab-Kfs-Bt-Cal, 2) Qz-Ab-Kfs-Bt, 3) Qz-Ab-Bt-Cal, and 4) Qz-Bt-Cal. Chlorite is present in nearly all samples and partly replaces biotite. The minor mineral composition of the veins is variable, but may include chalcopyrite, galena, scheelite, molybdenite, barite, rutile, ilmenite, titanite, apatite, muscovite, epidote, REE fluorocarbonate minerals, and zircon. Alteration haloes surrounding the veins are characterized by bands of biotite, disseminated pyrite, and reduced grain size within the host rock. Along the transect to the south, pyrite is increasingly replaced by pyrrhotite, which can be interpreted as a result of the increasing metamorphic grade toward the south. If this interpretation is correct, the implication is that the veins (and possibly a mineralization event) pre-date metamorphism. Oscillatory zoning was observed within the pyrite grains in maps from electron probe microanalyses, which may reflect fluid mixing. Future work will include EPM analyses of pyrite and biotite, and LA ICP-MS analyses of pyrite.

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