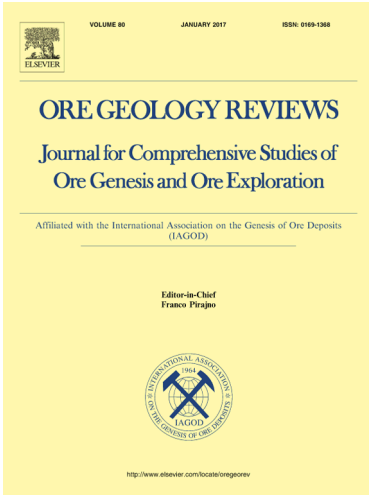
Accepted Manuscript



Early Carbonate Veining and Gold Mineralization in the Timmins Camp: Depositional Context of the Dome Mine Ankerite Veins

Jessica M. Stromberg, Erik Barr, Neil R. Banerjee

PII: S0169-1368(17)30562-0
DOI: https://doi.org/10.1016/j.oregeorev.2018.04.022
Reference: OREGEO 2566

To appear in: *Ore Geology Reviews*

Received Date: 15 August 2017
Revised Date: 17 April 2018
Accepted Date: 20 April 2018

Please cite this article as: J.M. Stromberg, E. Barr, N.R. Banerjee, Early Carbonate Veining and Gold Mineralization in the Timmins Camp: Depositional Context of the Dome Mine Ankerite Veins, *Ore Geology Reviews* (2018), doi: https://doi.org/10.1016/j.oregeorev.2018.04.022

Early Carbonate Veining and Gold Mineralization in the Timmins Camp: Depositional Context of the Dome Mine Ankerite Veins

Jessica M. Stromberg[1], Erik Barr[2*], Neil R. Banerjee[1]

[1]Department of Earth Sciences, Western University, London, ON, N6A 5B7, Canada, jstromb@uwo.ca, neil.banerjee@uwo.ca

[2]Goldcorp Porcupine Gold Mines, Dome Mine, South Porcupine, ON, P0N 1H0, Canada

*Present Address: Kirkland Lake Gold Ltd., Val Gagne, ON, P0K 1W0, Canada, ebarr@klgold.com

Corresponding Author: Jessica M. Stromberg[1], jstromb@uwo.ca

Abstract

The earliest auriferous veining event in the development of the over 16 Moz gold endowment at the Dome mine was an extensive set of ankerite veins (over 5,400 m strike length). The depositional context of the Dome mine ankerite veins has been historically contentious and their role in the mineralization history of the deposit not well understood. We present a deposit wide geochemical study of the ankerite veins and their host rocks, with observations from new underground mapping. Ankerite veining across the mine is almost exclusively restricted to the Vipond Formation, which is Fe rich and tholeiitic in nature. Metamorphic fluids and ankerite vein formation generally focused along flow boundaries in the volcanic sequence, however, carbonatization is ubiquitous. The flows of the Vipond Formation maintain their protolith geochemical signatures as REE, Zr, Al_2O_3, TiO_2, and Y are largely immobile during mineralization and alteration, which mobilized Na_2O, K_2O, and locally Fe_2O_3. The ankerite vein structures are reactivated and overprinted by quartz and quartz-tourmaline veining, and gold grade is variable, ranging from <1 to 98 g/t with the highest grades related to the overprinting veining. Gold in the ankerite veins occurs primarily at the vein margins associated with pyrite