Testing pyrrhotite trace element content as a vector towards the mineralization in the Sullivan Deposit, B.C.

SENOL, N.S, GREGORY, D.D[12]

[1] Department of Earth Sciences, University of Toronto, Toronto, Ontario, Canada, naci.senol@mail.utoronto.ca
[2]Department of Earth Sciences, University of Toronto, Toronto, Ontario, Canada, daniel.gregory@utoronto.ca

The Sullivan deposit, located Kimberley, British Columbia, Canada, is one of the most important SEDEX (sedimentary exhalative) deposits in the Canadian portion of the Belt-Purcell basin since as it is the largest past producer. The Sullivan deposit produced 161.97 Mt of Zn (5.86%), Pb (6.08%), Ag (67.36 g/t), and the past metal production of the Sullivan deposit is worth over $20 billion based on 2014 metal prices. There are two main parts that the Sullivan deposit forms, and it forms below the contact between Lower and Middle Aldridge Formation. The black laminated mudstone which is defined as carbonaceous wacke laminate by Cominco occurs in the top of the Middle Aldridge Formation. The Sullivan deposit has seen extensive hydrothermal alteration by a variety of alteration processes. The most prevalent alteration is sericitic alteration. It is mostly controlled by the disseminated, fragmental, coarse-grained sedimentary rocks at the Sullivan deposit. This alteration can be defined as a typical pale yellowish grey-green colour and formed due to sulphidation of biotite to form pyrrhotite and sericite during metamorphism. Mining exploration has been experiencing challenges since exploration methods are expensive and time-consuming. To overcome these challenges, new strategies must be developed on known deposits. Here, we will test a new tool search for new SEDEX style deposits in the Belt-Purcell basin: in situ analyses of pyrrhotite. However, prior to the analyses detailed petrology must be performed on samples of increasing distance from known mineralization and this petrology will be the main focus of this presentation. Here we present reflected light and SEM images of the samples from the host horizon of the Sullivan deposit with advancing distance from the deposit. Explicitly, we emphasize the different generations of the sulphide species that form within the host horizon and how these change with proximity to the mineralizing source.