THE GEOCHEMISTRY OF THE FOSTERVILLE GOLDFIELD, VICTORIA.

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ABSTRACT

The Fosterville goldfield occurs in sandstones, siltstones and shales of Ordovician age, associated with the brecciated shear zones and associated stockworks of the Fosterville Shear Zone. The Fosterville Fault is a planar mineralized structure with significant old mine workings in the oxidized zone over a strike length of 8 km. The present Central Ellesmere and Fosterville prospects are situated along the Fosterville Fault.

The style of mineralization present in the Fosterville goldfield is a sedimentary rock-hosted gold deposit, along the Fosterville Fault Zone. Gold occurs within sediment hosted arsenopyrite and pyrite, in crystal lattice and/or as minute inclusions. The mineralized fault breccia and associated stockworks are vertical to sub-vertical and up to 30 m in width; only very minor quartz veining occurs.

The origin of the Fosterville gold deposit is considered to be genetically related to a granite source, with a temperature for the mineralizing fluid of approximately 370 ^{0}C. The depth of the system range from 6.5-10 km.

PIXE (proton-induced x-ray emission) and AAS (atomic absorption spectroscopy) have been very useful in analyzing for trace elements in vein quartz. The Fosterville quartz shows generally high levels of trace elements. The analyses showed positive correlation between the presence of K, Ge, Al and As with Au in the host rock and the intensity of the EPR (electron paramagnetic resonance) of quartz veins. There is a highly significant correlation between the Ge content and EPR of the quartz at the absorption peak at g 2.0027. The present study indicates that the paramagnetic centre is Ge-Al related.

The high correlation between Ge, Au and EPR suggests that EPR and Ge may be used as an indicator of gold mineralization in this type of deposits. Ge is an element typically enriched in late magmatic and hydrothermal minerals.

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