

**GEOLOGY AND GENESIS OF EPITHERMAL GOLD-BARITE MINERALIZATION, VERRENASS DEPOSIT, TOODOGGONE DISTRICT, B.C.**

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Verrenass mineralization is an example of a unique class of barite-gold deposits. It is hosted by a Jurassic dacitic to latitic ignimbrite containing abundant flattened juvenile fragments, and crystals-phenocrysts of plagioclase and oxyhornblende. Subaerial diagenesis and weak regional alteration devitrified fiamme glass to K-feldspar and quartz, hematitized mafics, and partially altered feldspars to laumon-montmoril. Alteration associated with mineralization is zoned about central linear fractures, and comprises successive envelopes of qtz-ill-ank-Fe hydromica-hem; qtz-ill-hem; qtz-dickite (kaol/nacrite may replace dick)-rut; qtz-barite-rut (qtz-py-bar-rut at depth). SiO<sub>2</sub> and BaO are strongly enriched within the Au-mineralized zone. The 3 ppm Au contour is approximated by 80 % SiO<sub>2</sub> and 1 % BaO contours. Al<sub>2</sub>O<sub>3</sub> content is highly variable and ranges up to 20 % in the immediate wallrocks. All other major elements are depleted in the alteration zone except TiO<sub>2</sub> which is immobile. Post-Au tenn-bn-cov added Cu, As, Sb, Hg, and Bi to the mineralized zone. Significant native gold mineralization occurs exclusively in barite, and locally attains grades of 100 ppm Au. Veining is generally absent. Late stage or secondary electrum contains 5-8 wt. % Ag. Fluid inclusions in barite homogenize between 180-200 C, and have salinities of 3.0 wt. % NaCl equivalent. Evidence of boiling has not been observed.

The alteration process prepared the host rocks for mineralization. Preferential argillization of originally feldspathic ignimbrite components, followed by acid leaching of kandites produced a porous and permeable trap for open-space barite-gold precipitation. Oxidation of reduced S to sulfate by mixing of hydrothermal fluid with groundwater is interpreted to have caused barite saturation and destabilization of gold-bisulfide complexes.