

### **μ-XRF Atlas of Epithermal and Porphyry Deposit Textures**

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Porphyry copper deposits are large hydrothermal ore systems associated with an intrusive igneous body and the porphyry copper and epithermal mineralization/alteration systems that lie above it. The magma body is usually andesitic to dacitic in composition, and it is rich in fluids and volatiles that fracture the host rock and precipitate mineralization as it rises to the surface. The chemical composition of these fluids influences the alteration, textures, and mineralogy that are observed along structural controls like fractures, from which we can identify three types of epithermal deposits in addition to porphyry: High Sulfidation (HS), Intermediate Sulfidation (IS), and Low Sulfidation (LS). This classification correlates with variations in sulfur content, sulfur oxidation state, and sulfidation state within the ore mineralization site. The main objective of this project is to characterize the mineralogy and textures of High, Intermediate, and Low Sulfidation Epithermal and Porphyry Deposits, using micro energy-dispersive X-ray fluorescence (μ-XRF) technology. Samples have been collected from several well-known and representative deposits around the world and scanned using a Bruker M4 Tornado to create high-resolution maps of the distribution of elements contained in each and color-coded for interpretation. We found that there are many chemical and distributive similarities among deposits occurring around the world. To illustrate this point, the samples studied have been superimposed onto existing models of porphyry and epithermal systems proposed by previous researchers (e.g., Sillitoe, 2010; Hedenquist and Arribas, 2022).