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Microstructural Analysis of Quartz Samples from Bald Butte Porphyry

Dikes, veins, and a silica cap associated with the ca. 40 Ma Bald Butte Porphyry system in the Marysville mining district can be genetically correlated with an economic Molybdenum deposit. This study employs Electron Backscatter Diffraction (EBSD) and Computer Integrated Polarization Microscopy (CIP) to study microstructures that record processes that produced the ~200-m-diameter dense silica cap overlying the subsurface Bald Butte stock. Samples collected from the silica cap contain quartz stockwork veins that crosscut each other and almost completely replace the country rock. The Cap is primarily quartz in composition with minor phyllosilicates, feldspar (?), and flourite (?). Isolated relicts of country rock can still be identified. Textures surrounding major grains may indicate conditions present after emplacement of the system. We are working to define the relationship between subgrain recrystalization textures and secondary crystal growth in voids within several samples. We also hope to employ Energy Dispersive Spectrometry (EDS) to acquire a chemical profile along a transect across these textures in order to document changes in fluid chemistry recorded by the growing crystals. This study has implications for understanding processes of silica replacement in epithermal mineral systems.