Raman spectroscopy of hydrothermal phyllosilicates associated with epithermal Au-Ag mineralization: implications for metal precipitation

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The Heritage prospect (Newfoundland, Canada) is an example of low-sulfidation epithermal Au-Ag mineralization hosted by intermediate volcanic rocks and characterized by silica ± sericite ± chlorite ± carbonate alteration assemblages. Precious metals are commonly associated with acanthite-native Ag-pyrite, often in ginguro-style bands.

In tandem with field portable spectroscopic techniques, such as Terraspec infrared spectroscopy [1], Raman spectroscopy is emerging as a promising tool for both field and microscale analysis of hydrothermal phyllosilicates [2].

Results

Combined Terraspec and Raman spectroscopies confirm the presence of at least two compositionally variable hydrothermal phyllosilicates: K-rich mica (muscovite-phengite) and Mg-Fe chlorite (clinochlore).

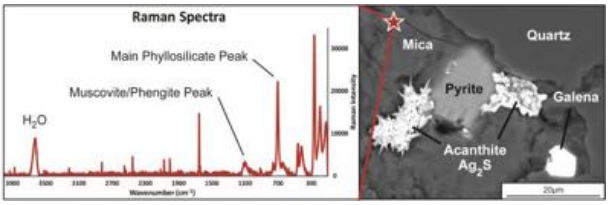

Figure 1: Backscattered electron (BSE) image of epithermal mineralization at Heritage, with Raman spectra of hydrothermal phyllosilicate related to the ore.

Discussion

Hydrothermal alteration of intermediate volcanic host rocks in low sulfidation systems typically involves broad scale silicification, and sericitic, chloritic and potassic alteration [3]. At Heritage there is petrographic and spectroscopic evidence suggesting a microscale spatial and genetic link between specific K-rich white mica compositions and Au-Ag mineralization.

[1] Kerr *et al.* (2011) *NLGS Report* **2011-1**, 145-166.
[2] Wang *et al.* (2015) *J. Raman Spectrosc.* **46**, 829-845.
[3] Hedenquist (2000) *SEG Reviews* **13**, 245-277.