

SPECTRAL EVOLUTION

Identifying Chrysocolla, A Mineral Associated With Copper

Chrysocolla is an important pathfinder mineral for copper deposits. It is often found on or near the surface in outcrops, pits, or benches making it a good target for copper exploration. NIR spectroscopy can be a valuable vectoring tool for mineral exploration in copper mining. Using an oreXpress™ high resolution field spectrometer and Spectral Evolution's EZ-ID™ software, a geologist can quickly identify chrysocolla and associated pathfinder minerals such as azurite, malachite and cuprite, create an accurate alteration zone mineral map and vector to mineralization while maximizing drilling effectiveness. In addition, using an oreXpress with EZ-ID in core logging saves on analysis costs by eliminating unprofitable cores from analysis and provides accurate alteration data for use with 3D mining and other third party software.

Chrysocolla is one of the most important copper minerals as it has one of the lowest operating cost extraction methods. It can easily be leached out via heap leaching or *in situ* leaching. Chrysocolla has a distinctive spectra with major absorption features around 1900, 2230 and 2400 nanometers. It can be differentiated from other minerals found with it such as kaolinite and muscovite by concentrating on the feature around 2230nm. Malachite which is often found with chrysocolla has its major absorption feature at 2275nm. EZ-ID matches the target scan from the sample against two libraries of more than 600 known minerals to provide an accurate match. Unmixing can be performed using the EZ-ID match regions and score tables to concentrate on the most important absorption features.

Benefits of using an oreXpress with EZ-ID include:

- ◆ Quickly collect a lot of scans
- ◆ Cover more ground in less time for better mapping
- ◆ Collect more accurate data for a more complete picture of the area you are exploring
- ◆ Get results immediately instead of waiting for lab analysis
- ◆ Drill fewer holes with better results
- ◆ In the core shack, correctly identify promising samples, save on assay costs, and save your valuable logging data

The oreXpress delivers full range, UV/VIS/NIR capabilities from 350-2500nm, is light-weight (under 7 lbs), rugged, includes integral autoexposure and auto-dark shutter, and comes with an ALGIZ 8X rugged tablet with digital camera, GPS, and voice notes that can be tagged to your spectra. In addition, our DARWin Data Acquisition software saves your scans as ASCII files for use (without pre-processing) with third party software, including chemometric analysis software. For higher resolution the oreXplorer field spectrometer is available and the oreXpert offers the highest resolution available in a portable spectrometer.

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A spectra of a chrysocolla sample from a copper mine in Canada with a known sample from the USGS library.



oreXpress with 3mm spot size Miniprobe. Also available with standard 10mm spot size contact probe.

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