

SPECTRAL EVOLUTION

Identifying Talc with a High Resolution Field Spectrometer

Talc is the softest mineral on earth and has many industrial uses in cosmetics, electronics as an insulator, and a filler in paint, rubber, and paper. Talc is part of the tri-octahedral phyllosilicates and has a chemical formula of $\text{Si}_4\text{O}_{10}\text{M}_3(\text{OH})_2$. Talc is found primarily in metamorphic rocks.

Talc can be identified by several distinct absorption features. Pure talc has a characteristic doublet around 2320nm. Other major absorption features can be seen at 2380nm and a triple feature near 2077/2127/2172nm. When the talc has iron in it there's a ferrous iron (Fe^{2+}) feature around 1000nm.

A geologist identifying talc can benefit from the ultra-high resolution capabilities of the oreXpert field spectrometer from Spectral Evolution to see additional distinct features including a triplet at 1400nm indicative of OH^1 .

The oreXpert features high resolution:

- ◆ 1.5nm @ 700nm
- ◆ 3.0nm @ 1500nm
- ◆ 3.8nm @ 2100nm

When used with EZ-ID mineral identification software a geologist can match unknown samples against three libraries of over 1100 minerals and 2600 spectra for fast identification. Match regions can be set up to focus on specific absorption features for better identification and unmixing of minerals. EZ-ID also includes spectral scalars that provide information on crystallinity changes, alteration pattern shifts and geochemical conditions.

The oreXpert is designed for field work—goes in a backpack, runs off lithium-ion batteries for a full day of scanning, comes with an optional ALGIZ® 8X tablet with GPS, a digital camera and sunlight readable display running DARWin LT on Windows 10. The tablet is connected to the oreXpert via Bluetooth for cable free connection. The oreXpert is very reliable with no moving optical parts to breakdown. DARWin LT saves all data as ASCII files for use with other third party programs for additional analysis. The oreXpert is also ideal for core shack use allowing a geologist to build a digital database of core samples.

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The oreXpert delivers high resolution/high sensitivity for field identification of minerals.



EZ-ID software identifies minerals in real-time by matching your target spectra against a known spectral library such as the USGS library, the SpecMIN library or the GeoSPEC library. The scan above is from the USGS library matching a scan taken with the oreXpert to talc. The inset is a closeup of the 1400nm feature in a scan taken with the oreXpert (blue-top) versus a standard field spectrometer (green-bottom) showing additional features.

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