

# SPECTRAL EVOLUTION

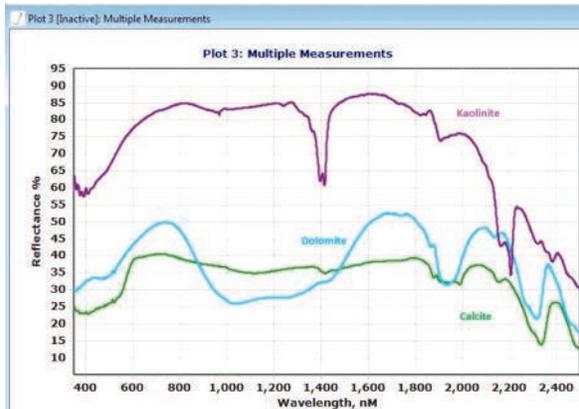
## Identifying calcite, dolomite, clay in limestone exploration

Limestone is used in a variety of products—from Portland cement to aggregate (gravel), to powdered limestone to remove steel impurities, to marble. During exploration it is important to identify the minerals that are often found in limestone, including: calcite, dolomite, quartz, pyrite, and clay. Calcite and dolomite are the key ingredients in commercially valuable limestone deposits and it is often difficult to distinguish these minerals from clays in the mixture.

Limestone might be typically classified as:

- ◆ Calcite limestone: calcite >90%; dolomite <10%
- ◆ Dolomitic limestone: calcite 50-90%; dolomite 10-50%
- ◆ Calcite dolomite: calcite 10-50%; dolomite 50-90%
- ◆ Dolomite: calcite <10%; dolomite >90%

The high resolution and sensitivity of the oreXpress spectrometer delivers enhanced spectra for more accurate identification, especially with calcite, dolomite and clays. While calcite and dolomite share several spectral features, they are easily identified separately with an oreXpress field spectrometer and EZ-ID mineral identification software. In a multi-spectral plot, the kaolinite clay in this limestone mixture can be differentiated by the doublets near 1400nm and 2200 nm.



While dolomite and calcite have similar absorption features, there are subtle differences. Dolomite has features at 1858, 1978, and 2320 nm; calcite at 1875, 1995, and 2330nm.

With EZ-ID matching against two libraries of 1600 spectral and 600 minerals, distinguishing between the three elements in

a limestone sample can be accomplished quickly and accurately.

As a field spectrometer, the oreXp[ress allows for rapid scanning in the field using a backpack, handheld microcomputer, two lithium-ion batteries and a contact probe to take up to 8 hours of scans for analysis using EZ-ID. An accurate mineral map of prospective deposits can help to focus on those areas with more commercial promise and a better concentration of calcite and dolomite. In addition the oreXpress with EZ-ID allows you to scan core quickly and build a virtual core library.

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oreXpress and EZ-ID match to a known library sample of dolomite



EZ-ID identifying calcite using match regions to focus on specific absorption features.



EZ-ID identifying sample of kaolinite, a clay sometimes found with dolomite and calcite.

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