

# SPECTRAL EVOLUTION

## Analysis of Clays in Mining Exploration

The accurate identification of clays in mineral assemblages can provide key indications of the presence (or absence) of mineralized systems. Using a field portable NIR spectrometer that can identify different clays and note when and where they alter, can help a geologist in many situations where visual identification is not possible, both in the field and in the core shack. Mapping of alteration zones can provide useful information that indicates vectors to undiscovered deposits.

For example, low sulfidation assemblages might be characterized by clay minerals such as illite, montmorillonite and sericite. High sulfidation might be characterized by kaolinite and alunite. The ability to identify the different clay minerals, especially in mixed clay assemblages is critical to creating an accurate mineral map.

Using the oreXpress field spectrometer with EZ-ID mineral identification software, a geologist can more clearly see the alteration of clay minerals that are often very similar. EZ-ID matches target spectra to libraries of known mineral spectra from USGS and Spectral International.

With EZ-ID the geologist can select specific spectral regions to fine-tune the matching process for a more precise ID. For example a geologist can highlight different features for different clays: kaolinite has characteristic absorption doublets near 2200 and 1400nm; smectite has absorption features near 1400, 1900, and 2200nm; illite has similar features near 1400, 1900 and 2200nm like smectite but also additional absorptions near 2340 and 2445nm.

The high resolution and sensitivity of the oreXpress spectrometer delivers enhanced spectra for more accurate identification, especially with clays where the different minerals have spectra that can be very similar.

In core logging, the oreXpress with the mineral contact probe allows a geologist to create a virtual digital core library, capturing alterations and identifying changes in clays to better vector to mineralization. And core logging can still be done quickly—logging as much as 400m in one day.

In addition to providing important information during exploration and core logging, the oreXpress can also indicate if the clays are swelling clays, like smectite, which can require different processing methods.

The USGS library contains 466 spectra for 226 minerals; SpecMIN has 1528 spectra for 500 minerals. By ordering EZ-ID with both libraries, a geologist has access to a wide range of match possibilities for exploration projects in iron, gold, copper, silver, nickel, uranium, and rare earths.

oreXpress, oreXpress Platinum and EZ-ID software are trademarks of Spectral Evolution, Inc. SpecMIN is a trademark of Spectral International, Inc.



*oreXpress and oreXpress Platinum spectrometers are used to identify clay minerals in the field and core shack.*



*EZ-ID software identifies minerals in real-time by matching your target spectra against a known spectral library such as the USGS library, or the SpecMIN library.*

1 Canal Street ♦ Unit B1  
Lawrence, MA 01840 USA  
Tel: 978 687-1833 ♦ Fax: 978 945-0372  
Email: [sales@spectralevolution.com](mailto:sales@spectralevolution.com)  
[www.spectralevolution.com](http://www.spectralevolution.com)

