

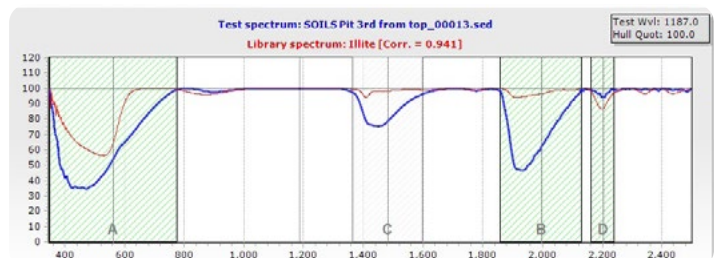


IDENTIFYING **CLAYS IN SOIL** WITH AN NIR SPECTROMETER

Identifying clay minerals in soil is essential to nutrient management for soil health and efficient crop production. Most soils are a mixture of clay, organic matter, sand, and silt. Clays have a large surface area and a negative charge which attract and retain positively charged plant nutrients such as Ca^{+2} , Mg^{+2} , K^+ , and Na^+ . The ability to hold and store positively charged ions is called cation exchange capacity (CEC). The more clay in the soil, the higher the CEC. Clay also acts as a binder for soil particles, helping the soil retain moisture and reduce nutrient loss from leaching.

Reflectance spectroscopy in the near infrared is a non-destructive tool for evaluating soil content. Materials have unique spectral signatures defined by reflectance or absorption as a function of wavelength. Studying soil with a UV/VIS/NIR spectroradiometer provides a

detailed view of the organic and inorganic materials contained within your sample. A full-range spectroradiometer (350-2500nm) is essential for detecting the presence of clays.



DARWin™ SP with EZ-ID™ instantly compares sample scans to known reference scans from the USGS spectral library for rapid analysis.

With industry-leading resolution and sensitivity, Spectral Evolution field portable spectroradiometers have the performance required to identify clays in soil. For accurate analysis and instant mineral identification, the EZ-ID™ add-on to our data acquisition software, DARWin™ SP, instantly compares your target spectra against spectral libraries of known samples. In addition, the Custom Library Builder module allows you to create your own spectral library from field samples that pertain directly to your site, studies, or application.

INSTRUMENTS & ACCESSORIES

Spectral Evolution offers a variety of portable UV/VIS/NIR spectroradiometers and accessories to aid in your soil research. Each of our NIST-traceable calibrated instruments measure the full spectral range (350-2500nm) with just one scan. They are specifically optimized for use in the field with a rugged, all photodiode array platform & no moving gratings. Our fiber optics are detachable & field-replaceable, so you'll never get stuck on-site with a broken fiber. All Spectral Evolution instruments come with DARWin™ SP data acquisition software to collect critical data & save it in ASCII format - no post-processing necessary. DARWin is available with the EZ-ID™ add-on, which includes sample libraries from the USGS, SPECMIN, and GeoSPEC™ for instant & accurate identification.



RS-3500

- Tried and true full-range model
- Standard spectral resolution
- Lightweight and portable for field research



PSR+

- Lightest, most portable full-range instrument
- Internal memory & onboard controls - no PC needed for operation
- Use in "handheld" mode with battery that slots into device and option to attach lens instead of fiber optic
- Tripod mountable for repeatable data collection



NaturaSpec™

- Best signal to noise compromise in a field instrument
- High resolution & sensitivity
- Better quality data - especially from dark samples



SR-6500

- Highest-resolution portable field spectroradiometer on the market
- Better ability to quantify contaminants or nutrients at a lower detection level
- More easily identify minerals within mixtures



RS-8800

- Built-in computer with IoT operating system to control instrument with smartphone
- See field of view in real-time & record essential metadata with exclusive accessory Sensaprobe™



ILM-550

- Illuminates large spot size for standoff measurements
- Aluminum reflector for bright, uniform illumination across the entire spectral range
- Includes two tungsten-halogen bulbs for diffuse or spot illumination mode
- Easily mounted on lab benches, optical tables, or tripod for repeatable data collection



Rugged Handheld Tablet

- Real-time, wireless instrument control
- Instantly view scans & match soil components *in situ* with DARWin LT and EZ-ID
- 8", sunlight readable touchscreen
- Built-in GPS, camera, and microphone to collect & organize essential field data



Pistol Grip

- Ergonomic handle with external trigger holds fiber optic in place for precise standoff measurements
- Reinforced tripod mount for hands-free, repeatable operation
- Picatinny rail to mount optional scopes & laser sights for enhanced targeting accuracy



Benchtop Probe w/Compactor

- Ideal for loose samples such as soil, crushed stone, or powders
- Optional compactor for consistent sample preparation
- Hands-free measurement
- SMA-905 fiber optic connection
- Built-in tungsten halogen bulb
- Durable sapphire window



Contact Probes

- Ergonomic design with external trigger for quick contact measurements
- Built-in illumination for great signal to noise across the full spectral range
- Available in 10mm or 3mm spot sizes for flexible targeting
- Scratch-resistant sapphire window

26 Parkridge Road, Suite 104, Haverhill, MA 01835

978-687-1833

www.spectralevolution.com | info@spectralevolution.com

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