

SPECTRAL EVOLUTION

Using an NIR Spectrometer to Identify Heavy Metals in Soil

Soil contamination with heavy metals is a growing problem worldwide. Elevated heavy metal contaminants in soils impact soil quality and can accumulate in the food chain and eventually endanger human health. Standard testing for heavy metals in soil are usually done via chemical analysis that is time consuming and relatively expensive.

NIR field spectroscopy can provide a fast and accurate method for identifying the presence of heavy metals in soil. SPECTRAL EVOLUTION offers a range of field spectroradiometers for soil analysis including the SR-6500, RS-5400, RS-8800, PSR+ and RS-3500. Measurements can be taken quickly and easily with a contact probe, benchtop probe or fiber optic lens without affecting the sample. Also, there is no sample preparation necessary. A single click and you capture a scan in seconds.

Heavy metals that can be found in soil include zinc, lead, manganese, nickel, chromium and copper. Important absorption features for these metals include:

- ◆ Lead: 440-584nm
- ◆ Zinc: 430-570nm and 590-770nm
- ◆ Manganese: 390-550nm and 580-710nm
- ◆ Nickel: 870-990nm
- ◆ Chromium: 620nm
- ◆ Copper: 820nm

In analyzing heavy metals in soils, first and second derivatives can also supply useful information. DARWin SP Data Acquisition software that runs on all SPECTRAL EVOLUTION instruments provides these derivatives. In addition further analysis of heavy metal content can also be discovered using chemometrics software, such as Unscrambler from Camo Analytics. Build, optimize and test your model in Camo Analytics Unscrambler. The coefficients from your model are used in the prediction engine built into our DARWin software to identify heavy metals in new samples.

SPECTRAL EVOLUTION spectroradiometers deliver the following capabilities:

- ◆ Rapid data/spectra collection in the field – allowing you to take more scans in less time
- ◆ High resolution in a field instrument
- ◆ High signal-to-noise ratio for improved reflectance values
- ◆ Fast start-up and use with no optimization step required between scans
- ◆ Sturdy construction for harsh field environments
- ◆ Reliable operation with no moving optics and a robust fiber optic cable with quick-disconnect
- ◆ Rugged and reliable FOV lenses, contact probes and benchtop probe for single click measurements

Our optional EZ-ID sample identification software allows you to scan known samples and save them as a library for matching in the field. EZ-ID accesses three libraries of over 1100 minerals to identify minerals in soil, especially clays.

Identifying heavy metals in soil is a key especially for improving the health of agricultural soils to prevent endangering crops.



SPECTRAL EVOLUTION field spectrometers include the SR-6500, RS-5400, RS-8800, PSR+ and RS-3500. Here a researcher is using the PSR+ and a contact probe for soil measurements in a pit.

26 Parkridge Road ♦ Suite 104
Haverhill, MA 01835 USA
Tel: 978 687-1833 ♦ Fax: 978 945-0372
Email: sales@spectralevolution.com
www.spectralevolution.com

