XRF: Ideal Monitoring for Above and Below

X-ray fluorescence spectrometry (XRF) is the preferred method for both air and soil analysis. For air monitoring, XRF's combination of superior sensitivity and non-destructive analysis is ideally suited for the measuring of specific elements in ambient particulate matter. Meanwhile, in soil analysis, XRF's ability to identify a wide range of elements at dynamic concentrations makes it suited for the analysis of geological samples.

AIR ANALYSIS

XRF can easily analyze F to U (fluorine to americium) in solids, liquids, powders and depositions, while high-powered instruments can measure below F.

9 F 18.998403163 Fluorine → 95 Am 243 Americium

Some instruments, like the Thermo Scientific ARL QUANT'X EDXRF spectrometer, can perform analysis in 4 minutes or less. Typical runs include the analysis of 40 elements.

Energy dispersive XRF requires little to no sample prep, making it the most popular method for analysis of particulate matter collected on air filters.

Features such as elemental mapping analysis can enhance the capabilities of an XRF system by providing additional screening, contamination identification and inclusion analysis.

SOIL ANALYSIS

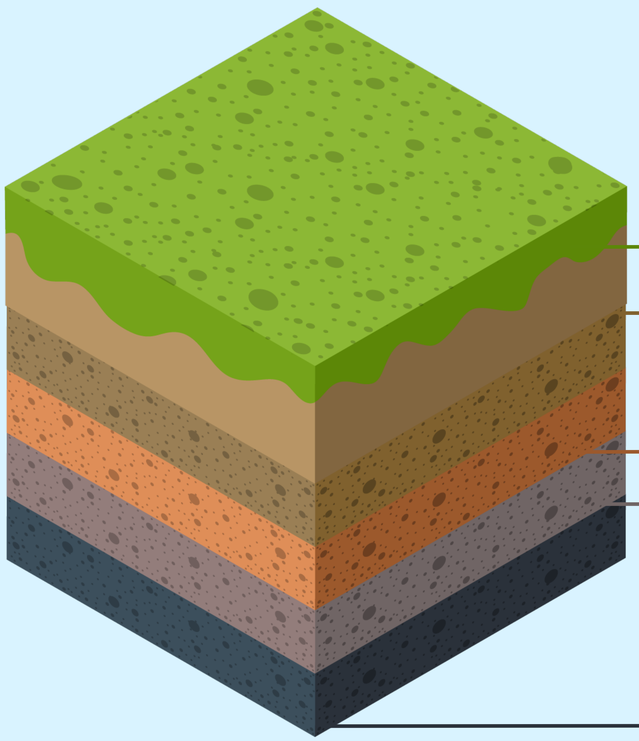
The ability to accurately analyze trace elements in geological samples depends upon an XRF's sensitivity, resolution and background/overlap correction function. Typical analysis of rocks and soil involves the identification of up to 35 elements. Let's take a look at the common elements analyzed by the Thermo Scientific ARL PERFORM'X spectrometer in varying rock samples.

Geological samples are formed by constant deposits of inorganic and organic materials over millions of years.

As layer of deposit accumulates upon layer, the weight creates pressure and increased temperature creating rocks or other formations.

Over time, these formations are eroded and carried away by rain, wind and snow and deposited in streams and lake beds.

Analysis of these materials is of importance as it gives not only indications of the mineral bodies present, but also environmental contaminates.



Grass/soil

Limestone

6 C 12.011 Carbon; 8 O 15.999 Oxygen; 20 Ca 40.078 Calcium

Shale

14 Si 28.085 Silicon; 13 Al 26.9815385 Aluminum; 22 Ti 47.867 Titanium; 40 Zr 91.224 Zirconium; 31 Ga 69.723 Gallium

Sandstone

8 O 15.999 Oxygen; 14 Si 28.085 Silicon; 11 Na 22.98976928 Sodium; 19 K 39.0983 Potassium; 56 Ba 137.327 Barium

Igneous

12 Mg 24.305 Magnesium; 26 Fe 55.845 Iron; 8 O 15.999 Oxygen; 15 P 30.973761998 Phosphorus

- Alkali Metal
- Alkaline Earth
- Transition Metal
- Basic Metal
- Semimetal
- Nonmetal
- Halogen
- Noble Gas
- Lanthanide
- Actinide

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