SciAps

XRF X-500 Series

Limits of Detection for Geochemistry

This table provides estimated detection limits for an interference-free silicon dioxide sample matrix based on three sigma, 99.7% confidence level and 120-second beam times. Limits of detection may be higher depending on the concentration of specific interfering elements and or overall soil matrix density. Some common interferences are presented on reverse.

XRF Test Stand

- Interlocked lid for your protection.
- Super stable base to keep your samples positioned correctly and safe.
- Integrated fans to cool the instrument even at the most extremes.

Designed for reliability, durability and safety.

X-500 Series

Element	Interference-free SiO2
P	160
S	20
Cl	27
K	21
Ca	8
Ti	3
V	1
Cr	2
Mn[1]	17
Fe	14
Co[2]	9
Ni	5
Cu	3
Zn	2
As	1
Se	1
Rb	1
Sr	1
Y	1
Zr	1
Nb	1
Mo	1
Ag	2
Cd	3
Sn	7
Sb	9
Te	5
Ba	27
La	37
Ce	45
Pr	183
Nd	225
Au	1
Hg	1
Tl	2
Pb	1
Bi	1

1. Moving Mn to Beam 3 will improve LOD
2. Cobalt LOD is strongly dependent on iron concentration

Lead, arsenic: Lead produces a strong interference for arsenic measurements, therefore the arsenic LOD will be elevated for high lead concentrations (more than 1,000 ppm of lead typically). SciAps XRF automatically subtracts the lead interference. The subtraction increases the statistical error of the arsenic measurement, and thus elevates the arsenic LOD. This is true of every XRF analyzer.

Titanium, vanadium, barium: Barium produces L-shell emissions that overlap with Ti and V. Therefore samples with elevated Ba concentrations (> 500 ppm typically) may produce false detects on Ti and V and also elevated LOD for these elements.

Iron, cobalt: The cobalt LOD will be higher in real-world samples due to a strong Fe interference. Most real-world soil samples contain 2-5% Fe or more.

Gold analysis: Gold naturally forms microscopic "nuggets" and is not homogenous. Gold has several interferences, most notably As, Zn, W and Se. These elements, if present, will elevate the LOD for Au and may produce false positives. SciAps offers two options for gold exploration. We offer a pathfinder suite of elements fully calibrated. Also, the Z-300 handheld LIBS analyzer uses a 50 um laser beam, with internal sample viewing camera. Users may analyze ONLY the gold "lump" in the material in this case.