



Application Note

Analysis of Trace Metals in Fluids and Solids by ICP-OES

Some applications for trace metal analysis

Often it is required to know the amount of trace elements in solids or solutions. Some applications for trace metals measurements are:

- Material composition testing (e.g. in ores, concentrates, metals, catalyst and other precision metal bearing metals);
- Environmental testing (e.g. measuring of heavy metals contaminants in water and soils);
- Toxicity testing in food and beverages;
- Forensic research (trace elements as "fingerprints");
- Trace metals in petroleum (e.g. measurement of mercury and arsenic contaminations);
- Determination of chemical specification of solid of fluid;
- Wear testing (e.g. by analysis of trace elements in motor oil).

ICP-OES

Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES) is one of the most common techniques for trace metal elemental analyses. It has low detection limits (ppm's), multi-element capabilities and a very high specificity. It is able to measure liquid samples. However, also any solid sample that can be dissolved or digested into an aqueous or organic solution can be analyzed by means of ICP-OES, e.g. trace elements in metals or soils can be measured by dissolving them in an acid solution.

Table 1. Measured trace elements in and aqueous solution by ICP-OES

Element	Concentration (µg/l)	Element	Concentration (µg/l)
Ag	0.8	K	1.0
Al	3.0	Li	0.01
B	2.0	Mg	0.2
Ba	0.5	Mn	0.1
Bi	4.0	Na	0.4
Ca	2.0	Ni	1.5
Cd	0.2	P	1.4
Co	0.3	Pb	2.2
Cr	0.4	S	3.2
Cu	0.5	Si	1.7
Fe	0.6	Sr	0.02
Ga	1.0	Ti	0.9
In	2.0	Zn	0.4



*The equipment for the measurement of trace metals elements:
The Optima 5300 DV ICP-OES*



Contact

T: +31 (0)40 75 161 75
 F: +31 (0)40 74 400 25
 M: +31 (0)6 155 744 98
 E: info@matinspired.nl
 I: www.matinspired.nl

Visiting address

TU/e Science Park
 Catalyst 1.21
 De Lismortel 31
 5612 AR Eindhoven
 The Netherlands

Postal address

MATinspired
 P.O. Box 80
 5600 AB Eindhoven
 The Netherlands