



## ALS Method ME-MS23™



### Chemistry of Mineral Systems

Drill core lithochemistry is now defining subtle but extremely diagnostic element associations and haloes associated with ore systems at depth. The challenge is to identify their fingerprints at surface. Ionic Leach™ is designed to achieve this.

### Extracting More From Samples

Increasing restrictions on exploration access has re-focused attention onto surface geochemical samples, which are arguably the most cost effective samples in exploration. Likewise, the cost of drill campaigns and the need for deeper holes demand improved hole targeting to increase the success rate. This then allows drilling dollars to be spent on drill outs earlier in the exploration, discovery and development cycle.

The need to extract more information from individual soil, stream or organic-rich (e.g. bog, peat) samples, has driven continued development of partial extraction geochemistry. Nano particle science and innovation in analytical instrumentation has complimented research work on mechanisms of ion release, transport and accumulation at surface, resulting in improved analytical methods.

### Ionic Leach™ Capability

Ionic Leach™ is specifically designed to detect subtle but diagnostic element responses at surface that can characterise large mineral systems near surface and at depth. The element suite incorporates both commodity elements and key pathfinders from a single analysis that are diagnostic of precious and base metal, uranium, REE's, PGE, diamond and Sn, Ta, Li systems.

# Ionic Leach™

An advancing technology, extracting maximum value from exploration soil, steam and organic-rich sediment samples.

**Superior extraction technology and ultra sensitive ICP-MS now delivers sub-ppb (below crustal abundance) detection limits for critical ore and pathfinder elements — allowing for better drill targeting and identification of mineral systems in complex settings.**

The method also routinely delivers responses for I and Br, pathfinders not detected by conventional soil analyses. The ability to reliably report these and other pathfinders enhances the techniques capability to identify metal zonation within, and haloes surrounding mineral systems. Geological signatures and alteration zonation can often be defined.

### Ionic Geochemistry

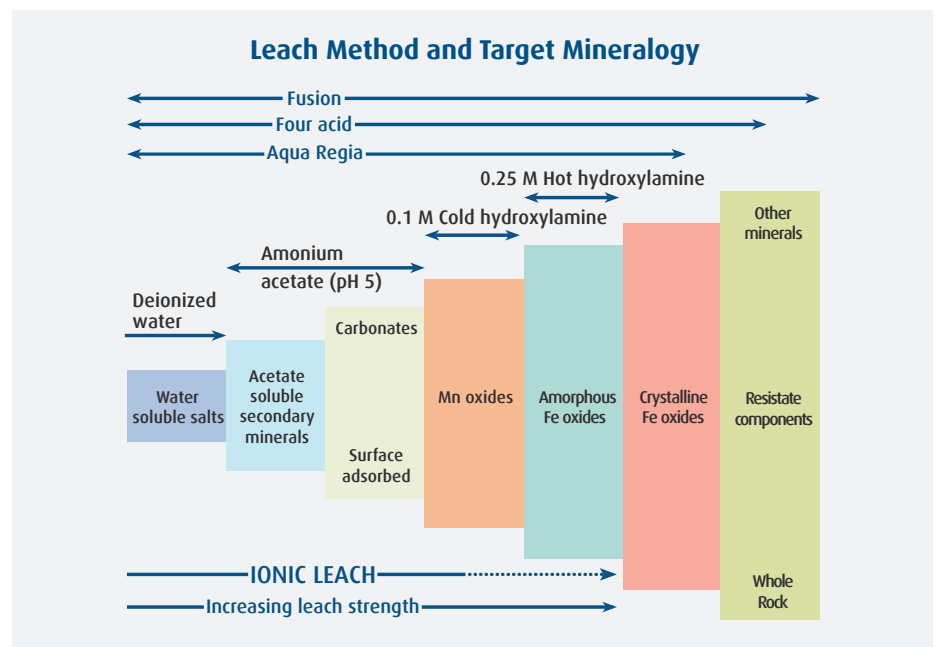
A growing body of research confirms that ionic element species are mobile. This allows elements released at depth to be mobilised to the surface where these loosely bound ions can be measured.

The mobility of ions is strongly controlled by the pH conditions present in the soil. Therefore, a good understanding of the soil pH variation, both with depth and across the sampling area, is recommended

for understanding the mobility of ions in a program.

### Advantages

- Low detection limits allowing characterisation of background for greater confidence in subtle anomalies.
- Multi-species ionic fingerprints can define and rank drill targets reducing wasted drill meters.
- Define targets in complex mineral settings, new mineral systems and regional corridors.
- Applicable in a wide range of landscapes, regolith settings and climatic conditions.
- Sampling is fast and efficient with low impact culturally and environmentally.
- Cost-effective field exploration where access is restricted for ground disturbing activities.



# Ionic Leach™ — Minimal processing and ultra low detection limits revolutionise partial extraction geochemistry for surface samples.



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## Ionic Leach™ Background

This innovative partial extraction technique for surface samples relies on complexing agents to selectively extract and hold ionic species from soil, stream and organic rich sediment samples in the leachant solution.

Samples are extracted as collected in isolated, purpose built facilities using equipment and protocols that eliminate contamination or loss in samples.

The leachant solution is introduced directly to the ICP-MS instrument. Using advanced sample introduction technology the ultra low sub-ppb detection limits routinely achieve 'natural background' levels thereby enhancing 'signal to noise' ratios. This helps identify often subtle, but significant responses from mineralisation, geology and alteration that can be diagnostic of numerous mineral systems.

Ionic Leach™ offers a package of 61 elements under code ME-MS23™ and Pb isotopes under code MS23-PbIS™.

## Ionic Leach™ Method

A 50g sample is used with no pre-treatment: samples are collected directly from the field bags. The lack of drying and sieving significantly reduces the possibility of contamination and processing occurs in a dedicated ionic preparation laboratory. The sample to reagent ratio is 1:1 thereby eliminating

dilution prior to analysis. This allows very low detection limits to be achieved.

## Sampling

The following list summarise the sample packaging protocols specific for ionic leach:

- 120 g of sample is collected and placed in a 'snap seal' or 'ziplock' plastic bag with the sample number written in permanent marker on the bag.
- The bag is folded over, removing most of the air and sealed. Then the bag is placed in another plastic bag, again removing as much air prior to sealing - double bag the sample.
- With dry soils a plastic sieve between 2-5 mm can be used to collect the sample. In wet conditions, pick out larger stones and place residual material directly in the bag.
- Remove jewelry and only use plastic implements, shovels and picks. Picks should be cleaned of any paint or coatings.
- ALS always recommends an orientation survey to assess the advantages of Ionic Leach™ for any sampling program in specific exploration areas, particularly where sampling may be difficult.

## GEOCHEMISTRY CLIENT SERVICES

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ME-MS23™ Analytes and detection limits (ppb)													
Ag	0.1	Co	0.3	Ge	0.1	Mn	0.01 ppm	Re	0.01	Th	0.02	Zr	0.1
As	0.5	Cr	1	Hf	0.05	Mo	0.5	Sb	0.5	Ti	5	<sup>204</sup> Pb	0.01
Au	0.02	Cs	0.1	Hg	0.1	Nb	0.1	Sc	1	Tl	0.05	<sup>206</sup> Pb	0.01
Ba	10	Cu	1	Ho	0.1	Nd	0.1	Se	2	Tm	0.1	<sup>207</sup> Pb	0.01
Be	0.2	Dy	0.1	I	0.01 ppm	Ni	1	Sm	0.1	U	0.05	<sup>208</sup> Pb	0.02
Bi	0.3	Er	0.1	In	0.1	Pb	0.1	Sn	0.2	V	0.2		
Br	0.05 ppm	Eu	0.1	La	0.1	Pd	0.05	Sr	1	W	0.1		
Ca	0.2 ppm	Fe	0.1 ppm	Li	0.2	Pr	0.1	Ta	0.05	Y	0.1		
Cd	0.2	Ga	0.5	Lu	0.1	Pt	0.1	Tb	0.1	Yb	0.1		
Ce	0.1	Gd	0.1	Mg	0.01 ppm	Rb	0.1	Te	0.5	Zn	10		

**Note:** Lead Isotopes not included in standard package. Request MS23-PbIS™ add on to include isotopes.

ALS provides a wide range of specialised testing services covering all stages of your project's life cycle.

Please visit [alsglobal.com](http://alsglobal.com) for more information on our services and specialties.