

## ION Chromatography

Ion Chromatography is a specialized, quantitative liquid chromatographic method for determining the specific ions in an aqueous solution. As with any other type of chromatography, the retention time is used for identification and the peak height or area is used for quantitative calculation.

The sample is injected into the instrument and pumped through an ion exchange column, which separates the ionic components. The individual ions continue through the system to a conductivity detector, which provides a signal to a computer where it is compared to calibration curves for quantification.

Liquid samples are analyzed after filtration and powder samples are analyzed using an extracted solution. Ion Chromatography is generally applicable to the quantitative determination of water soluble anions which have a pKa or pKb of less than 7. Only anions are determined by Ion Chromatography. Cations are determined as the element by ICP-MS.

Water, aqueous solutions, and aqueous based extractions of dry materials can be quickly analyzed. Extractions can be made from minerals, inorganic chemicals, refractories, ceramics, papers, pulps, and many other materials. On a routine basis, quantitative determination of the amounts of different ions can be performed cost effectively at part-per-million levels. Ion Chromatography also has the flexibility to facilitate method development.

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The following table lists results typically reported for a particular sample type. Other ions and other sample types can be analyzed upon request but method development is generally required.

Sample Type	Analytical Results
H2O	Standard Anions, Cations, CO <sub>3</sub> , pH, SR, TDS, Color.
PCC	Standard Anions, Cations, Carbonate, Citrate and pH
CaO	Standard Anions
Minerals	Standard Anions, Cations, pH, SR, and Citrate

The following table contains a list of available anions for analyses:

Group	Anions included
Standard Anions	F, Cl, NO <sub>2</sub> , SO <sub>4</sub> , NO <sub>3</sub> , PO <sub>4</sub> , Citrate
EP Cl and SO <sub>4</sub>	Total Cl and SO <sub>4</sub>

Sulfide	S <sup>2-</sup>
Chromate	CrO <sub>4</sub>
Total carboxylate	Acetate, Propionate, Formate, Pyruvate, Valerate
Poly-Phosphates	Ortho-PO <sub>4</sub> , PyroPO <sub>4</sub> , TriMetaPO <sub>4</sub> , TriPolyPO <sub>4</sub>
Standard Cations	Na, K, Mg, Ca, Si, Al, P (as the element by ICP)
Polyphosphonates	Please contact us for suitability of matrix

Detection limits and accuracy are based on sample type and size. Please consult for details.

Sample Size and Scheduling:

Sample Type	Sample Size, minimum	Turnaround
H <sub>2</sub> O	100 ml	2 weeks typical 2 days minimum
PCC and other slurries*	100 ml	2 weeks typical 2 days minimum
Dry powders	10 grams	2 weeks typical 2 days minimum

\*The % solids of the slurry is required to calculate the results based on the dry powder and should be provided with the request.

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