Method Summary

Determination of Dissolved and Total Metals in Aqueous Samples by ICP-MS

Scope and Range

This method details the preparation of samples for both unfiltered total analysis and filtered dissolved analysis. This method is accredited to MCerts Waters for Final, Crude and Trade effluents for the following components. Other aqueous matrix can be ran without accreditation.

Dissolved		**Total**	
Analyte	LOD	Analyte	LOD
Aluminum (Dissolved)	<6 µg/l	Aluminum (Total)	<11 µg/l
Arsenic (Dissolved)	<1.3 µg/l	Arsenic (Total)	<0.45 µg/l
Cadmium (Dissolved)	<0.09 µg/l	Cadmium (Total)	<0.07 µg/l
Chromium (Dissolved)	<0.65 µg/l	Chromium (Total)	<0.9 µg/l
Cobalt (Dissolved)	<4.5 µg/l	Cobalt (Total)	<1.4 µg/l
Copper (Dissolved)	<2.5 µg/l	Copper (Total)	<1.7 µg/l
Iron (Dissolved)	<26 µg/l	Iron (Total)	<23.5 µg/l
Lead (Dissolved)	<0.27 µg/l	Lead (Total)	<0.3 µg/l
Nickel (Dissolved)	<1.5 µg/l	Nickel (Total)	<1.8 µg/l
Phosphorous (Dissolved)	<78 µg/l	Phosphorous (Total)	<19 µg/l
Selenium (Dissolved)	<1.7 µg/l		
Zinc (Dissolved)	<4.7 µg/l	Zinc (Total)	<9.7 µg/l

References

Inorganic Ventures; Analytical Chemistry Periodic Table. https://www.inorganicventures.com/periodic-table

US EPA Method 6020A Inductively Coupled Mass Spectrometry, Rev1, 2007. Available on the internet.

ISO 17294 - 2 : 2004 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS) - Part 1: General Guidelines. (Controlled document 588)

ISO 17294 - 1 : 2006 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS) - Part 2: Determination of 62 elements. (Controlled document 589)

Principle

Preparation Dissolved:
Aqueous sample is filtered through 0.45um filter then acidified.

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Preparation Total:
Aqueous sample is acidified then heated to digest any suspended material or sediment. The digested sample is then analysed.

Analysis:
The samples are analysed using ICPMS using Kinetic Energy Discrimination to remove most polyatomic interferences for appropriate elements.

Interferences

Kinetic Energy Discrimination is used to remove most polyatomic interferences for appropriate elements. Saline waters or seawater can lead to suppression caused by sodium ions. These samples may be ran but typically further dilution is required to mitigate these effects.