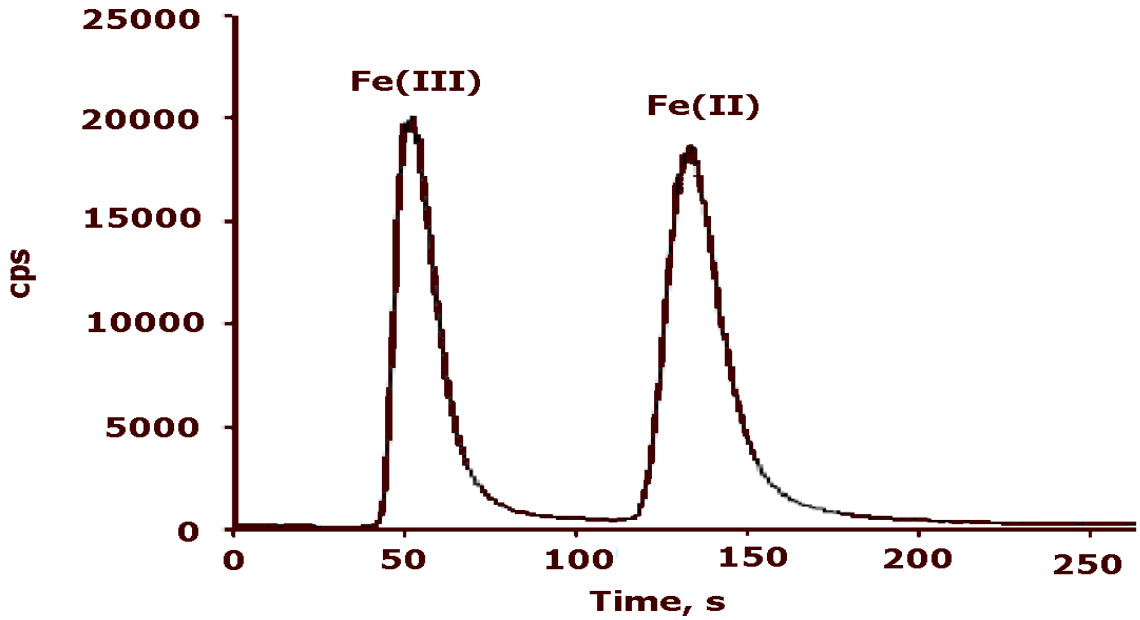
IC Application Note M–12

Speciation of Fe(II) and Fe(III) in soil applying IC-ICP/MS according to EPA SW-846 Method 6800



The speciation analysis of iron is crucial because the oxidation state determines the environmental behavior. Iron uptake by organisms as well as its transport and storage depend to a great extent on its oxidation state. Here, the two species are separated on a Metrosep A Supp 10 S-Guard/4.0 column. For detection, the IC-ICP/MS with speciated isotope dilution methodology is applied.

Results

	Fe(III) [µg/kg]	Fe(II) [µg/kg]
Standard solution	250	250

Metrohm

Sample

Standard

Sample preparation

Filtration (0.45 µm)

Columns

Metrosep A Supp 10 S-Guard/4.0	6.1020.510

IC Solutions

Eluent	4.0 mmol/L dipolinic acid 20.0 mmol/L ammonium nitrate, pH = 4.3

Parameters

Flow rate	0.8 mL/min
Injection volume (MiPT)	100 µL
P_{max}	25 MPa
Recording time	5 min

Parameters ICP/MS

RF power	1550 W
Plasma gas flow rate	15 L/min
Carrier gas flow rate	0.95 L/min
Makeup gas flow rate	0.15 L/min
Collision gas (He) flow rate	6.0 L/min
Sampling depth	8.0 mm
Spray chamber temperature	2 °C
Tuning solution	1 µg/L Li, Co, Y, Ce Tl in 2% HNO_3 solution
Acquisition mode	Spectrum and time resolved analysis
Monitoring mass Fe	56 amu

Analysis

ICP/MS detection

Instrumentation

940 Professional IC Vario ONE	2.940.1100
ICP-MS Agilent 7700	
858 Professional Sample Processor	2.858.0020
Remote box	6.2148.010
Remote cable Professional IC - MS-Detector (Agilent)	6.2141.380