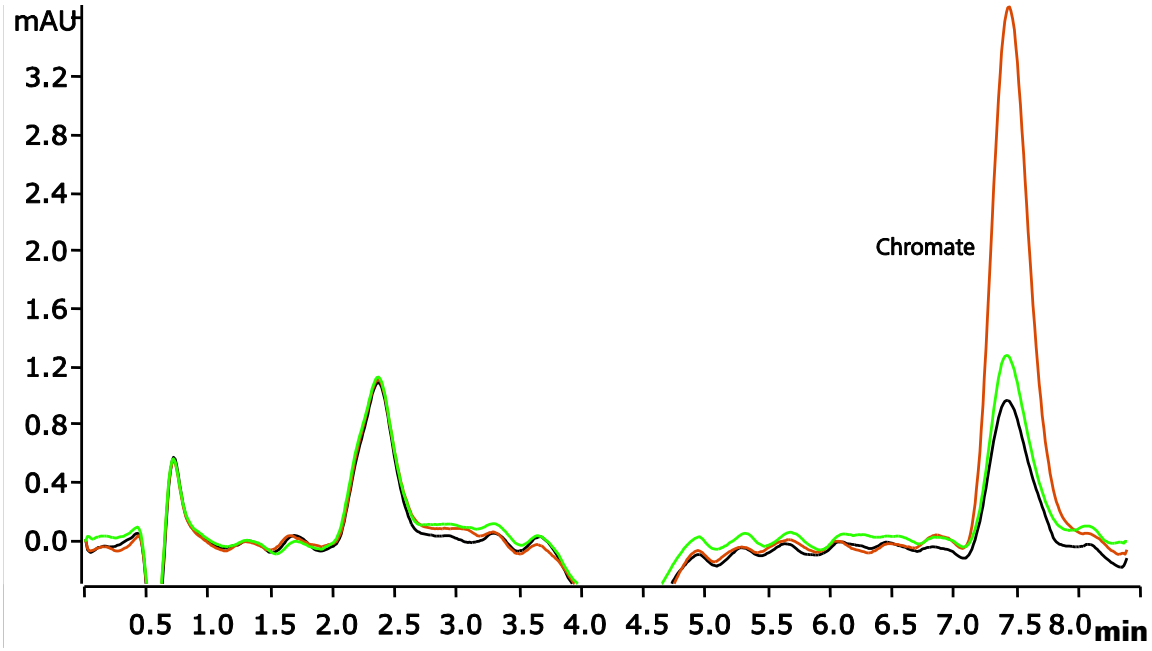
IC Application Note U–57

Chromate in drinking water by ion chromatography with PCR and UV/VIS detection according to EPA Method 218.7



Hexavalent chromium (chromate) is known to be cancerogenic if inhaled and suspected to be cancerogenic if ingested. EPA Method 218.7 allows to determine chromate in drinking water down to the sub-µg/L range (method detection limit, MDL = 15 ng/L). Post-column reaction with 1,5-diphenylcarbazide and subsequent visible detection at 530 nm is applied.

Results

Chromate Cr(VI)	Concentration [µg/L]	RSD [%]	Recovery [%]
Drinking water	0.33	0.71	
Spike 1 (0.08 µg/L)	0.41	0.41	99.9
Spike 2 (0.8 µg/L)	1.13	0.23	99.8

Metrohm

Method description

Sample

Drinking water

Sample preparation

pH adjustment by adding 1 mL of adjustment buffer per 100 mL sample.

Column

Metrosep A Supp 5 - 150/4.0	6.1006.520
Metrosep A Supp 4/5 Guard/4.0	6.1006.500

Solutions

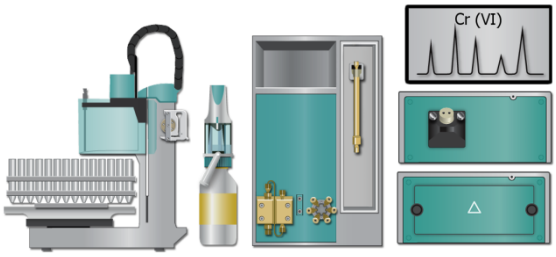
Eluent	12.8 mmol/L sodium carbonate 4.0 mmol/L sodium hydrogen carbonate 2.5 g/L ammonium sulfate
Post-column reagent	2.0 mmol/L 1,5-diphenyl-carbazide
Adjustment buffer	33 g/L ammonium sulfate $(NH_4)_2SO_4$ 65 mL/L ammonium hydroxide (25%)

Analysis

UV/VIS after PCR

Parameters

Flow rate	0.7 mL/min
Flow rate PCR	0.2 mL/min
Injection volume	1.325 mL
P_{max}	15.0 MPa
Column temperature	45 °C
Reactor temperature	45 °C
Detection	530 nm
Reference	650 nm



Instrumentation

881 Compact IC pro	2.881.0010
858 Professional Sample Processor – Pump	2.858.0020
886 Professional Reactor	2.886.0110
887 Professional UV/VIS detector	2.887.0010
800 Dosino	2.800.0020
Dosing Unit 5 mL	6.3032.150

Instrument setup