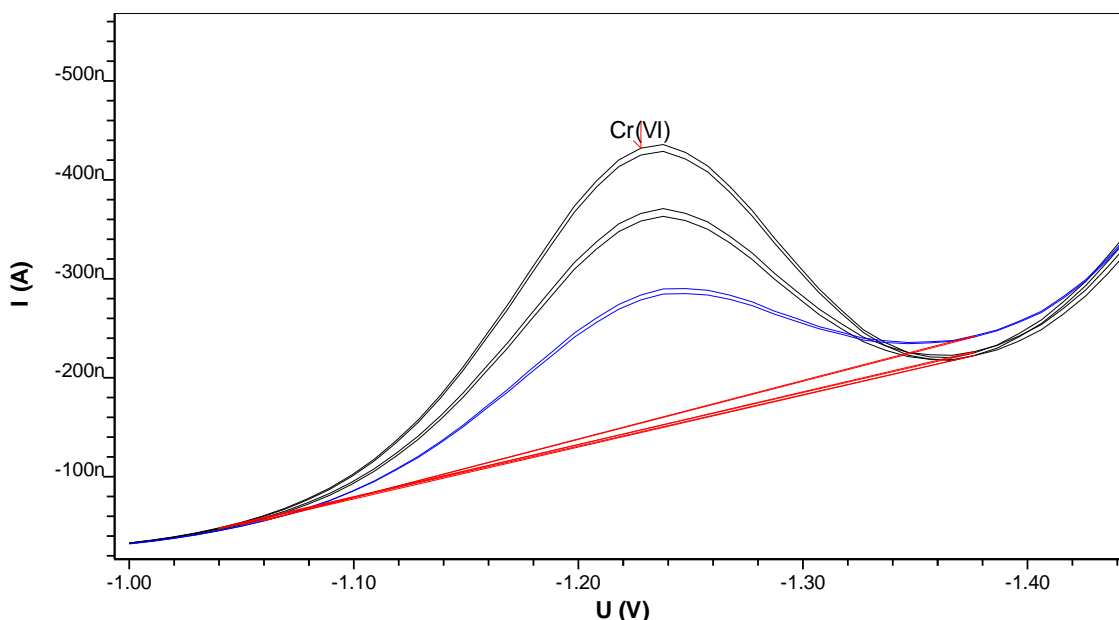


Total chromium in waste water after UV digestion (DTPA method)



Total chromium can be determined in waste water samples. UV digestion is necessary to remove interfering organic matter in advance. Complete oxidation of Cr(III) to Cr(VI) can be achieved by an additional UV irradiation step at pH > 4.

Results

Cr(total) in waste water

2.0 µg/L

Method description

Sample

Waste water

Instruments

797 VA Computrace & 909 UV Digester



Sample preparation

For UV digestion 10 mL waste water sample, 10 μL HCl, and 50 μL H_2O_2 are pipetted into the 12 mL quartz sample vessels. The sample holder with the 12 quartz sample vessels is placed in the 909 UV Digester. The samples are irradiated at 90 °C for 60 min. To oxidize Cr(III) to Cr(VI) the pH of the solution is adjusted to 4-6 with NaOH. The samples are irradiated at 90 °C for 20 min.

Parameters 909 UV Digester

Temperature	90 °C
Irradiation time (UV digestion)	60 min
Irradiation time (Oxidation)	20 min

Electrodes

Multi-Mode Electrode pro	6.1246.120
Silanized capillaries	6.1226.050
Ag/AgCl/KCl (3 mol/L) reference electrode. Bridge electrolyte c(KCl) = 3 mol/L	6.0728.020 6.1245.010
Separate Pt rod electrode	6.0343.000

Reagents

HCl	Hydrochloric acid, for trace analysis*, w(HCl) = 30%
H_2O_2	Hydrogen peroxide solution, for trace analysis*, w(H_2O_2) = 30%

Sodium acetate	Sodium acetate anhydrous, for trace analysis*, 99.99%
DTPA	Diethylenetriaminepentaacetic acid, $\geq 99\%$
NaNO_3	Sodium nitrate, 99%
NaOH	Sodium hydroxide solution, for trace analysis*, w(NaOH) = 30%

*e.g., Merck suprapur®, Sigma-Aldrich TraceSelect® or equivalent.

Solutions

Supporting electrolyte	c(Sodium acetate) = 0.2 mol/L c(DTPA) = 0.05 mol/L c(NaNO_3) = 2.5 mol/L
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Analysis

Measuring solution	10.06 mL digested and oxidized sample solution + 2.5 mL supporting electrolyte → pH adjusted to 6.2 ± 0.1 with NaOH
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Parameters 797 VA Computrace

Working electrode	HMDE
Drop size	7
Stirrer speed	2000 rpm
Mode	DP
Purge time	300 s
Equilibration time	10 s
Start potential	-1.0 V
End potential	-1.5 V
Pulse amplitude	0.05 V
Pulse time	0.04 s
Voltage step	0.01 V
Voltage step time	0.3 s
Sweep rate	0.0331 V/s
Peak potential Cr(VI)	-1.23 V

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