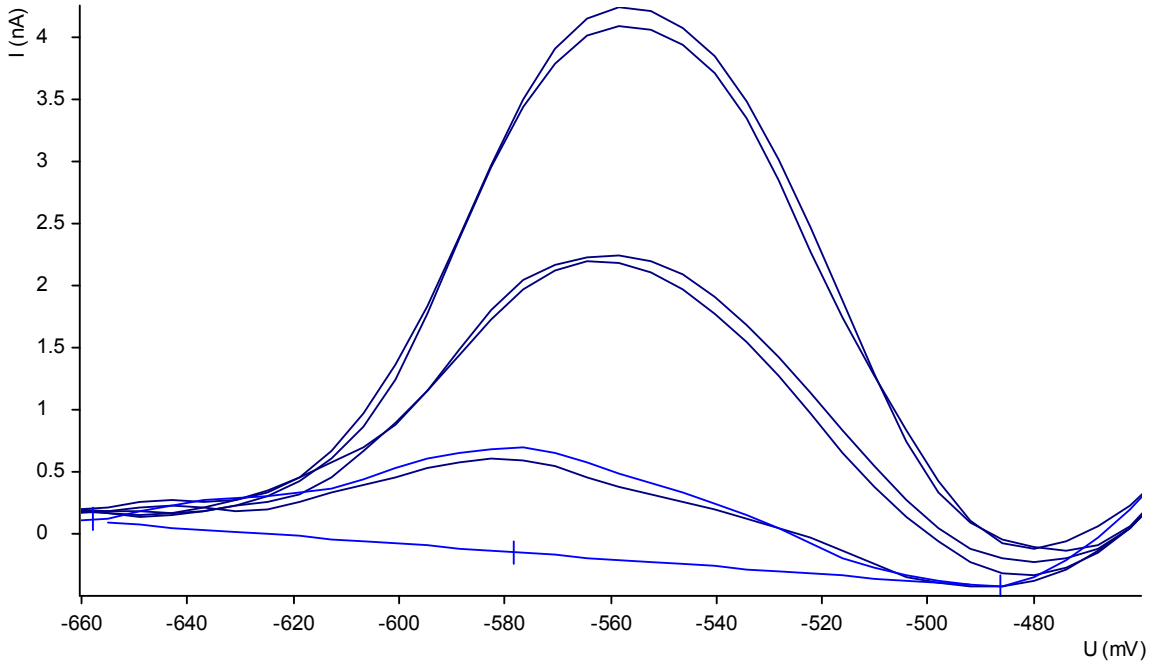
VA Application Note V–107

Tin in waste water after UV digestion



Tin can be determined in waste water by anodic stripping voltammetry (ASV) in oxalate buffer after addition of methylene blue. Samples with organic substances have to undergo UV digestion before analysis. Samples with higher concentrations of metals can be diluted before digestion.

Results

Sn in waste water
4.0 µg/L

Metrohm

Method description

Sample

Waste water

Instruments

797 VA Computrace & 909 UV Digester

Sample preparation

1 mL waste water sample, 9 mL ultrapure water, 120 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 and irradiated at 90 °C for 60 min.

Parameters 909 UV Digester

Temperature	90 °C
Irradiation time	60 min

Electrodes

Multi-Mode Electrode pro Silanized capillaries	6.1246.120 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%
$(NH_4)_2(C_2O_4)$	Ammonium oxalate monohydrate, 99.5%
NH_4Cl	Ammonium chloride, for trace analysis*
Methylene blue	Methylene blue, 97%

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

Solutions

Electrolyte	Supporting electrolyte: c(ammonium oxalate) = 0.14 mol/L c(ammonium chloride) = 0.17 mol/L c(HCl) = 0.15 mol/L
Methylene blue solution	c(methylene blue) = 1 g/L

Analysis

Measuring solution	5 mL digested waste water + 5 mL supporting electrolyte + 50 µL methylene blue solution

Parameters 797 VA Computrace

Working electrode	HMDE
Stirrer speed	2000 rpm
Mode	DP
Purge time	300 s
Deposition potential	-0.8 V
Deposition time	90 s
Equilibration time	20 s
Start potential	-0.8 V
End potential	-0.3 V
Pulse amplitude	0.05 V
Voltage step	0.006 V
Voltage step time	0.4 s
Sweep rate	0.015 V/s
Peak potential Sn	-0.56 V