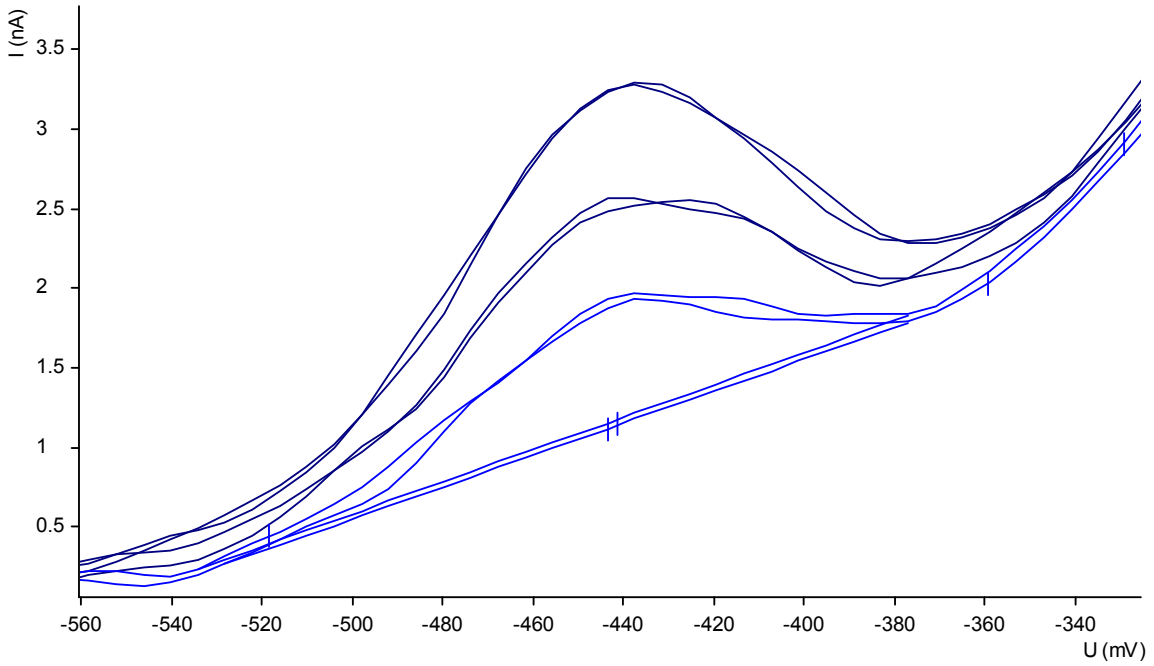
VA Application Note V–108

Thallium in waste water after UV digestion



Thallium in waste water is determined in acetate buffer in presence of EDTA by anodic stripping voltammetry (ASV). Samples with organic substances have to undergo UV digestion before analysis.

Results

Tl in waste water
7.8 µg/L

Metrohm

Method description

Sample

Waste water

Instruments

797 VA Computrace & 909 UV Digester

Sample preparation

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 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%
KCl	Potassium chloride, for trace analysis*
$Na(CH_3CO_2)$	Sodium acetate, for trace analysis*
EDTA	Ethylenediaminetetraacetic acid disodium salt dihydrate, 99%

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

Solutions

Electrolyte	Acetate buffer c(KCl) = 1.5 mol/L c(sodium acetate) = 0.5 mol/L
EDTA solution	c(EDTA) = 0.1 mol/L

Analysis

Measuring solution	10 mL H_2O + 2 mL acetate buffer + 2 mL digested sample + 100 µL EDTA solution → pH adjusted to 4.6

Parameters 797 VA Computrace

Working electrode	HMDE
Stirrer speed	2000 rpm
Mode	DP
Purge time	300 s
Deposition potential	-0.8 V
Deposition time	160 s
Equilibration time	20 s
Start potential	-0.8 V
End potential	-0.2 V
Pulse amplitude	0.05 V
Voltage step	0.006 V
Voltage step time	0.3 s
Sweep rate	0.02 V/s
Peak potential Tl	-0.44 V