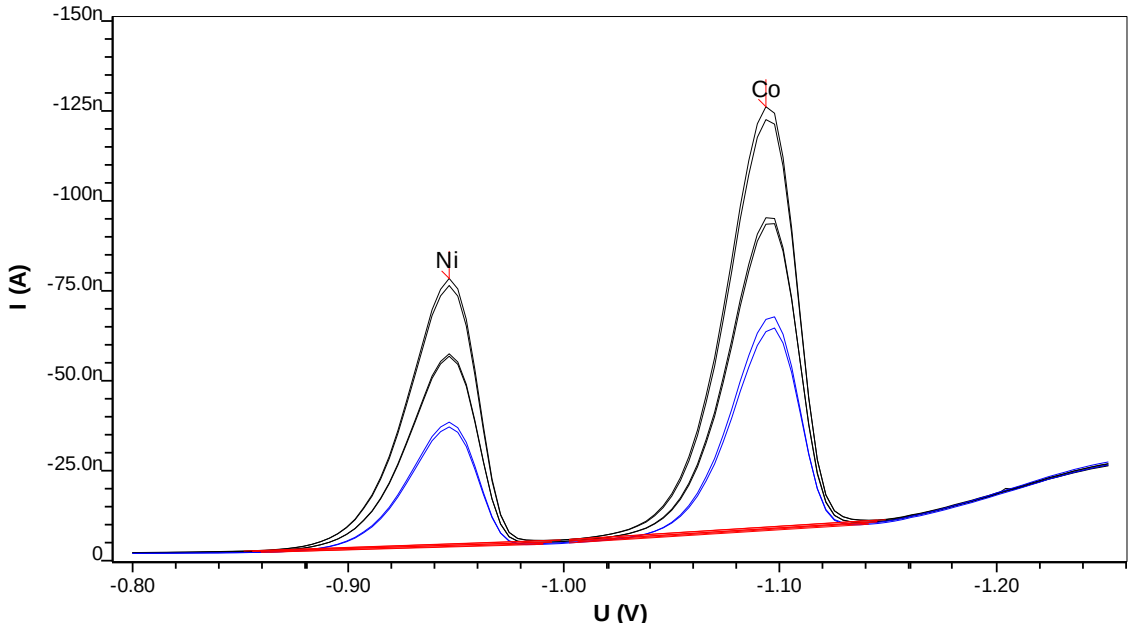
VA Application Note V-106

Nickel and cobalt in waste water after UV digestion



The determination of nickel and cobalt in waste water samples can be carried out using adsorptive stripping voltammetry after UV digestion of the sample according to DIN 38406 part 16.

Results

Ni	1.8 µg/L
Co	2.0 µg/L

Metrohm

Method description

Sample

Waste water

Instruments

797 VA Computrace & 909 UV Digester

Sample preparation

10 mL waste water sample, 10 µL and 100 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 90 min.

Parameters 909 UV Digester

Temperature	90 °C
Irradiation time	90 min

Electrodes

Multi-Mode Electrode pro Non-silanized capillaries	6.1246.120 6.1226.030
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_3	Ammonia solution, for trace analysis*, w(NH_3) = 25%
DMG	Dimethylglyoxime disodium salt octahydrate, 97%

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

Solutions

Supporting electrolyte	Ammonia buffer pH 9.8 c(HCl) = 1 mol/L c(NH_3) = 3 mol/L
Complexing agent	Dimethylglyoxime disodium salt octahydrate c(DMG) = 0.1 mol/L in water

Analysis

Measuring solution	10.11 mL digested sample solution + 1.0 mL supporting electrolyte + 0.1 mL complexing agent

Parameters 797 VA Computrace

Working electrode	HMDE
Stirrer speed	2000 rpm
Mode	DP
Purge time	300 s
Deposition potential	-0.7 V
Deposition time	30 s
Equilibration time	10 s
Start potential	-0.8 V
End potential	-1.25 V
Pulse amplitude	0.05 V
Pulse time	0.04 s
Voltage step	0.004 V
Voltage step time	0.3 s
Sweep rate	0.013 V/s
Peak potential Ni	-0.95 V
Peak potential Co	-1.1 V