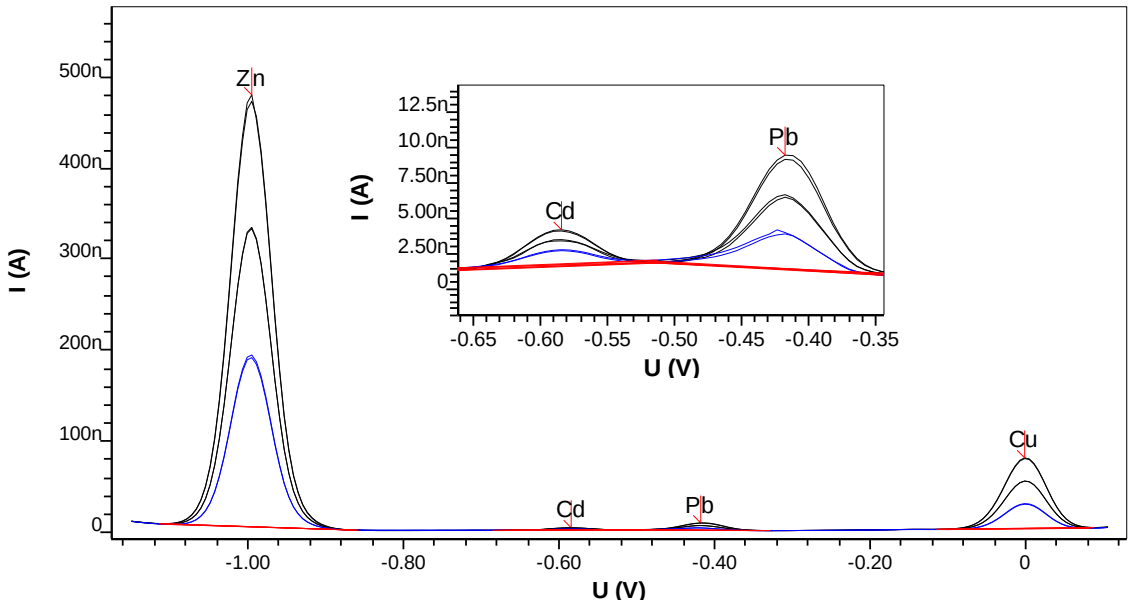
VA Application Note V–83

# Zinc, cadmium, lead, and copper in waste water after UV digestion




Zinc, cadmium, lead, and copper can be determined in waste water samples after UV digestion by anodic stripping voltammetry according to DIN 38406 part 16.

## Results

| | |
|---|---|
| Zn | 198 µg/L |
| Cd | 1.9 µg/L |
| Pb | 7.5 µg/L |
| Cu | 41.2 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 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 60 min.

### Parameters 909 UV Digester

| | |
|---|---|
| Temperature | 90 °C |
| Irradiation time | 60 min |

### Electrodes

| | |
|---|---|
| Multi-Mode Electrode pro<br>Silanized capillaries | 6.1246.120<br>6.1226.050 |
| Ag/AgCl/KCl (3 mol/L) reference electrode. Bridge electrolyte c(KCl) = 3 mol/L | 6.0728.020<br>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% |
| $CH_3COOH$ | Acetic acid, for trace analysis* |
| $NH_3$ | Ammonia solution, for trace analysis*, w($NH_3$) = 25% |

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

### Solutions

| | |
|---|---|
| Supporting electrolyte | Ammonium acetate buffer pH 4.6<br>c($CH_3COOH$) = 2 mol/L<br>c($NH_3$) = 1 mol/L |

### Analysis

| | |
|---|---|
| Measuring solution | 10.11 mL digested sample solution<br>+ 1 mL supporting electrolyte |

### Parameters 797 VA Computrace

| | |
|---|---|
| Working electrode | HMDE |
| Stirrer speed | 2000 rpm |
| Mode | DP |
| Purge time | 300 s |
| Deposition potential | -1.15 V |
| Deposition time | 90 s |
| Equilibration time | 10 s |
| Start potential | -1.15 V |
| End potential | 0.1 V |
| Pulse amplitude | 0.05 V |
| Pulse time | 0.04 s |
| Voltage step | 0.006 V |
| Voltage step time | 0.1 s |
| Sweep rate | 0.06 V/s |
| Peak potential Zn | -1.0 V |
| Peak potential Cd | -0.58 V |
| Peak potential Pb | -0.42 V |
| Peak potential Cu | 0 V |