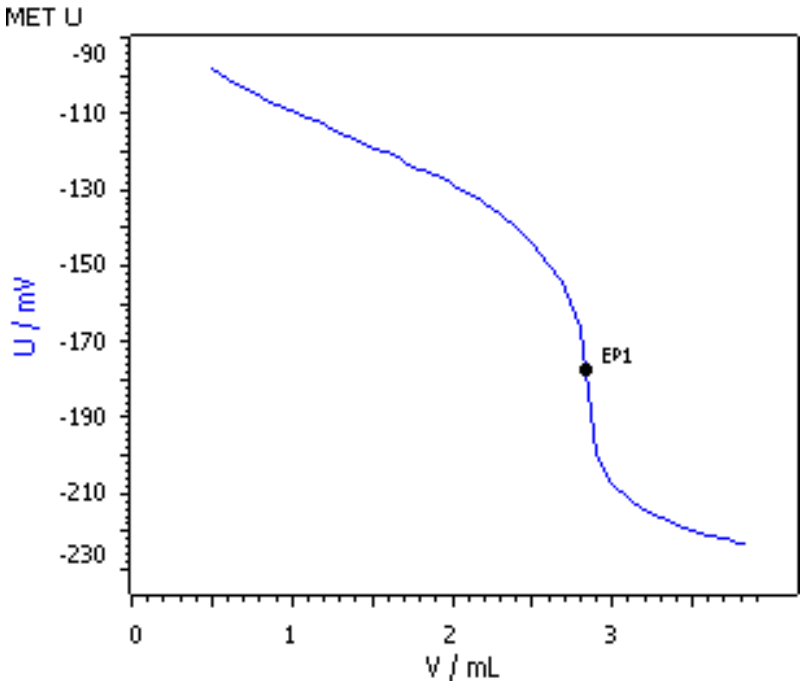
Titration Application Note T–128

# Automated determination of magnesium in aqueous solution using the Cu ISE




Magnesium can be analyzed using the Cu ISE. A small amount of Cu-EDTA complex thereby acts as indicator as the Cu ISE itself is not sensitive for magnesium.

Metrohm

# Method description

### Sample

Aqueous solution of magnesium

### Sample preparation

Strongly acidic sample solutions (e.g., from acid digestions) are preneutralized to pH = 4–5 with w($NH_3$) = 25%.

### Configuration

| | |
|---|---|
| 907 Titrando | 2.907.0010 |
| 815 Robotic USB Sample Processor XL | 2.815.0020 |
| 786 Swing head | 2.786.0040 |
| Swing arm | 6.1462.070 |
| Titration head | 6.1458.010 |
| Sample rack 28 x 200 mL | 6.2041.830 |
| 800 Dosino, 5 x | 2.800.0010 |
| 802 Stirrer | 2.802.0020 |
| 5 mL Dosing unit | 6.3032.150 |
| 10 mL Dosing unit, 2 x | 6.3032.210 |
| 50 mL Dosing unit | 6.3032.250 |
| Disposable PP sample beakers, 200 mL, 1000 pieces | 6.1459.310 |
| Cu ISE | 6.0502.140 |
| LL ISE Reference | 6.0750.100 |

### Solutions

| | |
|---|---|
| Titrant | c(EDTA) = 0.1 mol/L<br>If possible this solution should be bought from a supplier. |
| Buffer solution<br>pH = 10 | 54 g $NH_4Cl$ is weighed into a 1 L volumetric flask and dissolved in deionized water. 350 mL w($NH_3$) = 25% is added and the mixture made up to 1 L with deionized water. |
| Cu-EDTA | c($Cu(NH_4)_2EDTA$) = 0.1 mol/L<br>If possible this solution should be bought from a supplier. |

### Analysis

An appropriate amount of sample solution is pipetted into the titration vessel and diluted with 50 mL deion. $H_2O$. 0.5 mL Cu-EDTA and 5 mL buffer solution are added. After a pause of 30 s, the solution is titrated with c(EDTA) = 0.1 mol/L until after the equivalence point.

### Parameters

| | |
|---|---|
| Mode | MET U |
| Pause | 30 s |
| Stirring rate | 8 |
| Signal drift | 50 mV/min |
| Min. waiting time | 5 s |
| Max. waiting time | 26 s |
| Volume increment | 0.1 mL |
| EP criterion | 30 mV |
| EP recognition | greatest |

### Results

Mean results (n = 5)

| | |
|---|---|
| Mg content / (g/L) | 0.645 |
| s(rel) / % | 0.14 |

### Comments

The sample size should be chosen in such a way that the titrant volume needed for the titration lies between 10 and 90% of the buret volume.