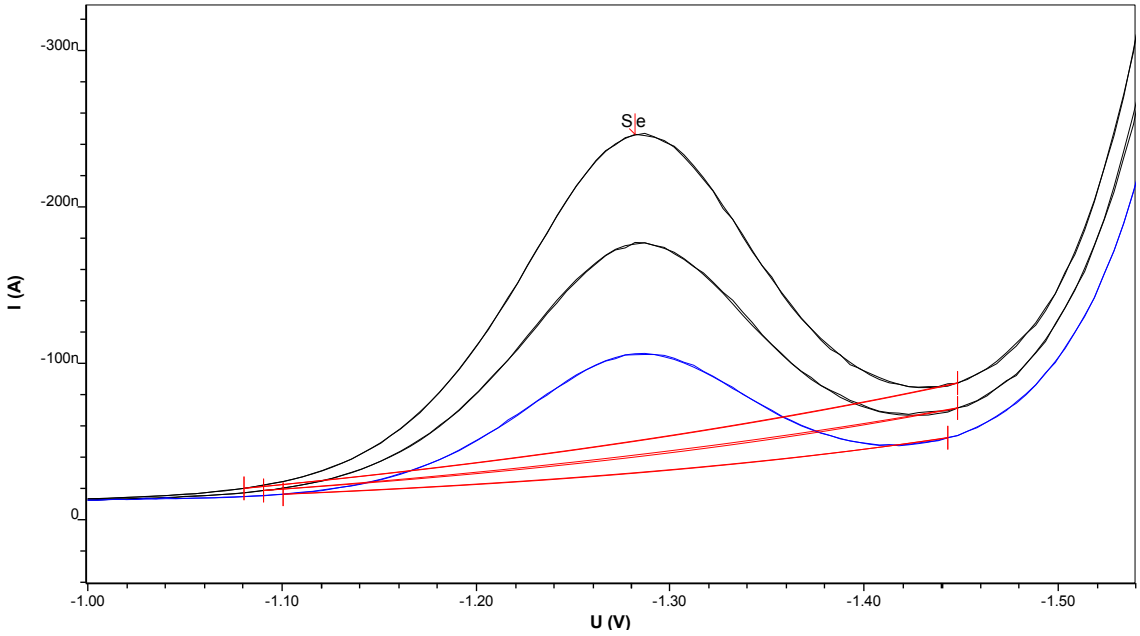
VA Application Note V-206

Determination of selenite in electrolyte solutions for production of copper indium gallium selenide (CIGS) solar cells



Selenite can be determined in electrolyte solutions used in production of copper indium gallium selenide solar cells – also called CIGS cells – for the electrodeposition of the CIGS absorber layer.

The determination of selenite is carried out by polarography after dilution of the sample in supporting electrolyte.

Results

Se in CIGS electrolyte solution
125 mg/L

Metrohm

Method description

Sample

Electrolyte solution containing sulfuric acid

Sample preparation

No sample preparation necessary.

Electrodes

Multi-Mode Electrode pro Non-silanized glass capillaries	6.1246.120 6.1226.030
Ag/AgCl/ KCl (3 mol/L) reference electrode. Bridge electrolyte KNO_3 sat.	6.0728.020 6.1245.010
Platinum rod electrode	6.0343.000

Reagents

CH_3COONH_4	Ammonium acetate, for analysis
Na_2 EDTA	Ethylenediaminetetraacetic acid disodium salt dihydrate, for analysis
Se standard stock solution	ß(Se(IV)) = 1 g/L, commercially available
Ultrapure water	Resistivity >18 MΩ·cm (25 °C), type I grade (ASTM D1193)

Solutions

Supporting electrolyte	c(ammonium acetate) = 1 mol/L c(Na_2 EDTA) = 0.01 mol/L
Se standard solution	ß(Se(IV)) = 100 mg/L

Analysis

Measuring solution	10 mL supporting electrolyte + 50 µL undiluted sample

Parameters

Working electrode	DME
Stirring speed	2000 min^{-1}
Mode	DP
Purge time	300 s
Equilibration time	5 s
Start potential	-1.0 V
End potential	-1.55 V
Pulse amplitude	0.05 V
Potential step	0.005 V
Potential step time	0.8 s
Sweep rate	0.006 V/s
Peak potential Se(IV)	-1.28 V