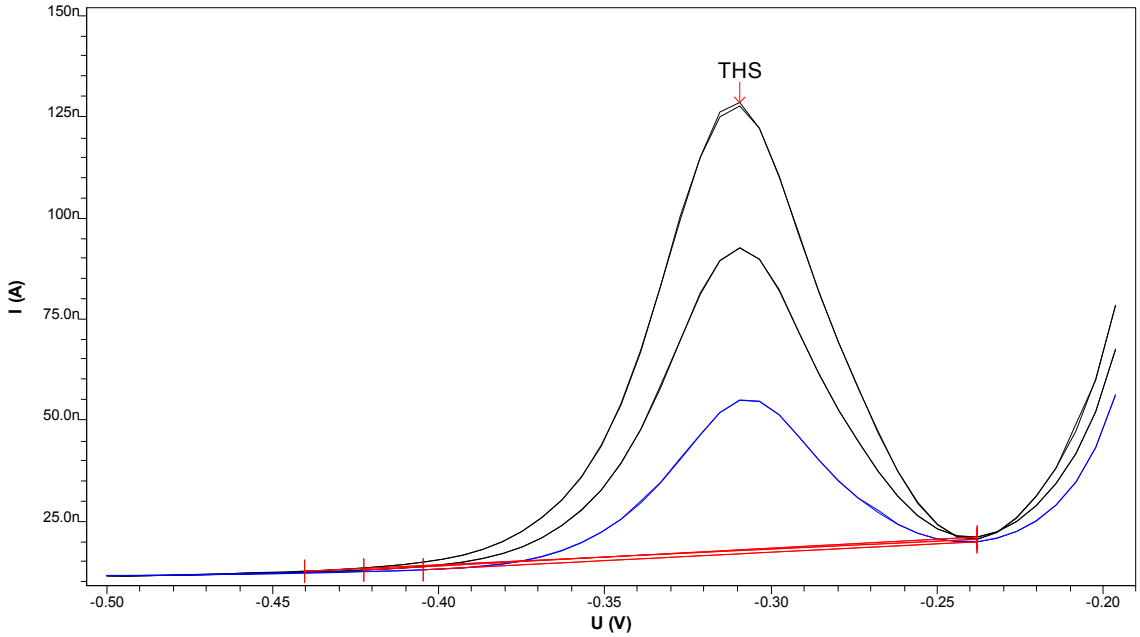
VA Application Note V-208

Thiourea in electrolytes for production of copper indium selenide (CIS) or copper indium gallium selenide (CIGS) solar cells



Thiourea can be determined in electrolyte solutions used in production of copper indium selenide solar cells – also called CIS cells – or copper indium gallium selenide solar cells – also called CIGS cells. The electrolyte solutions are used for chemical bath deposition (CBD) of a CdS layer on top of the CIS or CIGS absorber layer.

The determination of thiourea is carried out by polarography.

Results

Thiourea in electrolyte solution
26.1 mg/L

Metrohm

Method description

Sample

Electrolyte solution for chemical bath deposition (CBD)

Sample preparation

The sample is diluted 1:1000 with ultrapure water.

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

NaOH	Sodium hydroxide solution, w(NaOH) = 30%, for trace analysis*
Thiourea	Thiourea, CH_4N_2S, for analysis
Ultrapure water	Resistivity >18 MΩ·cm (25 °C), type I grade (ASTM D1193)

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

Solutions

Sodium hydroxide solution	w(NaOH) = 30%
Thiourea standard solution	ß(thiourea) = 1 g/L in ultrapure water

Analysis

Measuring solution	10 mL ultrapure water + 1 mL w(NaOH) = 30% + 100 µL diluted sample

Parameters

Working electrode	DME
Stirring speed	2000 min^{-1}
Mode	DP
Purge time	300 s
Equilibration time	5 s
Start potential	-0.5 V
End potential	-0.2 V
Pulse amplitude	0.05 V
Potential step	0.006 V
Potential step time	0.6 s
Sweep rate	0.01 V/s
Peak potential thiourea	-0.3 V