VA APPLICATION NOTE V-200

Determination of thiourea in copper electrorefining solutions

Precision meets simplicity with the Multi-Mode Electrode pro

In the copper electrorefining process, chemical additives such as thiourea are utilized to enhance electrolytic refining and regulate the grain size of copper deposits. Precise quantification of thiourea is crucial for ensuring the quality of the refined copper. This requires its direct analysis in copper concentrates that contain sulfuric acid and trace amounts of chloride. However, the presence of chloride can interfere with the analysis.

This Application Note introduces a voltammetric method for the accurate quantification of thiourea in copper electrolytes. The main advantage of this method lies in its ability to precisely determine thiourea levels even in the presence of high chloride concentrations within the sample matrix.

With precise control over thiourea levels, the copper refining process can be adjusted more precisely, leading to improvements in the consistency and quality of the refined copper.

This method offers a simple and precise solution for maintaining optimal levels of thiourea.

SAMPLE

Cu electrorefining electrolyte

EXPERIMENTAL

Add the sample and the electrolyte solution into the measuring vessel and degas it for 5 min. The interfering effect of chloride is mitigated through the addition of masking analyte. The determination is carried out using parameters listed in **Table 1**. Quantification is done with the 884 Professional VA manual for MME (**Figure 1**) using two standard additions with thiourea standard addition solutions.

Figure 1. 884 Professional VA manual for MME

Table 1. Parameters

Parameter	Setting
Mode	DME
Start potential	0.3 V
End potential	0.2 V
Sweep rate	2 mV/s
Peak potential Thiourea	0.26 V

ELECTRODES

- Multi-Mode Electrode pro

RESULTS

Figure 2 presents the result of the determination in an electrorefining solution containing 0.75 mg/L thiourea.

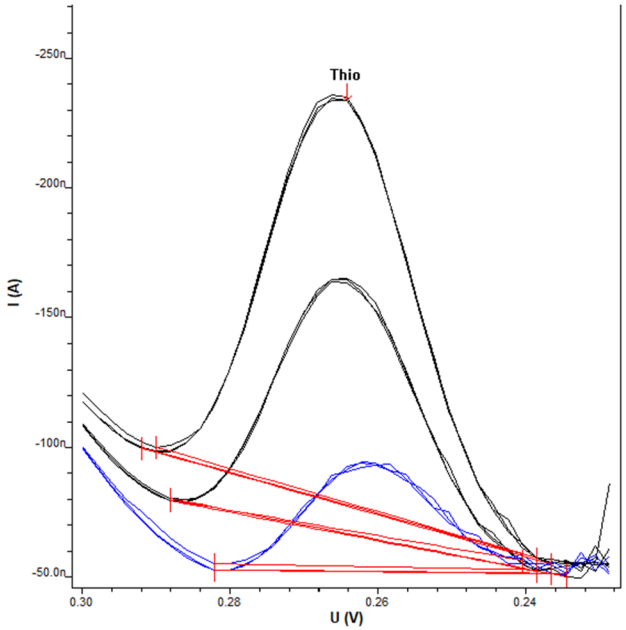

Figure 2. Determination of thiourea in an electrorefining electrolyte containing 0.75 mg/L thiourea

Table 2. Result

Sample	Thiourea in mg/L
Cu electrorefining electrolyte	0.71

Analytes:	**Sulfur – organic**
Matrix:	**Plating baths – copper**
Method:	**Voltammetry, Polarography**
Industry:	**Plating & galvanics**

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