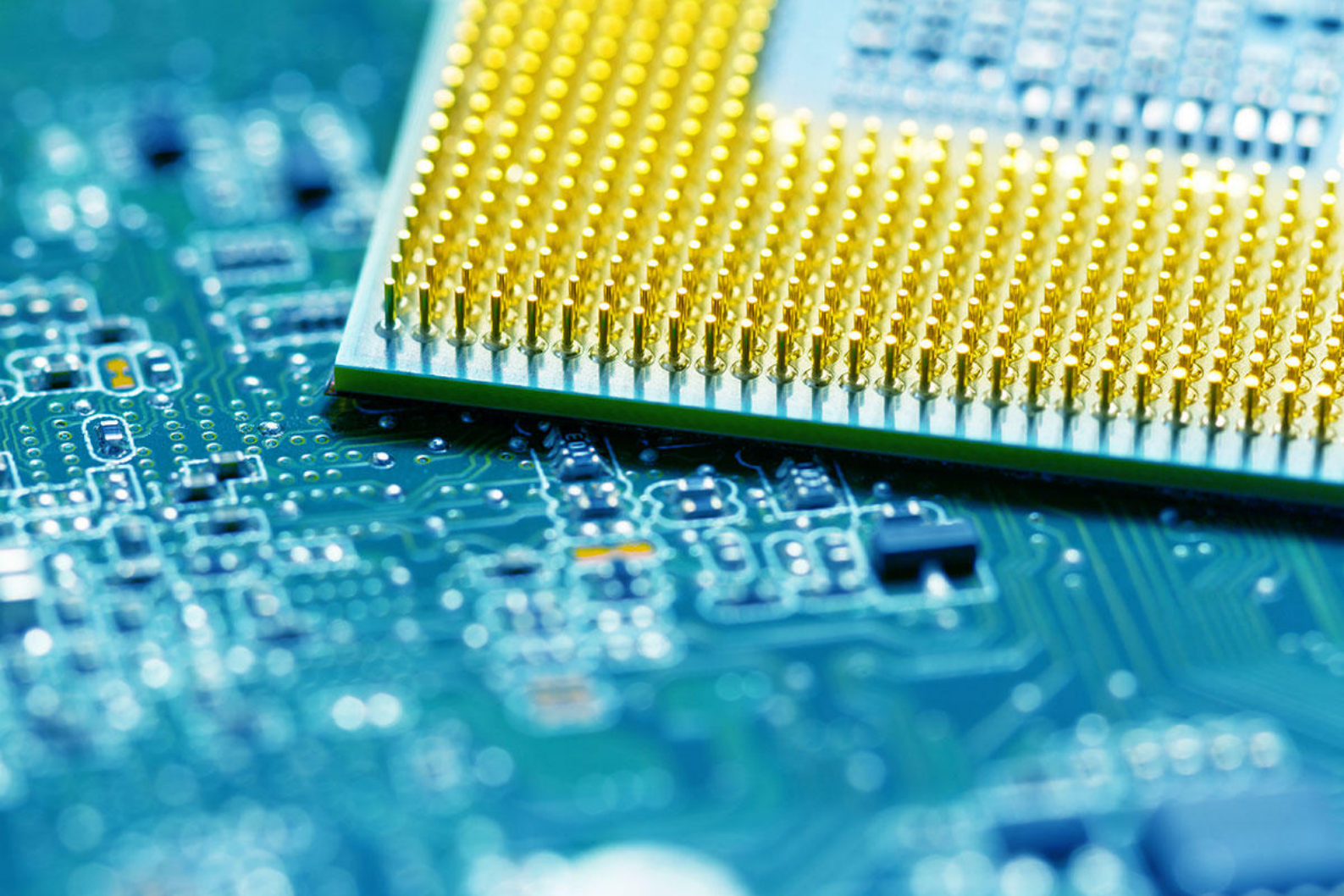




Application Note AN-V-199

Voltammetric determination of gold(I) in gold plating baths

Gold plating bath analysis with the Multi-Mode Electrode pro

In the metal plating industry, particularly during gold electroplating, the meticulous control and determination of gold(I) concentration in the gold plating bath is critical. This not only ensures a high quality and consistent thin layer of gold, but also plays a significant role in optimizing the efficiency and cost of gold plating.

The conversion of Au(I) to pure gold metal is relatively simple and efficient, using one unit of electricity per mole of gold deposited. However, when Au(III) forms and accumulates in the gold bath, it significantly lowers the current efficiency

because the reduction of Au(III) to gold metal requires three units per mole. A lower fraction of Au(I) leads to inefficient use of electricity and gold, making the process more costly and less sustainable.

Voltammetric analysis using the Multi-Mode Electrode pro emerges as a highly effective tool, offering a direct and straightforward method for the determination of gold(I) in both cyanide and sulfite gold plating baths without the need for time-consuming sample preparation.

SAMPLE

Gold cyanide bath Gold sulfite bath

EXPERIMENTAL

Add the electrolyte solution into the measuring vessel and degas it for 5 min. In the next step, add the gold plating bath sample. The determination is carried out using the parameters listed in **Table 1**. Quantification is done with the 884 Professional VA manual for MME (**Figure 1**) using two Au(I) standard solutions.



Figure 1. 884 Professional VA manual for MME

Table 1. Parameters

Parameter	Setting
Mode	DME
Start potential	-0.9 V
End potential	-1.75 V
Sweep rate	15 mV/s
Peak potential Au(I)	-1.45 V

ELECTRODES

- Multi-Mode Electrode pro

RESULTS

Figure 2 presents results of Au(I) determination in a gold sulfite plating bath.

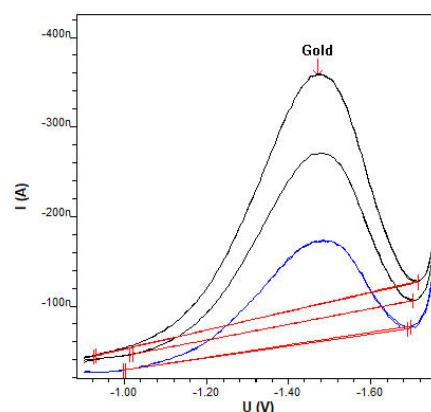


Figure 2. Determination of Au(I) in a gold sulfite plating bath, $\beta(\text{Au(I)}) = 12.1 \text{ g/L}$

Table 2. Result

Sample	Au(I) in g/L
Gold cyanide plating bath	1.6
Gold sulfite plating bath	12.1

Internal references: AW CH4-0498-052010, AW

CH4-0412-082004

CONTACT

瑞士万通中国
北京市海淀区上地东路1号
院1号楼7层702
100085 北京

marketing@metrohm.com.cn

CONFIGURATION



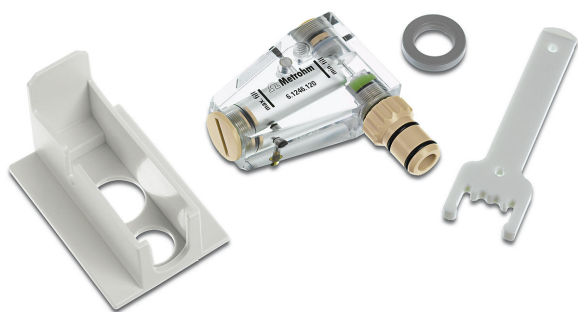
(MME) 884 Professional VA manual

用于多模式电极 (MME) 的 884 Professional VA manual 是借助多模式电极 pro 或 scTRACE Gold 或铋液滴电极使用伏安法和极谱法进行痕量分析的入门仪器。此项已经证实的瑞士万通电极技术与恒电位/恒电位仪以及外接的灵活 viva 软件联用,在重金属测定领域中展现了新的前景。带有经认证的校准器的恒电位仪在每次测量之前均自动冲洗进行校准,确保可能的高精度。

通过此仪器也可使用旋转圆盘电极进行测定,例如借助«循环伏安溶出法»(CVS)、«循环脉冲伏安溶出法»(CPVS)和计时电位法(CP)测定电镀池中的有机添加剂。借助可更换的测量头,可在使用不同电极的各种应用之间实现快速切换。

使用 **viva** 软件进行控制、数据采集和评估。

用于 MME(多模式电极)的 884 Professional VA manual 供货时配备大量附件,包括用于多模式电极 pro 的测量头。电极组和 **viva** 许可证则须单独订购。



Multi-Mode-Electrode pro

用于伏安法的汞电极。可作为 DME、SMDE 或 HMDE 使用。