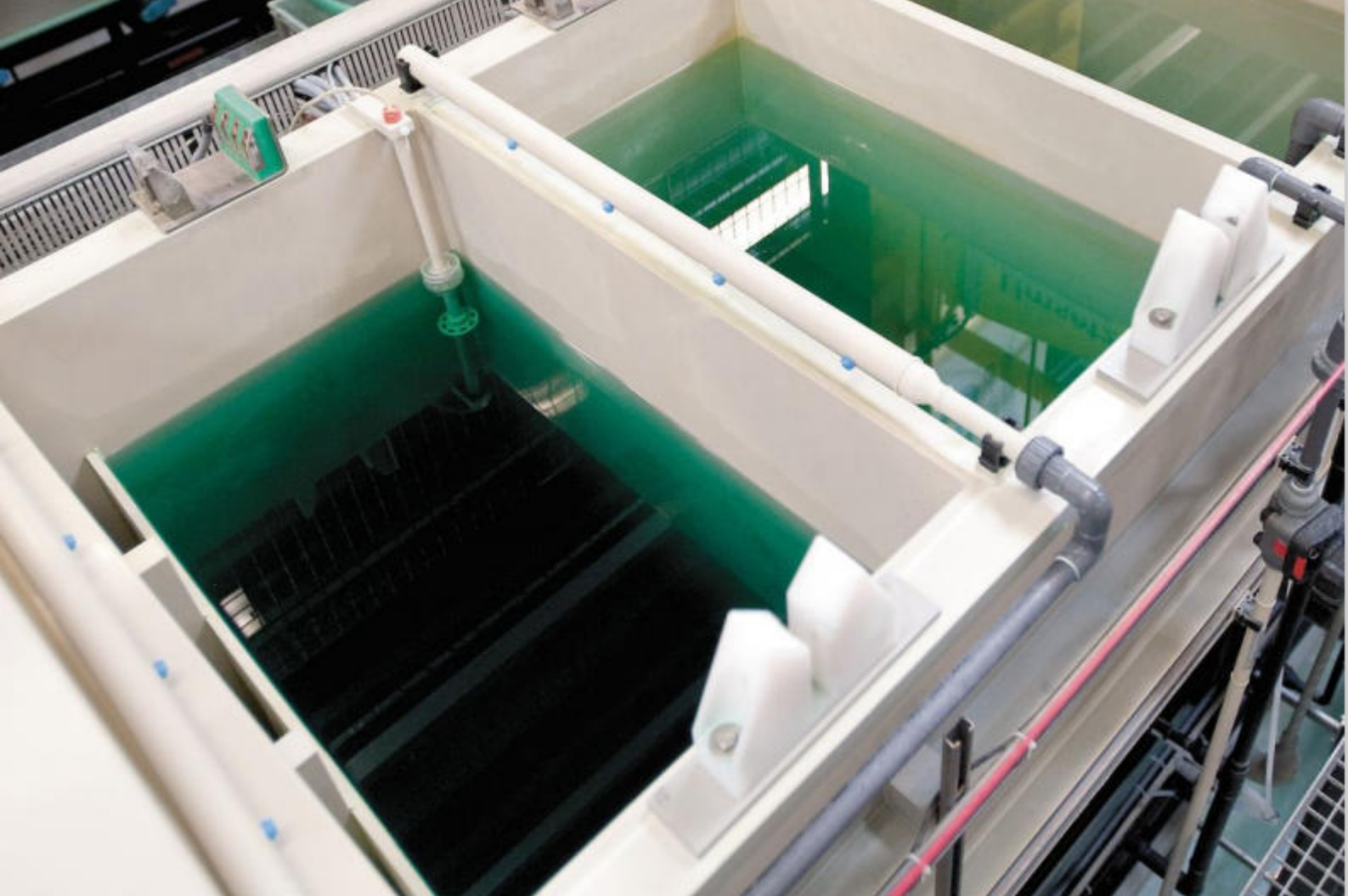




Application Note AN-V-196

化学镍镀液中的锑和铋

Stabilizer determination using anodic stripping voltammetry

Lead was commonly used as a stabilizer in electroless nickel plating processes in the past. The regular and precise determination of the stabilizer concentration is essential to keep the plating process running successfully under stable conditions. With the increasing number of restrictions in recent years on the use of lead in consumer products, particularly electronics, alternative stabilizers were developed and introduced. Two of these alternative stabilizers used to replace lead are antimony and bismuth. Electroless nickel plating is used in various

industrial production processes. The ENIG (electroless nickel, immersion gold) and ENEPIG (electroless nickel, electroless palladium, immersion gold) processes in the production of printed circuit boards are very reliant on the success of this method as electroless nickel plating is the first step in the process.

Differential pulse anodic stripping voltammetry has been established as a straightforward, sensitive, selective, and interference-free method for this application.

SAMPLE

Electroless nickel plating bath

EXPERIMENTAL

After diluting the sample in supporting electrolyte, the voltammetric determination of antimony and bismuth is carried out on the 884 Professional VA with the Multi-Mode Electrode pro as working electrode using the parameters listed in **Table 1**. The concentration is determined by two additions of antimony and bismuth standard addition solution.

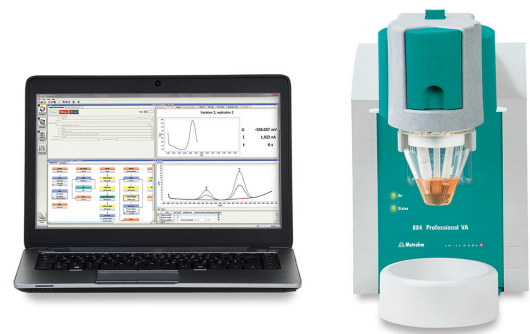


Figure 1. 884 Professional VA.

Table 1. Parameters for the determination of Sb3+ and Bi.

Parameter	Setting
Working electrode	HMDE
Mode	DP – Differential Pulse
Deposition potential	-0.4 V
Deposition time	30 s
Start potential	-0.3 V
End potential	+0.05 V
Peak potential Sb(III)	-0.16 V
Peak potential Bi	-0.04 V

ELECTRODES

- Working electrode: Multi-Mode Electrode pro with silanized capillaries
- Reference electrode: Ag/AgCl/KCl (3 mol/L) reference electrode with electrolyte vessel. Bridge electrolyte: KCl (3 mol/L)
- Auxiliary electrode: Platinum rod electrode

RESULTS

The determination of antimony and bismuth in electroless nickel plating baths can be carried out in a simple and straightforward manner. The method is selective and free of interferences. It is suitable for concentrations in the low to mid mg/L range.

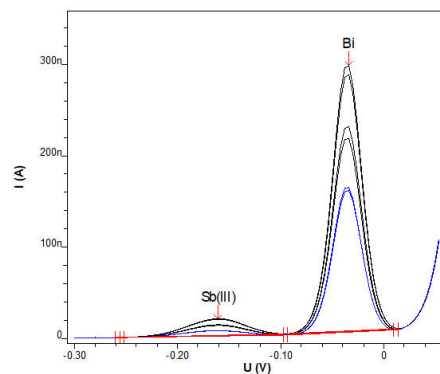


Figure 2. Determination of antimony and bismuth in electroless nickel bath with two standard additions.

Table 2. Results in electroless nickel bath

Analyte	Concentration [mg/L]
Sb(III)	0.4
Bi	4.7

CONTACT

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CONFIGURATION



2 Dosino (MME) 884 Professional VA semiautomated

用于多模式电极 (MME) 的 884 Professional VA semiautomated 是一台操作方便的常规分析仪,可采用多模式电极 pro 或 scTRACE Gold 进行伏安测量和极谱法痕量测定。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。

两台随附的 800 Dosino 可在测定过程中自动添加辅助溶液,例如电解质、缓冲液或标准溶液。

使用 **viva** 软件进行控制、数据采集和评估。

用于多模式电极 (MME) 的 884 Professional VA semiautomated 供货时带有大量附件,以及用于多模式电极 pro的测量头。电极组和 **viva** 许可证则须单独订购。



VA pro Professional VA

整套电极组,用于极谱和伏安测定。包含多模式电极 pro、参比电极、铂辅助电极、量杯、搅拌器、电解质溶液和其它用于构建工作台以及运行多模式电极的附件。