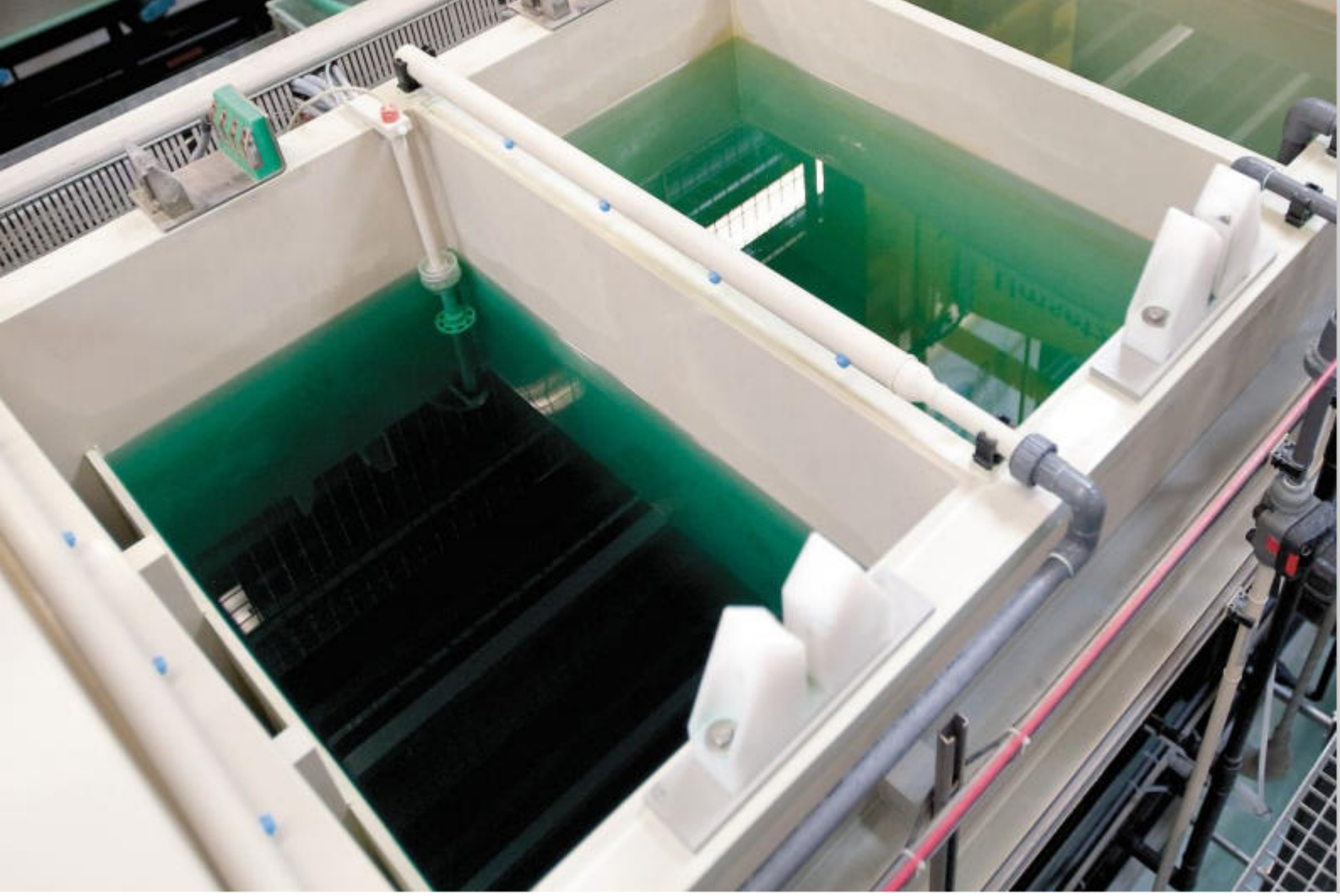

Application Note AN-V-196

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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.

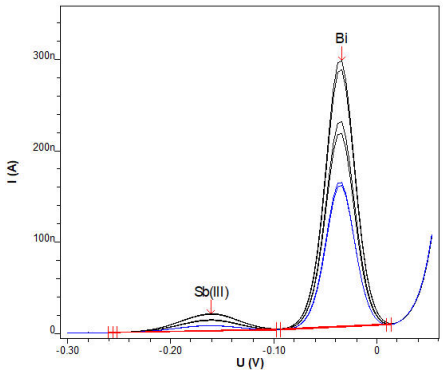

Figure 2. Determination of antimony and bismuth in electroless nickel bath with two standard additions.

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 (MME) 的 884 Professional VA semiautomated 是一台操作方便的常分析,可采用多模式 pro 或 scTRACE Gold 行伏安量和法痕量定。此已的瑞士万通技与恒位/恒位以及外接的活 viva 件用,在重金属定域中展了新的前景。有的校准器的恒位在每次量之前均自冲洗行校准,保精度。

通此器也可使用旋行定,例如借助«循伏安溶出法»(CVS)、«循脉冲伏安溶出法»(CPVS)和位法(CP)定池中的有机添加。借助可更的量,可在使用不同的各用之快速切。

台随附的 800 Dosino 可在定程中自添加助溶液,例如解、冲液或准溶液。

使用 viva 件行控制、数据采集和估。

用于多模式 (MME) 的 884 Professional VA semiautomated 供有大量附件,以及用于多模式 pro的量。和 viva 可独。

VA pro Professional VA

整套,用于和伏安定。包含多模式 pro、参比、助、量杯、拌器、解溶液和其它用于建工作台以及行多模式的附件。