

Application Note AN-V-238

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Straightforward determination over a wide concentration range with the scTRACE Gold

The electroless nickel plating process is known for its superior surface finishing properties with excellent resistance to wear and corrosion. The efficiency of the ENIG (electroless nickel, immersion gold) and ENEPIG (electroless nickel, electroless palladium, immersion gold) processes in manufacturing printed circuit boards strongly depends on the exact composition of the electroless nickel plating bath. Monitoring stabilizer concentrations in Ni baths (e.g., bismuth, Bi) is crucial for high-quality coatings. Anodic stripping voltammetry (ASV) allows fast

and robust monitoring of the bismuth concentration in Ni plating bath samples. This determination is performed on the scTRACE Gold. It is a combined sensor containing working, reference, and auxiliary electrodes integrated on a single ceramic substrate. It does not need extensive maintenance such as mechanical polishing. Measurements can be performed with the 884 Professional VA. This method is suited for manual or automated systems.

SAMPLE

Electroless Ni plating bath

EXPERIMENTAL

Add water, the electroless Ni plating bath sample, and the supporting electrolyte into the measuring vessel. The determination of bismuth is carried out with the 884 Professional VA (Figure 1) using the parameters specified in Table 1. The concentration is determined by two additions of a bismuth standard addition solution.

The scTRACE Gold is electrochemically activated prior to the first determination.



Figure 1. 884 Professional VA, fully automated for voltammetric analysis.

Table 1. Parameters

| Parameter | Setting |
|----------------------|-------------------------|
| Mode | DP – Differential Pulse |
| Deposition potential | -0.1 V |
| Deposition time | 30 s |
| Start potential | 0.0 V |
| End potential | 0.3 V |
| Peak potential Bi | 0.15 V |

ELECTRODES

- scTRACE Gold

RESULTS

The typical Bi concentration in nickel plating bath samples is around 1 mg/L. However, samples containing 100 µg/L Bi can be reliably determined with a 30 s deposition time using this method. The scTRACE Gold sensor quickly measures bismuth in Ni baths over a broad concentration range.

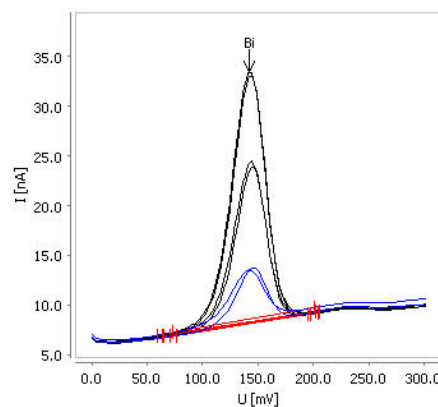


Figure 2. Determination of bismuth in an electroless Ni bath sample containing 1 mg/L Bi (30 s deposition time, sample volume 25 µL in 10 mL water).

Table 2. Result

| Sample | Bi (mg/L) |
|--|-----------|
| Electroless Ni plating bath containing 1 mg/L Bi | 1.07 |

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CONFIGURATION



(MME) 884 Professional VA manual

用于多模式 (MME) 的 884 Professional VA manual 是借助多模式 pro 或 scTRACE Gold 或液滴使用伏安法和法行痕量分析的入器。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,保可能的高精度。

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。

使用 **viva** 件行控制、数据采集和估。

用于 MME(多模式)的 884 Professional VA manual 供配大量附件,包括用于多模式 pro 的量。和 **viva** 可独。