



Application Note AN-V-217

# Nickel, cobalt in drinking water

## Straightforward determination by voltammetry using a gold microwire electrode

Nickel is widely used in stainless steel production. At high enough concentrations, it is known to cause allergic reactions when in contact with skin. Drinking water may be contaminated by taps which are made from metals containing nickel. The guideline value for nickel in the World Health Organization's «Guidelines for Drinking-water Quality» is set to 70  $\mu\text{g/L}$ . National limit values are typically lower at e. g. 20  $\mu\text{g/L}$ . Cobalt usually occurs associated with nickel and can be found in smaller concentrations besides nickel.

Adsorptive stripping voltammetry is a viable, less sophisticated alternative to atomic absorption spectroscopy (AAS) for the determination of nickel and cobalt in drinking water. While AAS (and competing methods) can only be performed in a laboratory, adsorptive stripping voltammetric determinations can be used in the laboratory or alternatively in the field with the 946 Portable VA Analyzer. The determination is carried out on a bismuth film applied to the scTRACE Gold electrode.

## SAMPLE

Tap water

## EXPERIMENTAL

The scTRACE Gold is electrochemically activated prior to the first determination. In the next step, the water sample and the supporting electrolyte are pipetted into the measuring vessel. The determination is carried out with the 884 Professional VA or with the 946 Portable VA Analyzer using the parameters specified in **Table 1**. The concentration is determined by two additions of a standard addition solution.



**Figure 1.** 946 Portable VA Analyzer (scTRACE Gold version)



**Figure 2.** 884 Professional VA fully automated for VA

**Table 1.** Parameters

Parameter	Setting
Mode	SQW – Square wave
Deposition potential	-0.8 V
Deposition time	30 s
Start potential	-0.8 V
End potential	-1.4 V
Peak potential Ni	-1.1 V
Peak potential Co	-1.25 V

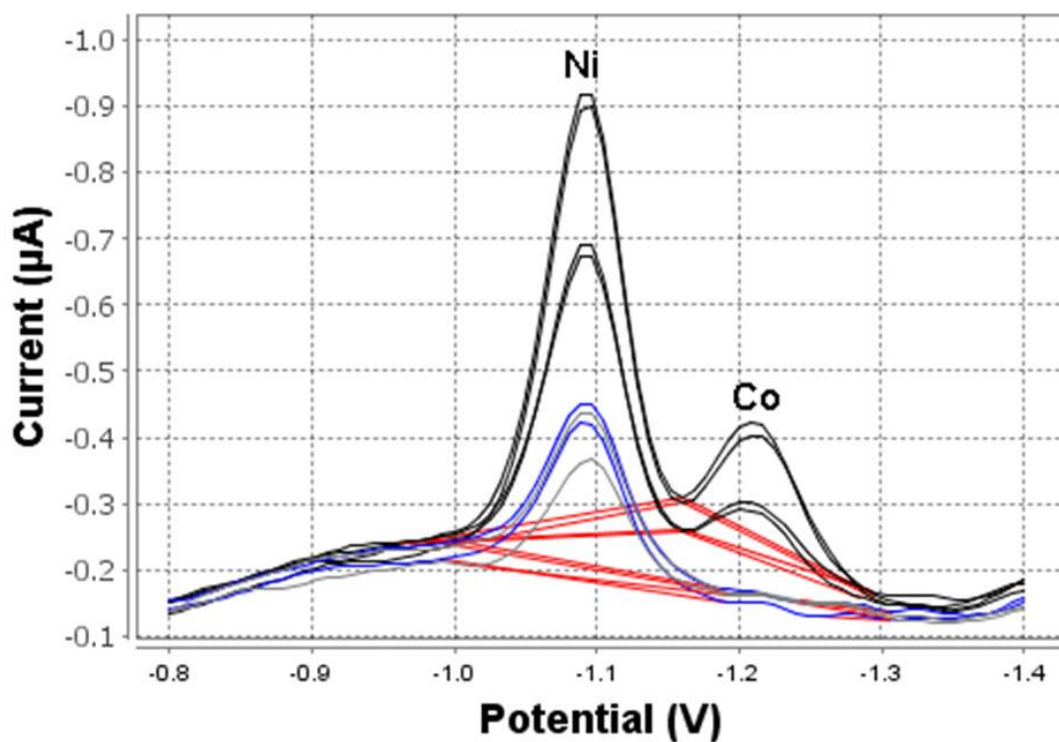
## ELECTRODES

- scTRACE Gold

## RESULTS

The limit of detection of the method for both elements is approximately 1 µg/L with the 946

Portable VA Analyzer, and about 0.2 µg/L with the 884 Professional VA.



**Figure 3.** Determination of nickel, cobalt (946 Portable VA Analyzer; 30 s deposition time)

**Table 2.** Results of nickel and cobalt determination in tap water

Sample	Ni (( $\mu\text{g/L}$ ))	Co ( $\mu\text{g/L}$ )
Tap water	1.3	<1

Internal references: AW VA CH4-0571-092018;

AW VA CH4-0572-092018

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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高端痕量分析的入器。此已的瑞士万通技与高效位/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,保可能的最高精度。

通此器也可使用旋行定,例如借助«循环伏安溶出法»(CVS)、«循环脉冲伏安溶出法»(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。



### VA scTRACE Gold Professional VA

整套,用于定或汞。包括用于 scTRACE Gold、scTRACE Gold、拌器和量杯的支架。



### 946 Portable VA Analyzer (scTRACE Gold)

用于定重金属,如痕量汞,,,,,,,、或之重金属的便携式金属分析器。scTRACE Gold 用的器版本。系由恒位和集成了拌器与可更式的独立量台成。用 Portable VA Analyzer 件。源由 USB 接口和内置的可充池提供。装在手提箱内交付,包含所有必需的附件。