



Application Note AN-V-214

## 用水中的

### Straightforward determination by voltammetry using a gold microwire electrode

Lead is known to be highly toxic to humans as it interferes with enzyme reactions. Chronic lead poisoning can be caused by Pb leaching into drinking water from piping systems. The current provisional guideline for lead in the World Health Organization's «Guidelines for Drinking-water Quality» sets a maximum concentration of 10  $\mu\text{g/L}$ .

With a limit of detection (LOD) of 0.2  $\mu\text{g/L}$ , anodic stripping voltammetry using the scTRACE Gold is a viable, less sophisticated alternative to atomic absorption spectroscopy (AAS) to determine lead in drinking water. While AAS (and competing methods) can only be

performed in a laboratory, anodic stripping voltammetry can be used conventionally in the laboratory with the Metrohm 884 Professional VA or alternatively in the field with the 946 Portable VA Analyzer.

The determination is carried out on a silver film applied to the scTRACE Gold electrode. It is a combined sensor consisting of a gold microwire working electrode, Ag/AgCl reference electrode, and carbon auxiliary electrode on a ceramic substrate. It is easy to handle and needs no extensive maintenance such as mechanical polishing.

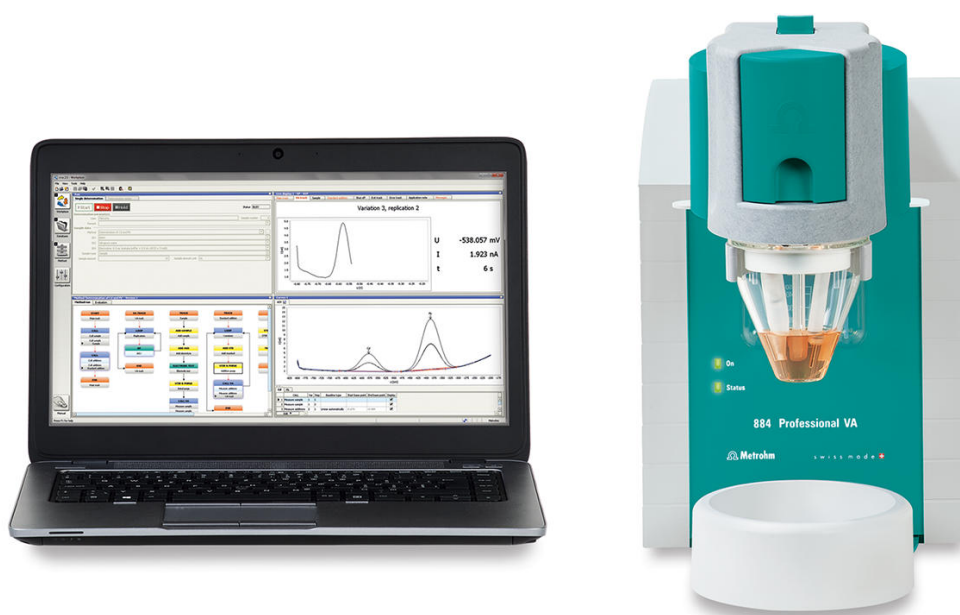
## EXPERIMENTAL

The water sample is pipetted into the measuring vessel. Citric acid buffer is added as supporting electrolyte. The determination of lead can be carried out on the 946 Portable VA Analyzer or on the 884 Professional VA using the scTRACE Gold sensor via anodic stripping voltammetry using the parameters listed in **Table 1**. The lead concentration is determined by two additions of lead standard addition solution.

The scTRACE Gold is modified with a silver film prior to the determination of lead. The silver film is electrochemically deposited from a silver solution.



**Figure 1.** 946 Portable VA Analyzer



**Figure 2.** 884 Professional VA

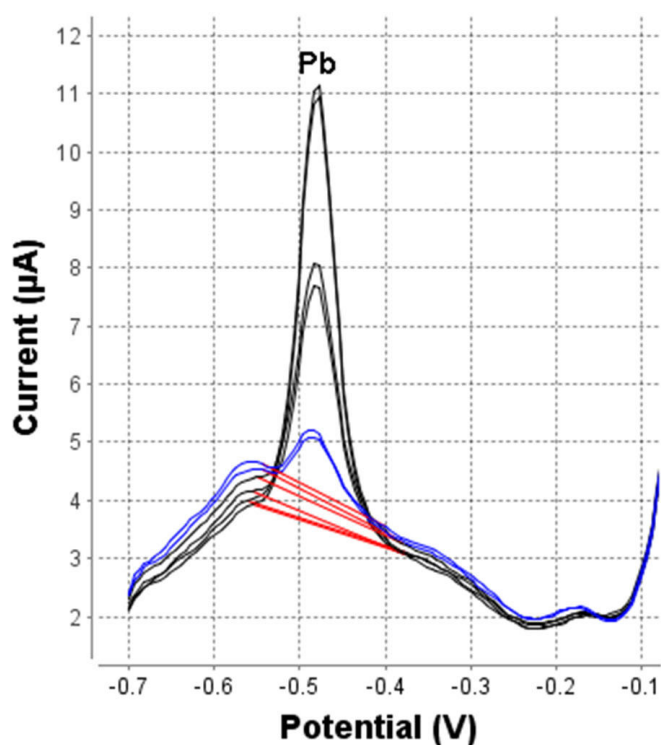
**Table 1.** Parameters

Parameter	Setting
Mode	SQW – Square wave
Deposition potential	-0.7 V
Deposition time	90 s
Start potential	-0.7 V
End potential	0 V
Peak potential Pb	-0.48 V

## RESULTS

The method is suitable for the determination of lead concentrations in unpolluted water samples in concentrations up to 30  $\mu\text{g/L}$ . The limit of

detection of the method is approximately 1  $\mu\text{g/L}$ .



**Figure 3.** Determination of lead in tap water with 2 standard additions

**Table 2.** Result

Sample	Concentration [ $\mu\text{g/L}$ ]
Tap water	1.1

## REFERENCES

Application Bulletin 433: [Determination of lead in water with the scTRACE Gold modified with a silver film](#)

Internal reference: AW CH4-0587-092019

## CONTACT

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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。



**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、砷、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。