



Application Note AN-V-222

饮用水中铁的测定

Wide linear range with a low detection limit using the Bi drop electrode and the triethanolamine method

The presence of iron in drinking water can lead to an unpleasant, harsh metallic taste or reddish-brown stains. In addition, «iron bacteria» which can grow in waters containing Fe as low as 0.1 mg/L, create a reddish-brown slime that can clog plumbing and cause an offensive odor. Over a longer period, the formation of insoluble iron deposits is problematic in many industrial and agricultural applications, such as water supply, system cooling, or field irrigation. To avoid these problems, the U.S. Environmental Protection Agency (EPA) defines the Secondary Maximum Contaminant Level (SMCL) for water

treatment and processing plants as 0.3 mg/L Fe in drinking water.

The voltammetric determination of the iron triethanolamine complex on the non-toxic Bi drop electrode does not require enrichment. This system uses catalytic signal enhancement, allowing both the detection at very low levels (limit of detection of 0.005 mg/L) and measurements in a wide range of concentrations up to 0.5 mg/L. This method is best suited for automated systems or process analyzers, allowing fully automatic determination of iron in a large sample series.

SAMPLE

Drinking water, mineral water, sea water

EXPERIMENTAL

The water sample and the supporting electrolyte are pipetted into the measuring vessel. The determination of iron is carried out with a 884 Professional VA using the parameters specified in **Table 1**. The concentration is determined by

two additions of an iron standard addition solution.
The Bi drop electrode is electrochemically activated prior to the first determination.



Figure 1. 884 Professional VA fully automated for VA

Table 1. Parameters

Parameter	Setting
Mode	DP – Differential Pulse
Start potential	-0.75 V
End potential	-1.25 V
Peak potential Fe	-1 V

ELECTRODES

- Working electrode: Bi drop
- Reference electrode: Ag/AgCl/KCl (3 mol/L)
- Auxiliary electrode: Glassy carbon rod

RESULTS

The method is suitable for the determination of iron in water samples in concentrations from

$\beta(\text{Fe}) = 10\text{--}500\text{ }\mu\text{g/L}$. The limit of detection of the method is approximately $\beta(\text{Fe}) = 5\text{ }\mu\text{g/L}$.

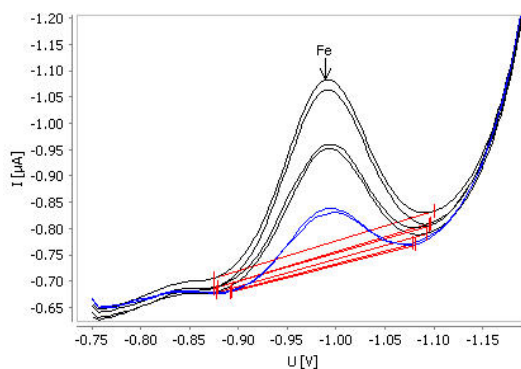


Figure 2. Determination of iron in tap water spiked with $\beta(\text{Fe}) = 20\text{ }\mu\text{g/L}$

Table 2. Result

Sample	Fe ($\mu\text{g/L}$)
Tap water spiked with $\beta(\text{Fe}) = 20\text{ }\mu\text{g/L}$	19.1

REFERENCES

Application Bulletin 439: [Voltammetric determination of iron in water samples with a Bi drop electrode](#)

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CONFIGURATION



(MME) 884 Professional VA manual

用于多模式电极 (MME) 的 884 Professional VA manual 是借助多模式电极 pro 或 scTRACE Gold 或 铋液滴电极使用伏安法和极谱法进行痕量分析的入门仪器。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,确保可能的高精度。

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。

使用 **viva** 软件进行控制、数据采集和评估。

用于 MME(多模式电极)的 884 Professional VA manual 供货时配备大量附件,包括用于多模式电极 pro 的测量头。电极组和 **viva** 许可证则须单独订购。



VA Professional VA

完整的电极套件,用于伏安法测定重金属。包含铋液滴电极、参比电极、玻璃碳辅助电极、量杯、搅拌器,电解液和其他附件。