Application Note AN-V-226

Zinc in drinking water

An ultra-sensitive method for a wide concentration range on the mercury film modified glassy carbon electrode

No health-based guideline value exists for zinc. However, to maintain good quality municipal drinking water, the United States Environmental Protection Agency (US-EPA) set a maximum concentration of 5 mg/L as the limit value. Typical concentrations in surface and ground waters are between 10–40 µg/L Zn. In tap water, this value can be up to 1 mg/L due to leaching of zinc from piping and fittings.

Anodic stripping voltammetry (ASV) on the ex-situ mercury film modified glassy carbon electrode provides a less complex alternative to atomic absorption spectroscopy (AAS) for zinc determination in drinking water. The main advantage of this method is the high sensitivity. With a deposition time of 10 s, the limit of detection for zinc is 0.15 µg/L. The linear working range goes up to approximately 300 µg/L. This method is suited for manual and automated systems.

SAMPLE

Drinking water, mineral water, sea water

EXPERIMENTAL

Prior to the first determination, the ex-situ mercury film is deposited on a freshly polished glassy carbon electrode. In the next step, the electrodes are cleaned with ultrapure water and the measuring vessel is emptied. Then the water sample and the supporting electrolyte are pipetted into the measuring vessel. The determination of zinc is carried out with the 884 Professional VA using the parameters specified in Table 1. The concentration is determined by two additions of a zinc standard addition solution.

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

Table 1. Parameters

Parameter	Setting
Mode	DP – Differential Pulse
Deposition potential	-1.4 V
Deposition time	10 s
Start potential	-1.2 V
End potential	-0.9 V
Peak potential Zn	-1.05 V

ELECTRODES

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

RESULTS

With the deposition time of 10 s, the method is suitable for samples between 10–150 µg/L zinc.

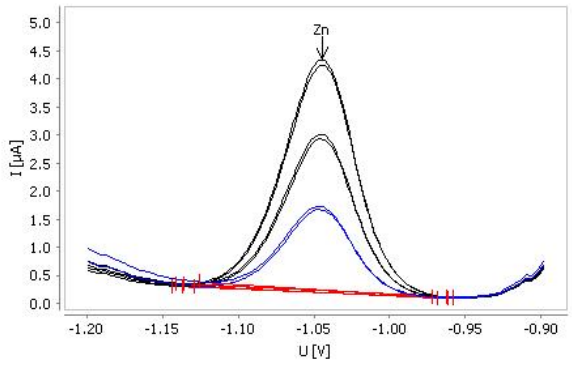

Figure 2. Determination of zinc in tap water (10 s deposition time)

Table 2. Result

Sample	Zn (µg/L)
Tap water	112

REFERENCES

Application Bulletin 254: Determination of zinc, cadmium and lead by anodic stripping voltammetry at a mercury film electrode

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CONFIGURATION

CVS 884 Professional VA manual

用于 CVS 用的 884 Professional VA manual 是借助 «循伏安溶出法»(CVS)、«循脉冲伏安溶出法»(CPVS)和位法(CP)在池中有机添加行高端定或采用旋行伏安法重金属定的入器。此已的瑞士万通技与高效位/恒位以及外接的活 viva 件用,展了新的 CVS 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。集成的温度量入端可在量程中控溶液温度。

通此器也可以行伏安法定。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 CVS(伏安量)用的 884 Professional VA manual 供有大量附件,以及用于旋的量。和 viva 可独。

VA Glassy CarbonRDE Professional VA

整套,用于伏安定,例如采用汞膜技。包含旋、玻、参比、玻助、量杯和解溶液。