



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 $\mu\text{g/L}$ 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 $\mu\text{g/L}$. The linear working range goes up to approximately 300 $\mu\text{g/L}$. 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 $\mu\text{g/L}$ zinc.

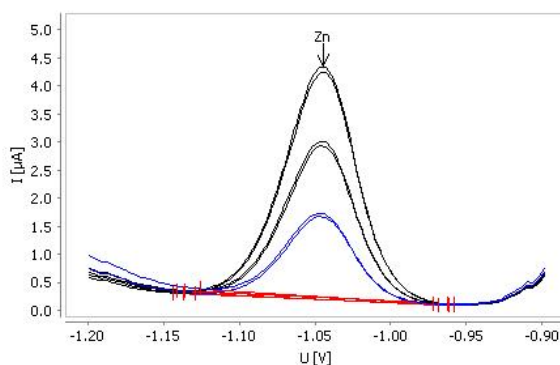


Figure 2. Determination of zinc in tap water (10 s deposition time)

Table 2. Result

Sample	Zn ($\mu\text{g/L}$)
Tap water	112

REFERENCES

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

CONTACT

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CONFIGURATION



884 Professional VA manual CVS

884 Professional VA manual CVS 仕様は、CVS (サイクリックホルタンメトリーストリッピング)、CPVS (サイクリックハルスホルタンメトリーストリッピング)、CP (クロノポテンシオメトリー) による電気めっき浴内の有機添加物のハイエント測定、または回転ディスク電極によるホルタンメトリー重金属測定へのエントリーレヘル装置です。高性能のポテンシostat/カルハノスタットと、非常に柔軟な **viva** ソフトウェアとのコンビネーションにおける熟練した Metrohm の電極技術が CVS に新たな展望を開きます。性能が認証されたキャリフレータの付いたポテンシostatは、各測定前に自動的に新たに調整を行い、可能な限り高い精度を保証します。内蔵式温度電極インポート口により、測定中の溶液温度のモニタリングが可能です。

この装置により、ホルタンメトリー測定を実施することも可能です。交換可能な測定ヘッドにより、異なる電極を持つ様々なアプリケーション間の迅速な交換が可能となります。

コントロール、データ処理および評価のためにソフトウェア **viva** が必要となります。

884 Professional VA manual CVS仕様は、多数の付属品および回転ディスク電極のための測定ヘッドを付属して納品されます。電極セットおよび **viva** ライセンスは別途ご注文ください。



VA electrode equipment with rotating disc electrode (RDE) made of glassy carbon for Professional VA instruments

Complete electrode set for voltammetric determinations, e.g. using mercury film method. Includes drive for rotating disc electrode, glassy carbon electrode tip, reference electrode, glassy carbon auxiliary electrode, measuring vessel, and electrolyte solution.