



Application Note AN-V-240

用极谱法测定甲状腺片剂中的总碘含量

Polarography in pharmaceutical analysis: indirect determination of iodine after dry ashing in a muffle furnace

Thyroid hormones are made by the thyroid gland and play an important role in regulating metabolism and growth. Iodine acts as a building block and the specific number of iodine atoms determines the type of the hormone: four for thyroxine (T₄) and three for triiodothyronine (T₃). The number of iodine atoms is critical for the functionality of thyroid hormones. Levothyroxine and liothyronine (synthetic forms of thyroid hormones T₄ and T₃) are essential components of thyroid tablets. T₄ is less active

and needs to convert to the more active T₃ to be fully effective. Accurate iodine determination in thyroid tablets is a crucial quality control measure, ensuring the effectiveness and safety of thyroid treatments.

A robust method is introduced for indirect determination of total iodine content in thyroid tablets as iodate, according to United States Pharmacopeia (USP) guidelines using the 884 Professional VA and the Multi-Mode Electrode pro.

SAMPLE

Commercially available thyroid tablet containing 100 µg levothyroxine and 20 µg liothyronine.

EXPERIMENTAL

Sample preparation and the determination of iodine is carried out according to the USP monograph «Thyroid Tablets». The process involves dry ashing of the tablets, where organically bound iodine is released and later converted to iodate. The iodate content is determined with the 884 Professional VA (Figure 1) by differential pulse polarography.



Figure 1. 884 Professional VA.

ELECTRODES

- Working electrode: Multi-Mode Electrode pro
- Reference electrode: Ag/AgCl/KCl (3 mol/L) reference electrode with electrolyte vessel.
- Bridge electrolyte: KCl (3 mol/L)
- Auxiliary electrode: Platinum rod electrode

Table 1. Parameters for IO3 determination

Parameter	Setting
Working electrode	DME
Mode	DP – Differential Pulse
Start potential	-0.8 V
End potential	-1.5 V
Potential step	0.005 V
Potential step time	1 s
Pulse amplitude	0.05 V
Peak potential Iodate	-1.18 V

RESULTS

Calculation of the results was carried out according to the USP monograph «Thyroid Tablets».

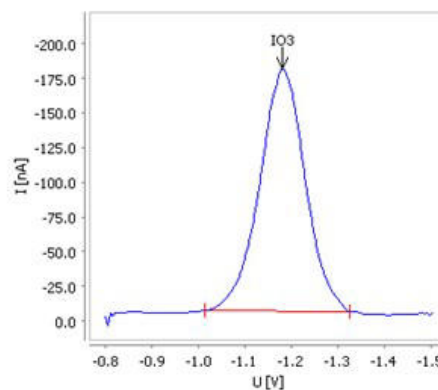


Figure 2. Determination of iodate in a thyroid tablet by differential pulse polarography with the 884 Professional VA and the Multi Mode Electrode pro.

Table 2. Results of iodine determination with the 884 Professional VA and the Multi-Mode Electrode pro.

Sample	Iodine in µg / tablet	Recovery rate
Tablet	70.59	92.3%
Tablet spiked with 72.55 µg	144.58	101.9%

Internal reference: AW VA CH-0633-042024

CONTACT

瑞士万通中国
北京市海淀区上地东路1号
院1号楼7层702
100085 北京

marketing@metrohm.com.cn

CONFIGURATION



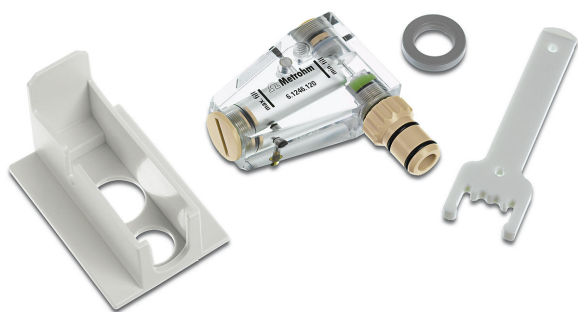
(MME) 884 Professional VA manual

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。



Multi-Mode-Electrode pro

用于伏安法的汞电极。可作为 DME、SMDE 或 HMDE 使用。