

# 止汗中和的定

## Consecutive complexometric titrations with the Optrode to determine Zr and Al in one beaker

Antiperspirants contain zirconium aluminum chlorohydrates as active ingredients. Currently, the zirconium aluminum glycine (ZAG) complex is mainly used because it has been shown to be more effective. To evaluate the product quality, it is necessary to control the amount of both aluminum and zirconium in the ZAG complex. This determination can be done by complexometric titrations under different conditions according to the US Pharmacopeia (USP).

### SAMPLE AND SAMPLE PREPARATION

As samples, zirconium and aluminum standards were pipetted into a beaker and diluted with water. A

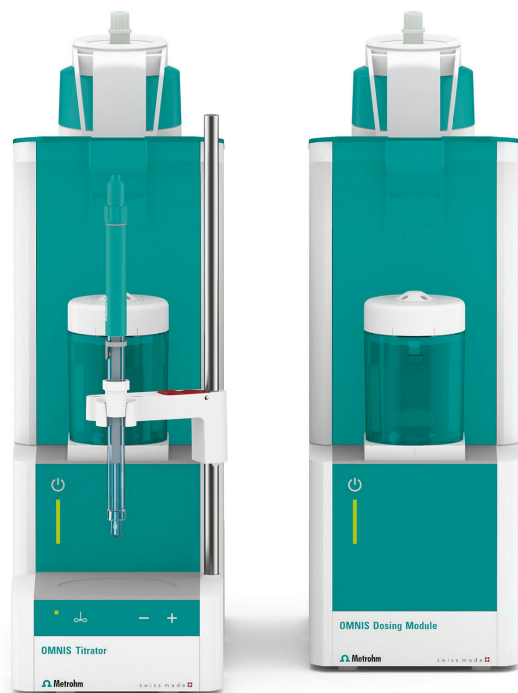
USP currently describes the assay of zirconium aluminum chlorohydrate complexes by two manual complexometric titrations after a laborious sample preparation procedure (digestion). This Application Note presents a complementary method that allows a consecutive determination after the sample preparation (digestion) of both metal ions in one beaker with an optical sensor and xylenol orange as an indicator.

drop of xylenol orange was added as color indicator.

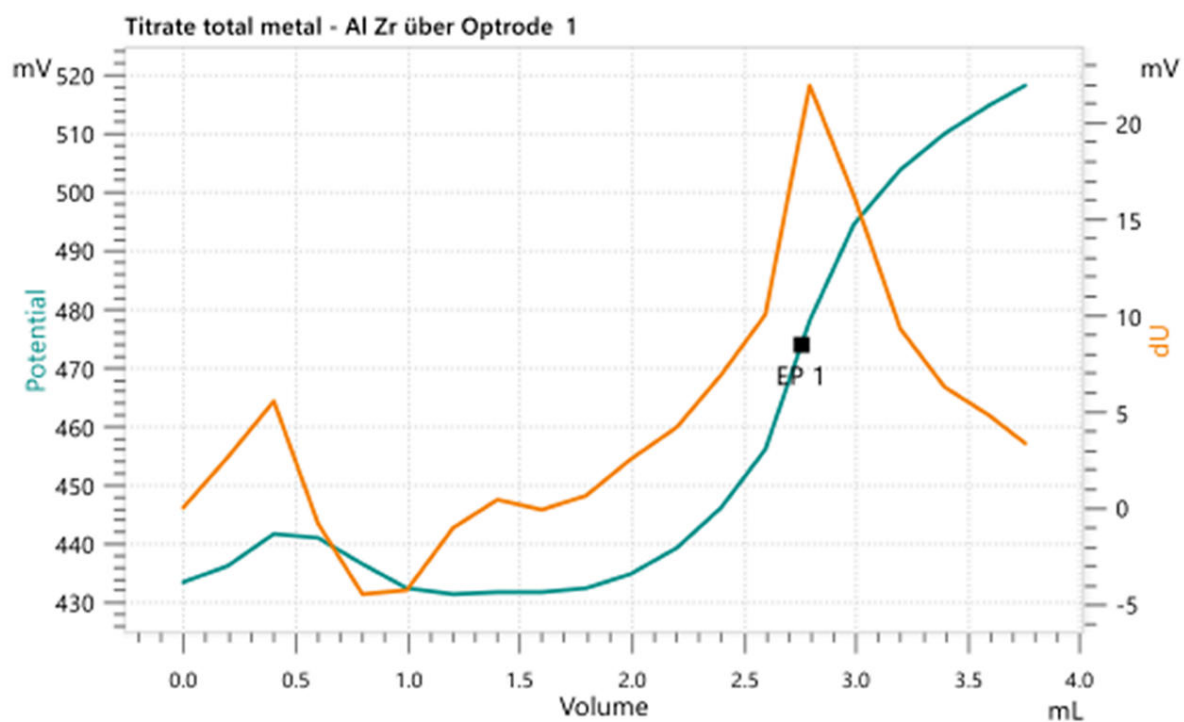
### EXPERIMENTAL

The pH of the sample was adjusted to pH 1 with 10 mL of buffer solution (pH 1). The sample was then titrated directly with EDTA (0.1 mol/L) on an OMNIS Titrator (**Figure 1**) to determine the Zr content (**Figure 2**). The equivalence point was reached once the solution turned from pink to yellow, detected by the Optrode at a wavelength of 574 nm. Afterward,

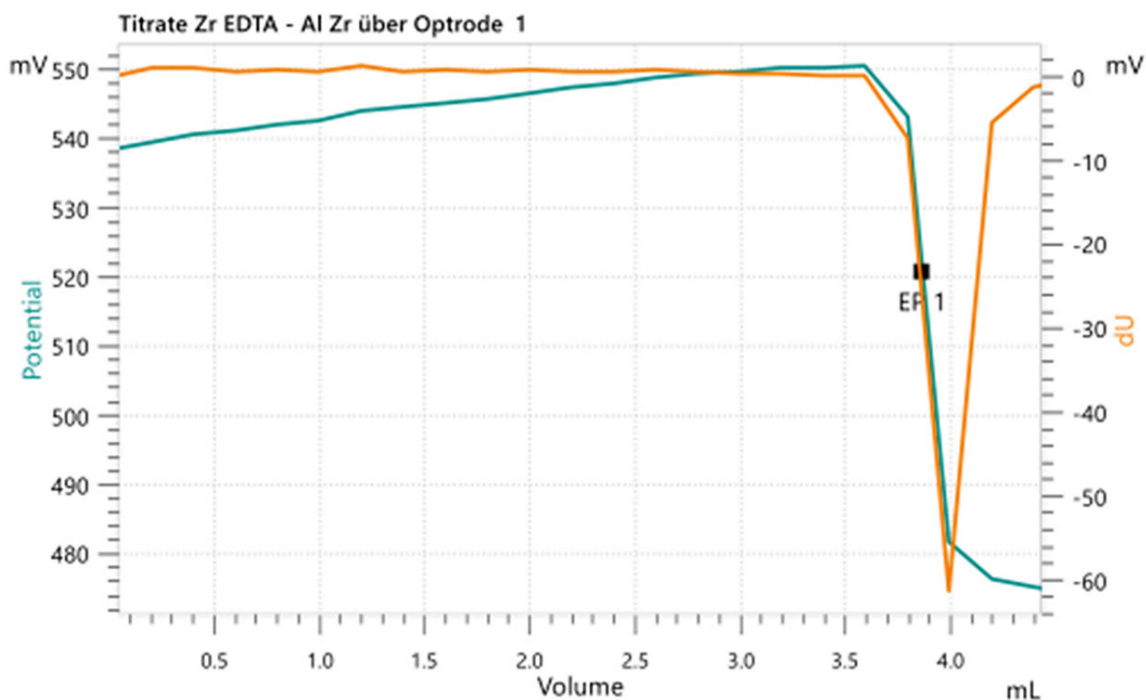
20 mL of acetate buffer (pH 4.7) and 15 mL of EDTA (0.1 mol/L) was added, followed by the back-titration of excess of EDTA with  $\text{Bi}(\text{NO}_3)_3$  (0.05 mol/L). The equivalence point was reached once the solution turned from yellow to purple, detected by the Optrode at a wavelength of 574 nm. This corresponds to the Al content (**Figure 3**).



**Figure 1.** OMNIS Titrator with an OMNIS Dosing Module.



**Figure 2.** Example titration curve for Zr determination at pH 1 with EDTA as titrant.



**Figure 3.** Example titration curve of the Al determination at pH 4.7 with bismuth nitrate as titrant.

**Table 1.** Summarized results for a mixture of Zr and Al standards (n = 3).

Metal	Mean (mg/mL)	RSD (%)	Recovery (%)
Zr	4.5015	0.69	98.9
Al	1.3289	2.13	97.3

## RESULTS

The results presented in **Table 1** were obtained for already liberated metal ions (i.e., Zr and Al

standards) made from zirconyl chloride and aluminum chloride.

## CONCLUSION

The analysis of both aluminum and zirconium ions can be realized successively on an OMNIS system. OMNIS allows fully automatic determinations,

eliminating the need for extra laboratory work, saving time and effort.

## CONTACT

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## CONFIGURATION



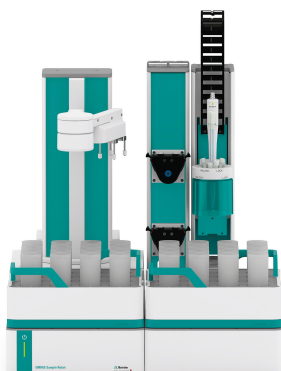
### OMNIS Professional Titrator

新型、模式位分析 OMNIS Titrator,于独立行或作 OMNIS 滴定系的核心元件行,用于点和等当点滴定(一/)。由于采用 3S OMNIS Liquid Adapter 技,理化学用品从未像在一安全。可以使用量模和量管元自由配置滴定,并在需要展一台棒式拌器。包括用于使用其他滴定或加液模平行滴定的“Professional”功能可。

- 通算机或本地网控制
- 可以其他用或助溶液外接最多四个滴定模或加液模
- 棒式拌器的接方式
- 可提供不同大小的量管:5、10、20 或 50 mL
- 采用 3S 技的 OMNIS Liquid Adapter:安全理化学用品,自生厂家的原始数据

#### 量模式和件:

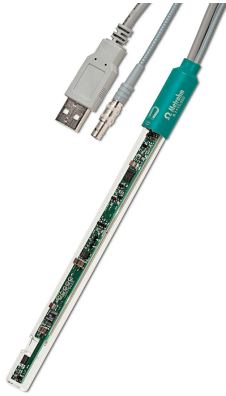
- 点定滴定:“Basic” 功能可
- 点和等当点滴定(一/):“Advanced” 功能可
- 点和等当点滴定(一/),包括 5 路平行滴定:“Professional” 功能可



### OMNIS Sample Robot S Pick and Place

OMNIS Sample Robot S 具有一个“蠕”模(2 通道)和一个 Pick&Place 模以及大量附件,可直接入全自滴定。此系具有个品位置,可用于 32 个 120 mL 的品。此模化系供已完全安装完,因此可在短内投入行。

系也可根据需要展配外台蠕以及多加一个 Pick&Place 模,由此使通量翻倍。如果需要更多工作台,可将此 Sample Robot 展 L 格款型的 OMNIS Sample Robot,由此可使七个品的品在多四个 Pick&Place 模上并行理,将品通量大四倍。



## Optrode

有 8 可用波的光度滴定用光学传感器。可以通件控制 (tiamo 2.5 及以上版本)或通磁来行波切。玻璃鞘溶耐受,并且易于清。省空的传感器用于,例如:

- 按照 USP 或 EP 的非水溶性滴定
- 基端基的定
- TAN/TBN 根据 ASTM D974
- 硫酸定
- 混凝土中的 Fe、Al、Ca
- 水硬度
- 根据 USP 的硫酸骨素

传感器不合通量色度(比色法)来定度。