



Application Note AN-T-090

Determination of zinc sulfate

Photometric analysis according Ph.Eur. and USP

The inorganic compound zinc sulfate is used for various applications. It is often utilized as a dietary supplement to nourish both humans and animals with zinc, an essential mineral for our health, since we cannot produce nor store it naturally. Zinc is also often used in medicine because of its antibacterial properties. Additionally, it can be applied on roofs to prevent extended moss growth, used as precursor of the white pigment «lithopone», or

in zinc electroplating. Due to its versatile applications, the determination of its purity is important.

This Application Note describes the photometric determination of zinc sulfate using the Optrode at a wavelength of 610 nm. Complexometric titration of zinc requires EDTA as titrant and Eriochrome Black T as indicator. The method fully complies with Ph. Eur. and USP.

SAMPLE AND SAMPLE PREPARATION

The analysis is demonstrated on a zinc sulfate heptahydrate sample. No sample preparation is

required.

EXPERIMENTAL

An appropriate amount of sample is weighed into a beaker and is dissolved in deionized water. Ammonia buffer pH 10 and a small amount of Eriochrome Black T indicator is then added to the beaker. The sample is titrated photometrically with standardized EDTA until after the break point.



Figure 1. 907 Titrand with tiamo. Exemplary setup for the photometric determination of zinc sulfate purity.

RESULTS

The analysis demonstrates a distinct color change which results in reliable and reproducible results. In this study, the zinc

sulfate content was determined as $w(\text{ZnSO}_4) = 57.61\%$ ($\text{SD}(\text{rel}) = 0.03\%$, $n = 6$). An example titration curve is shown in **Figure 2**.

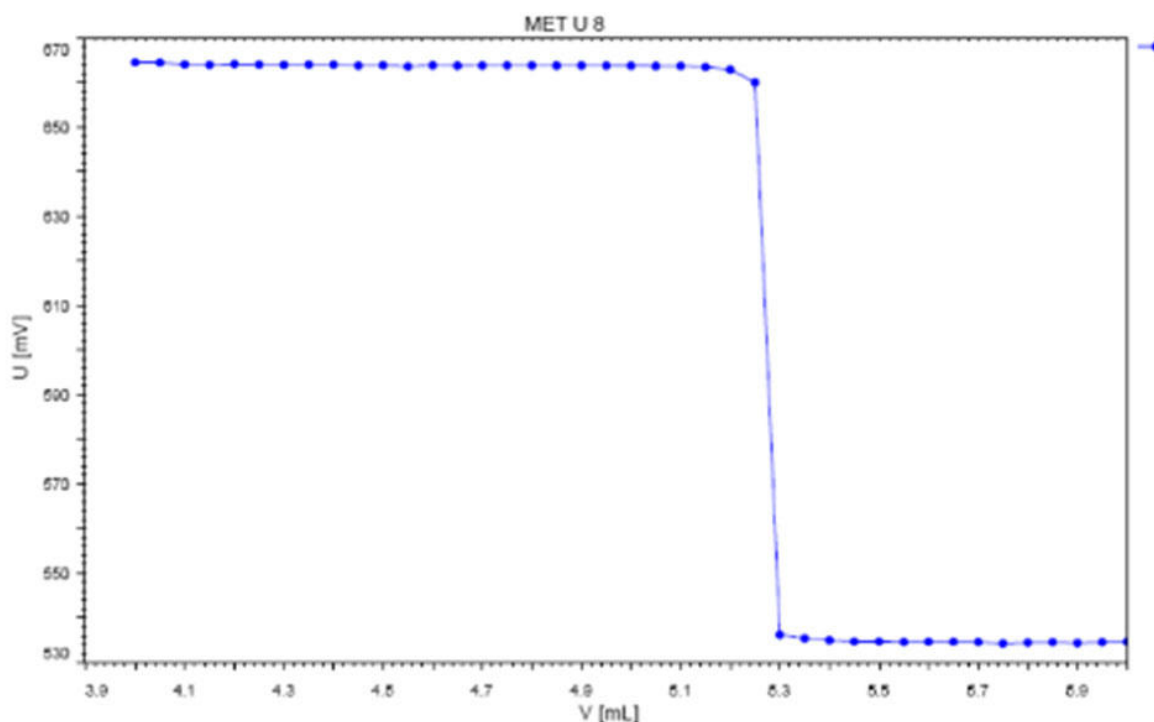


Figure 2. Example titration curve for photometric zinc sulfate determination. The break point is quite obvious in this chart.

CONCLUSION

The purity of zinc sulfate can easily be assessed using photometric titration. To reliably indicate the color change, a sensor such as the Optrode should be used. This has the advantage that the analysis is performed objectively, and the endpoint is always designated at the same color

change. The use of a Metrohm autotitrator and software in place of manual titration allows completely automated documentation for full traceability according to various regulations.

The analysis fully complies with Ph.Eur. and USP.

Internal reference: AW TI CH1-1311-012012

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CONFIGURATION



907 Titrando

測定インターフェースと Dosino ドージングユニットを備えた、カール フィッシャー 電位差滴定、および容量滴定のためのハイエンド滴定装置。

- タイプ 800 Dosino のドージングデバイスシステムが 4 つまで
- 変動滴下量当量点滴定 (DET)、等量滴下当量点滴定 (MET)、終点滴定 (SET)、酵素滴定および pH STAT 滴定 (STAT)、カール フィッシャー 滴定 (KFT)
- イオン選択性電極を用いた測定 (MEAS CONC)
- インテリジェント電極「iTrode」
- モニタリング、LQH を備えたドージング機能
- 追加のスターラーまたはドージングデバイスシステムのための 4 つの MSB コネクタ
- USB コネクタ
- OMNIS Software、*tiamo* ソフトウェアもしくは Touch Control を適用
- GMP/GLP 基準および FDA 基準 21 CFR Part 11 の要件を満たしています(必要な場合)



804 Ti Stand with stand

Titration stand and controller for 802 Rod Stirrer. The 804 Ti Stand together with the optional 802 Rod Stirrer provides an alternative to the magnetic stirrer. Ti Stand with base plate, support rod and electrode holder.



Optrode

使用可能な8つの波長を有する光度滴定のための光学センサー。波長の切り替えは、ソフトウェア制御 (tiamo 2.5以降) またはマグネットで行えます。ガラスシャフトは完全な耐溶剤性を有し、洗浄が簡単です。省スペースのセンサーは以下のような用途に適しています:

- USPまたはEPに則した非水滴定
- カルボキシル末端基の測定
- ASTM D974に則したTAN/TBN
- 硫酸塩の測定
- セメント中のFe、Al、Ca
- 水の硬度
- USPに則したコンドロイチン硫酸

センサーは、色の強度の測定 (比色法) による濃度の測定には適していません。