



Application Note AN-T-216

Assay of lithium nitrate

Reliable and fully automated determination by potentiometric titration

Lithium nitrate is an oxidizing agent used in the manufacture of red-colored fireworks and flares. In addition, the lithium nitrate trihydrate compound absorbs heat well and can be used for thermal energy storage at its melting temperature of 30 ° C.

Lithium nitrate is a hygroscopic substance and therefore the purity needs verification before it

is used for synthesis or other applications.

The purity can be easily determined using a fully automated titration system. The assay is done by a precipitation titration between lithium and fluoride in an ethanolic solution. The benefit of titration is that the lithium nitrate does not need to be diluted after dissolving in ethanol as with other techniques such as ICP-MS.

SAMPLE AND SAMPLE PREPARATION

The application is demonstrated on lithium nitrate with a purity of >98%. No sample

preparation is needed.

EXPERIMENTAL

This analysis is carried out on an automated system consisting of an OMNIS Advanced Titrator and an OMNIS Sample Robot S equipped with a fluoride ion selective electrode. After weighing the sample into the sample beaker, all further steps are automatically carried out by the system. The assay is performed by a precipitation titration with ammonium fluoride in an ethanolic solution.

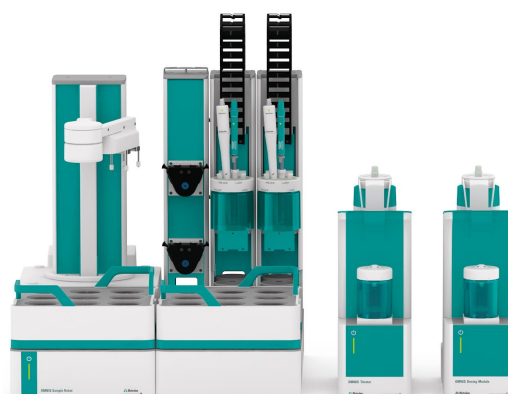


Figure 1. OMNIS Sample Robot, OMNIS Dosing module, and OMNIS Advanced Titrator equipped with fluoride ion selective electrode for the assay of lithium nitrate.

RESULTS

With this method a purity of 100.85% ($n = 5$, $SD(\text{rel}) = 0.45\%$) is determined. This value

corresponds to the theoretical value of $> 98\%$.

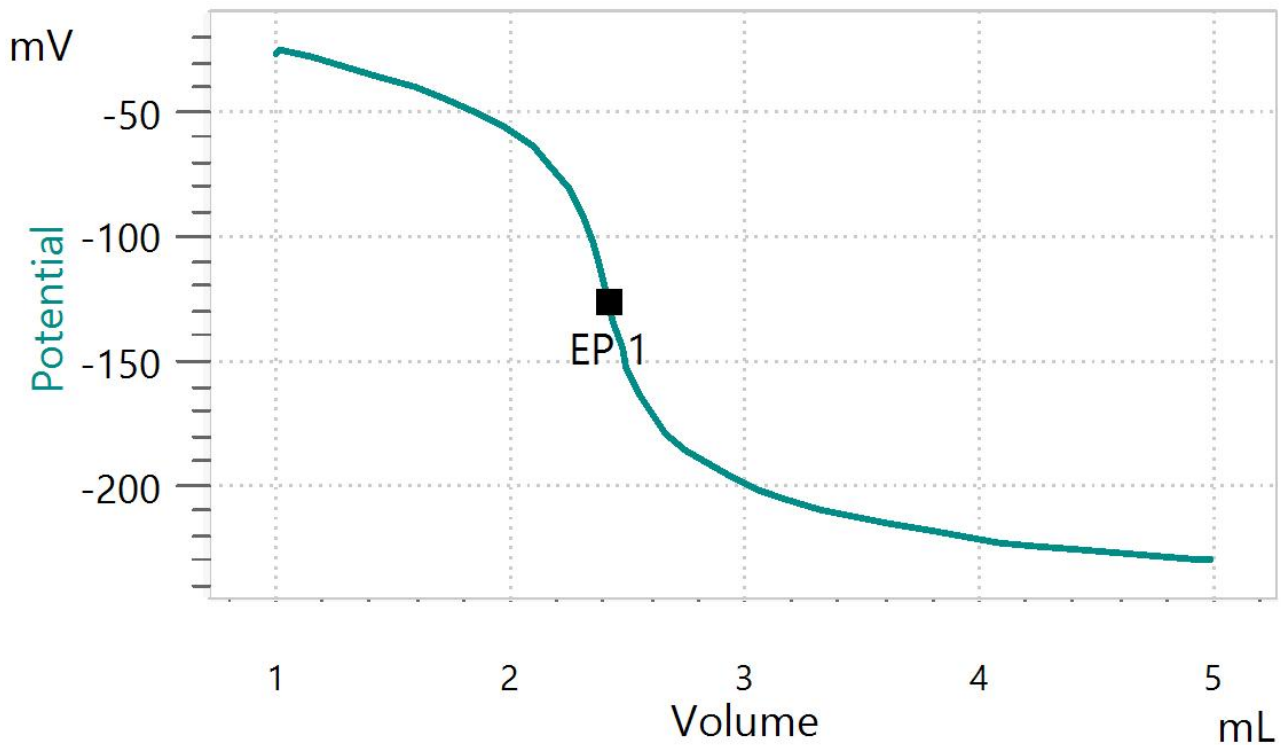


Figure 2. Example titration curve of the assay of lithium nitrate.

CONCLUSION

Titration is a precise and reliable method to determine lithium nitrate. In comparison to other techniques such as ICP-MS, it is not necessary to dilute the lithium nitrate sample, greatly increasing the accuracy of the analysis. Using an OMNIS Sample Robot allows the fully

automated measurement of up to four samples simultaneously. The OMNIS System offers the opportunity to customize the system according to your needs, and expand it for other required titration applications.

Internal reference: AW | CH1-1303-052020

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CONFIGURATION



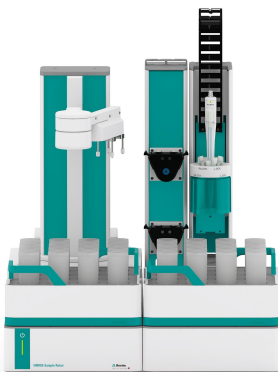
OMNIS Advanced Titrator

新型、模式位分析 OMNIS Titrator 滴定,于独立行或作 OMNIS 滴定系的核心元件行,用于使用 OMNIS Sample Robot 行点和等当点滴定(一/)。由于采用 3S 瓶配器技,理化学品从未像在一安全。可以使用量模和量管元自由配置滴定,并在需要展一台螺旋拌器。在需要可以通相的件功能可平行滴定升 OMNIS Advanced Titrator。

- 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
- 螺旋拌器的接方式
- 可提供不同大小的量管:5、10、20 或 50 mL
- 采用 3S 技的瓶配器:安全理化学品,自生商的原数据

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。

dF-ISE Pt1000

合式数字化物性,集成有温度感器 Pt1000 的 OMNIS 用晶体膜。ISE 用于:

- F- 的子量(10^{-6} mol/L 直至和)
- 自化子量
- 滴定

参比解: $c(\text{KCl}) = 3 \text{ mol/L}$

存放在参比解中。

dTrodes 可在 OMNIS Titratoren 上使用。

