



Application Note AN-T-216

硝酸锂的化验

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.

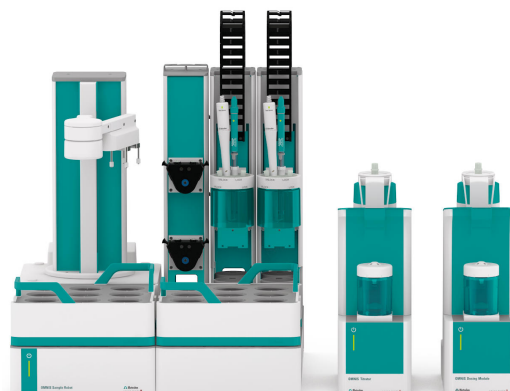


Figure 1. OMNIS Sample Robot, OMNIS Dosing module, and OMNIS Advanced Titrator equipped with fluoride ion selective electrode for the assay of lithium nitrate.

RESULTS

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

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

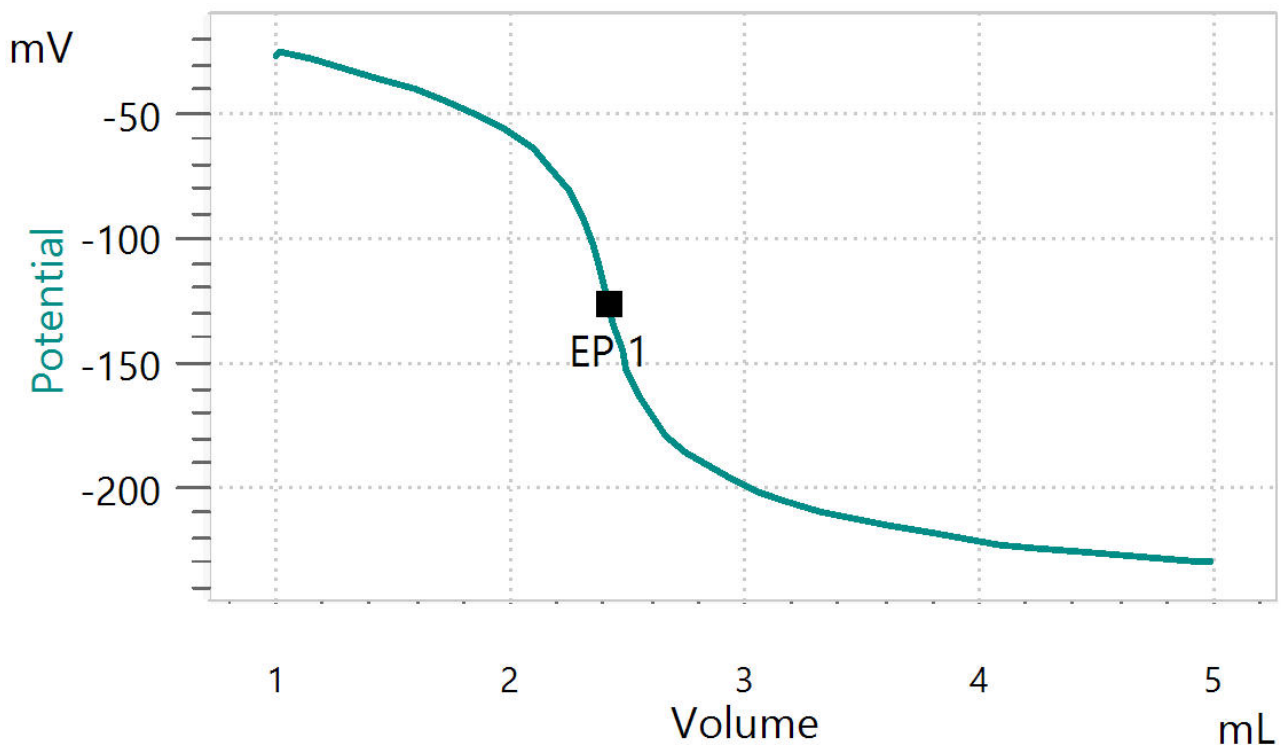


Figure 2. Example titration curve of the assay of lithium nitrate.

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.

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CONFIGURATION



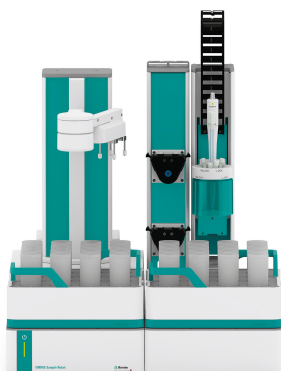
OMNIS Advanced Titrator

创新型、模块式电位分析 OMNIS Titrator 滴定仪,适于独立运行或作为 OMNIS 滴定系统的核心元件运行,用于使用 OMNIS Sample Robot 进行终点和等当点滴定(单一/动态)。由于采用 3S 试剂瓶适配器技术,处理化学品很安全。可以使用测量模块和计量管单元自由配置滴定仪,并在需要时扩展一台螺旋搅拌器。在需要时可以通过相应的软件功能许可证为平行滴定升级 OMNIS Advanced Titrator。

- 通过计算机或本地网络控制
- 可以为其他应用或辅助溶液另外连接四个滴定模块或加液模块
- 螺旋搅拌器的连接方式
- 可提供不同大小的计量管:5、10、20 或 50 mL
- 采用 3S 技术的试剂瓶适配器:安全处理化学品,自动传输生产商的原始试剂数据

测量模式和软件选项:

- 终点设定滴定:“Basic” 功能许可证
- 终点和等当点滴定(单一/动态):“Advanced” 功能许可证
- 终点和等当点滴定(单一/动态),包括平行滴定:“Professional” 功能许可证



OMNIS Sample Robot S Pick and Place

OMNIS Sample Robot S 具有一个“蠕动”泵模块(2 通道)和一个 Pick&Place 模块以及大量附件,可直接进入全自动滴定。此系统具有两个样品盘位置,可用于 32 个 120 mL 的样品盘。此模块化系统供货时已完全安装完毕,因此可在极短时间内投入运行。

该系统也可根据需要扩展配备另外两台蠕动泵以及多加一个 Pick&Place 模块,由此使通量翻倍。如果需要更多工作台,则可将此 Sample Robot 扩展为 L 规格款型的 OMNIS Sample Robot,由此可使七个样品盘的样品在多达四个 Pick&Place 模块上并行处理,将样品通量扩大四倍。



dF-ISE Pt1000

组合式数字氟化物选择性电极,带集成有温度传感器

Pt1000 的 OMNIS 用晶体膜。该 ISE 电极适用于:

- F⁻ 的离子测量(10⁻⁶ mol/L 直至饱和)
- 自动化离子测量
- 滴定

参比电解质:c(KCl) = 3 mol/L

电极存放在参比电解质中。

dTrodes 可在 OMNIS Titratoren 上使用。