



Application Note AN-T-251

# 电位滴定法测定碳酸锂中的碳酸盐含量

Determination of carbonate in lithium carbonate by potentiometric titration according to draft standard ISO 10662

Lithium carbonate is one of the main lithium salts in cathode materials used for lithium-ion batteries. Accurate carbonate and overall purity determination in this raw material are essential because even trace impurities can affect key physicochemical properties, ultimately influencing electrochemical behavior in downstream applications. This is especially significant in battery-grade materials, where

strict compositional tolerances are required to ensure consistent manufacturing performance, long-term cell stability, and overall safety. This Application Note describes carbonate content determination in lithium carbonate on an automated OMNIS system with Dis-Cover lids. The ISO 10662 draft method quantifies the main content of lithium carbonate to enable a precise assessment of material purity.

# SAMPLE AND SAMPLE PREPARATION

This method is applicable to a concentration of battery-grade lithium carbonate ( $\text{Li}_2\text{CO}_3$ ) greater than 95.00%. The samples were dried at 250 ° C

for two hours and allowed to cool down before use.

## EXPERIMENTAL

The analysis is carried out on an OMNIS Advanced Titrator with an OMNIS Sample Robot equipped with a dUnitrode and Dis-Cover lids (Figure 1). A blank analysis is performed with a start volume of hydrochloric acid and titrated until after the equivalence point. Samples are titrated with hydrochloric acid until after the second equivalence point.



**Figure 1.** OMNIS Sample Robot and OMNIS Advanced Titrator equipped with a dUnitrode and Dis-Cover lids.

## RESULTS

The samples were tested in duplicate on one day, and once again on the following day.

Results are displayed in Table 1.

**Table 1.** Results of the carbonate determination of lithium carbonate samples.

| Sample (n = 3) | Content mean value (%) | SD(rel) in % |
|----------------|------------------------|--------------|
| A              | 100.37                 | 0.18         |
| B              | 98.62                  | 0.42         |
| C              | 99.87                  | 0.96         |

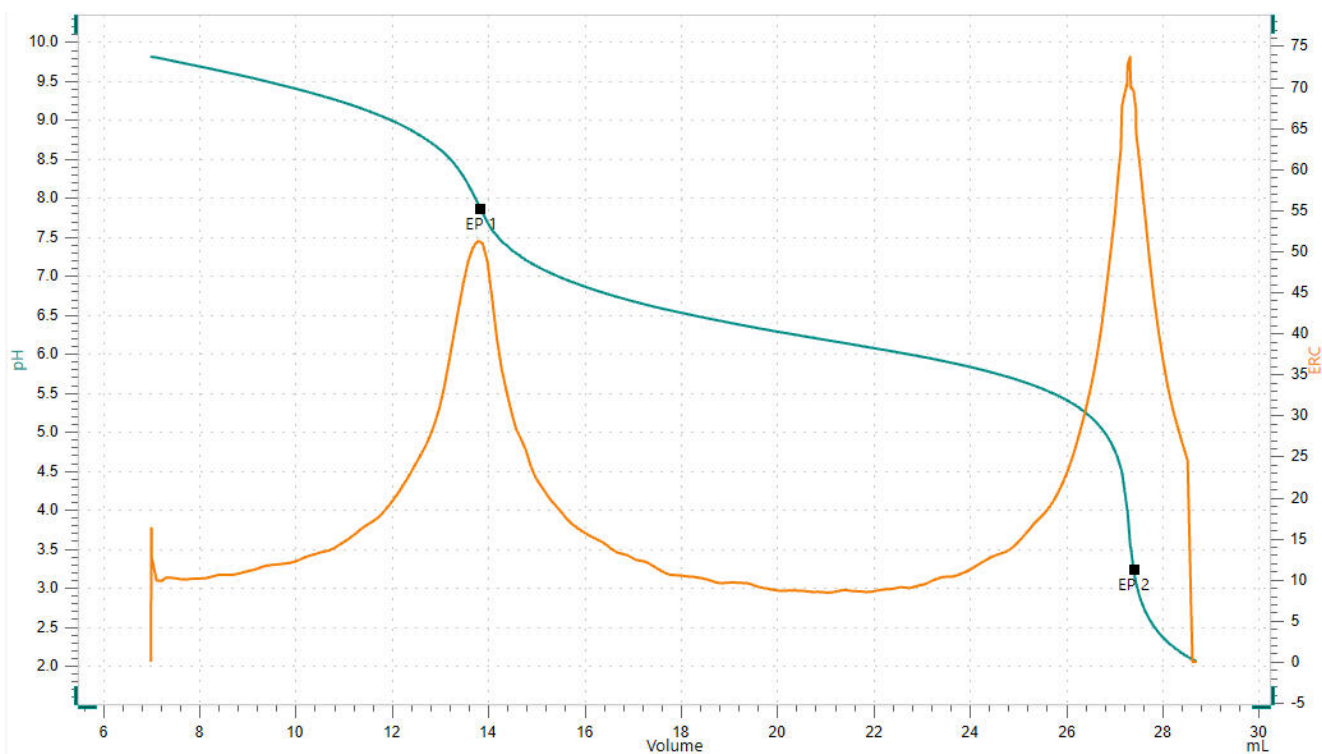


**Figure 2.** Titration curve of the carbonate content in lithium carbonate.

## CONCLUSION

The OMNIS Titrator and OMNIS Sample Robot with Dis-Cover lids provide a fast and reliable determination of carbonate in lithium carbonate

according to draft standard ISO 10662. The OMNIS system can be expanded to other titration applications as required.

## CONTACT

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## CONFIGURATION



### OMNIS Professional Titrator

创新型、模块式电位分析 OMNIS Titrator,适于独立运行或作为 OMNIS 滴定系统的核心元件运行,用于终点和等当点滴定(单一/动态)。由于采用 3S OMNIS Liquid Adapter 技术,处理化学品从未像现在一样安全。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棒式搅拌器。包括用于使用其他滴定或加液模块平行滴定的“Professional”功能许可证。

- 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最多四个滴定模块或加液模块
- 棒式搅拌器的连接方式
- 可提供不同大小的计量管:5、10、20 或 50 mL
- 采用 3S 技术的 OMNIS Liquid Adapter:安全处理化学品,自动传输生产厂家的原始试剂数据

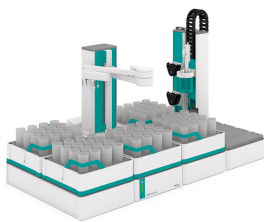
#### 测量模式和软件选项:

- 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 5 路平行滴定:“Professional” 功能许可证



### OMNIS Titration Module

用于与 OMNIS Titrator 滴定仪相连的带磁力搅拌器的滴定仪模块,以扩展额外的滴定台、扩展额外用于滴定/加液的滴定管,以及扩展两个测量模块(模拟或数字)。可自由选择 5、10、20 或 50 mL 计量管单元。



### OMNIS Sample Robot M Pick and Place

OMNIS Sample Robot M 具有一个“蠕动”泵模块(4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。此系统具有五个样品盘位置,可用于 80 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多达四台蠕动泵以及三个 Pick&Place 模块,由此使通量扩大四倍。如果 Sample Robot 上要置放更多样品,可将此 Sample Robot 扩展为 L 规格款型的 OMNIS Sample Robot,以使 112 个样品可在多达 Pick&Place 模块上并行处理,确保长时间不间断的运行。



### OMNIS Rod Stirrer Sample Robot

棒式搅拌器,可直接连接至 OMNIS Sample Robot,带有固定安装的电缆(2.5米)。



### OMNIS 50 mL

智能型计量管单元 50 mL,用于 OMNIS 滴定仪、滴定模块或 Dosing 模块。包括计量软管和防扩散滴管。



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智能型计量管单元 50 mL,用于 OMNIS 滴定仪、滴定模块或 Dosing 模块。包括计量软管和防扩散滴管。



OMNIS 滴定仪或滴定模块的数字测量通道,用于连接数字电极“dTrodes”。



#### (PP) 120 mL20

塑料材质的样品杯(聚丙烯,PP)120 mL,适用于 OMNIS 样品架 602041030,20 个。



#### Dis-Cover 120 mL OMNIS 16

OMNIS Sample Robot Pick&Place 系统中 120 mL 样品杯 6.01400.200、6.01400.300 和 6.01400.303 用 Dis-Cover 盖子。



#### 20 mm ETFE

搅拌螺旋桨 20 mm,高度可调,用于棒式搅拌仪“Titrator”(滴定)或棒式搅拌仪“Sample Robot”



### **dUnitrode Pt1000**

数字式、组合 pH 电极,用于集成有 Pt1000 温度传感器的 OMNIS。其特别适用于:

- 在较重、粘稠或碱性样品中进行 pH-测量和滴定
- 温度提升时
- 长时间测量

固定套管式隔膜对污染不敏感。

参比电解质: $c(\text{KCl}) = 3 \text{ mol/L}$ ,储存在保存液中。

替代方法: $T > 80 \text{ }^{\circ}\text{C}$  时的测量用参比电解质:Idrolyt,储存在 Idrolyt 中。

dTodes 可在 OMNIS Titratoren 上使用。