



Application Note AN-T-181

卤水中的锂

Reliable and inexpensive determination by potentiometric titration

Lithium is a soft metal which is used for many applications, such as production of high-temperature lubricants or heat-resistant glass. Furthermore, lithium is used in large quantities for battery production. It is obtained from brines and high-grade lithium ores. Depending on the lithium concentration, extraction may or may not be economically viable.

This Application Note demonstrates a method to determine the lithium concentration in brines by

potentiometric titration. Lithium and fluoride precipitate in ethanol as insoluble lithium fluoride. Using ammonium fluoride as titrant and a fluoride ion selective electrode (ISE), determination of lithium via potentiometric titration is possible.

This method is more reliable, faster, and less expensive than the determination of lithium in brine by other more sophisticated techniques such as atomic absorption spectroscopy (AAS).

SAMPLE AND SAMPLE PREPARATION

Two samples with ~20% (m/m) and ~40% (m/m) lithium chloride are analyzed. No further

sample preparation is required.

EXPERIMENTAL

The analysis is carried out with an automated system consisting of *tiamo*TM in combination with a 905 Titrando. A fluoride ion selective electrode (ISE) in combination with a Long Life ISE reference electrode is used for the indication of the titration.

After transferring an appropriate amount of sample into the titration vessel, enough ethanol is added to cover the diaphragm of the electrode. The titration is carried out using ammonium fluoride until after the first equivalence point is reached.

Calcium will interfere with the analysis and has to be analyzed separately.

RESULTS

For both samples this method gave reliable and

reproducible results.



Figure 1. 905 Titrando with tiamo. Example setup for the analysis of lithium in brine.

Table 1. Results of the lithium determination in brines.

n = 3	Assay of LiCl brine 1 in %	Assay of LiCl in brine 2 in %
Mean	41.3	14.85
SD(abs)	0.7	0.11
SD(rel)	1.6	0.7

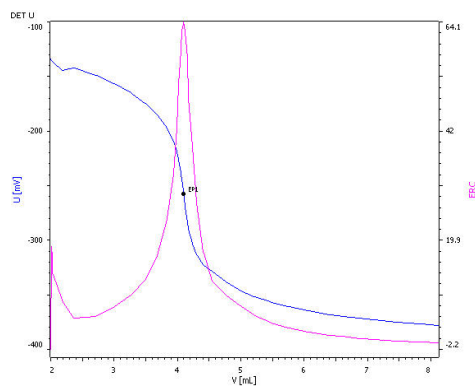


Figure 2. Example curve of the lithium determination in brines.

CONCLUSION

Using ethanol as solvent, ammonium fluoride as titrant, and the fluoride ISE for indication, the determination of lithium in brine can be performed reliably and cost-efficiently.

Therefore, this method provides an inexpensive and simple approach to determine if an extraction of lithium from brine is economically feasible or not.

CONTACT

Metrohm Taiwan Ltd.
開封街二段 46 號 5 樓
108 台北市

info@metrohm.com.tw

CONFIGURATION



907 Titrando

用于使用两个测量接口和 Dosino 加液单元电位分析和容量卡尔·费休滴定法滴定的电位滴定仪。

- 多达四套 800 Dosino 加液系统
- 动态(DET)、等量(MET)和终点滴定(SET),酶和 pH-STAT 滴定(STAT)、卡尔·费休容量滴定(KFT)
- 智能电极“iTrode”
- 使用离子选择性电极测量(MEAS CONC)
- 带监控的加液功能,LQH
- 用于其他搅拌器或加液器系统的四个 MSB 接口
- USB 接口
- 使用 OMNIS-Software、*tiamo*-软件或 Touch Control
- 如果需要,满足 GMP/GLP 和 FDA 要求,比如 21 CFR 第 11 部分



F-ISE Pt1000

组合式氟化物选择性电极,带集成有 Pt1000 的晶体膜。

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。