Application Note AN-T-221

高效液相色谱流动相的 SET 滴定

Automated timesaving pH adjustment of semi-aqueous media

High pressure liquid chromatography (HPLC) requires the use of a mobile phase – mostly consisting of semi-aqueous media. These kinds of media are challenging to titrate as the electrodes behave differently compared to when working with aqueous media. Laboratory analysts often remark that manual pH adjustment using a pH electrode is very time-consuming, resulting in long waiting times between additions until a stable pH is reached.

This Application Note presents the automatic pH adjustment of a mixture of acetonitrile, water, and triethylamine using a Metrohm titrator. The time required to adjust the mobile phase pH has decreased from hours to approximately 10 minutes with the described setup. Additionally, the pH value at the end of the adjustment as well as the volume of titrant used can be automatically documented and traced for auditing purposes.

For accurate endpoint indication, the EtOH-Trode was used. This electrode has been specially designed to measure pH in nonaqueous solutions owing to its double junction system and special membrane glass.

SAMPLE AND SAMPLE PREPARATION

This application is demonstrated on a solvent mixture composed of 1600 mL acetonitrile, 400 mL deionized water, and 10 mL triethylamine.

EXPERIMENTAL

The analyses were carried out on an Eco Titrator in combination with the EtOH-Trode (Figure 1). The determinations were performed on 200 mL aliquots of the solvent mixture.

The adjustment of the pH value was achieved within a matter of minutes, whereas manual pH adjustment took hours to complete. The obtained pH at the end of the titration was stable and reproducible.

Table 1. Volume needed for the adjustment of the pH value of 200 mL solvent mixture.

	pH 10	pH 7
Titrant volume	0.15 mL	0.95 mL

CONCLUSION

This application example shows how easily manual pH adjustments can be automated by choosing the right device and electrode. Moreover, automation offers significant benefits for laboratories including time savings, increased precision, economical analysis, and traceability.

Internal reference: AW TI DE1-0810-032021

CONTACT

Metrohm Taiwan Ltd.
開封街二段 46 號 5 樓
108 台北市
info@metrohm.com.tw

CONFIGURATION

Eco Titrator

紧凑型 Eco Titrator 具有内置磁力搅拌器和触摸感应式用户界面,可以满足日常分析需求。其始终提供符合 GLP 标准的结果。

普遍适用于几乎所有电位分析式滴定,例如:

- 食品:脂肪的酸度、氯化物、维生素 C、碘和过氧化物值
- 水分析:碳酸盐和 Ca/Mg 硬度、氯化物、硫酸盐、高锰酸盐指数
- 石化:酸/碱值、硫化物和硫醇、氯化物、溴值
- 电镀:总酸度、金属含量、氯化物
- 表面活性剂分析:阴离子、阳离子和非离子表面活性剂
- 光度计与光度电极:p 和 m 值、金属、水硬度

EtOH-Trode

用于非水介质(例如,用于乙醇中的 pHe)中 pH 测量的带双结系统的 pH 电极。

电极配有防污染的固定磨口隔膜,可以自由选择中间电解质(水性或非水性)。

当使用 c(KCl) = 3 mol / L 作为外参比液电解质时,建议在保存液中储存。当使用其他外参比液电解质时,建议存放在相应用过的电解液中。

这两个用于内参比液电解质 ("INNER FILLING") 和外参比液电解质 ("OUTER FILLING") 的腔体在交付时分别填充有 c(KCl) = 3 mol/l。