



Application Note AN-T-238

水中碱度(p值和m值)的测定

Fast and accurate potentiometric titration of alkalinity according to ASTM D1067 and EN ISO 9963-1

Alkalinity (sometimes referred to as water alkalinity) is a measure of the acid-binding capacity of water. Its degree depends on the amount of basic ions contained, mainly the carbonate content. Therefore, a distinction is made between total alkalinity (m-value) and carbonate alkalinity (p-value).

The analytical determination is carried out by titration with hydrochloric acid to pH 4.5 (turnover of the indicator methyl orange, hence «m-value»). If the initial pH of a sample is above

8.3, the acid consumption up to pH 8.3 (within the envelope of the indicator phenolphthalein, therefore «p-value») can be titrated as an intermediate step.

In this Application Note, the determination of pH and alkalinity in water with a titration method is presented. This method conforms to EPA 310.1, Standard Methods 2320 B (Titration Method), ASTM D1067, and both EN ISO 9963-1 and 9963-2.

SAMPLE AND SAMPLE PREPARATION

This application is demonstrated on tap water.

Sample preparation is not required.

EXPERIMENTAL

The determinations are carried out on an OMNIS Professional Titrator equipped with a dUnitrode with integrated Pt1000 (**Figure 1**).

An appropriate amount of water is pipetted into the titration beaker. After pH measurement, the p- and m-values are determined with fixed endpoints (FP) at pH 8.2 and 4.5 using standardized hydrochloric acid.



Figure 1. OMNIS Professional Titrator equipped with a dUnitrode with integrated Pt1000.

RESULTS

This method offers very accurate results, as displayed in **Table 1**. One exemplary curve for

alkalinity titration for water is shown in **Figure 2**.

Table 1. Results of the p alkalinity and m alkalinity of tap water expressed in mmol/L (n = 5).

Sample (n = 5)	p-value in mmol/L	m-value in mmol/L
Mean value	0.039	2.261
SD(abs)	0.002	0.001
SD(rel) in %	5.7	0.1

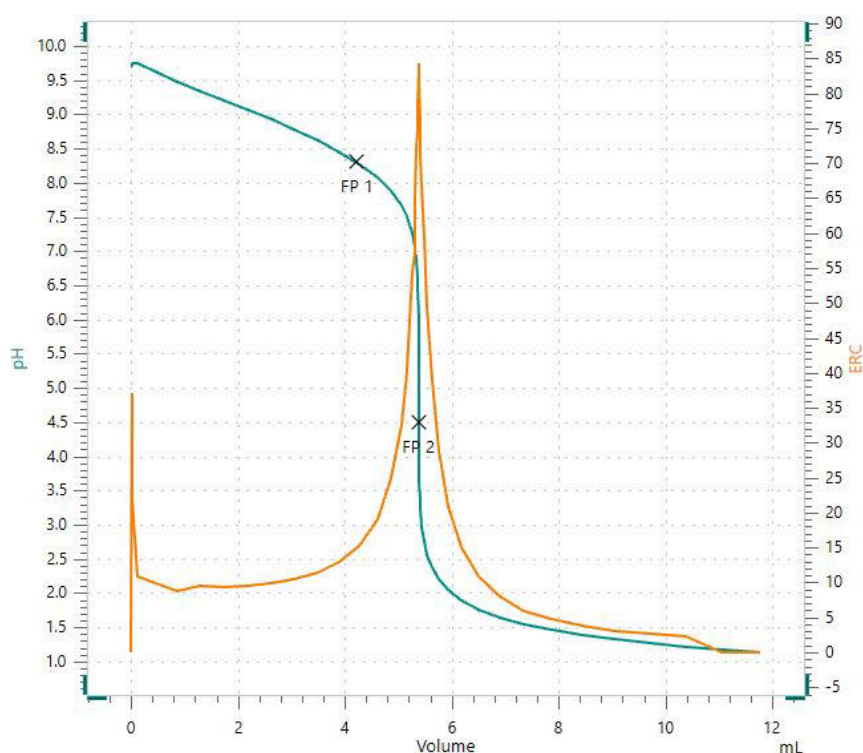


Figure 2. Titration curve showing a potentiometric determination of p alkalinity and m alkalinity with fixed endpoints at pH = 8.3 (FP1) and pH = 4.5 (FP2).

CONCLUSION

The presented titration method for alkalinity is used to accurately measure the p-value and m-value in tap water. This method conforms to EPA 310.1, Standard Methods 2320 B (Titration Method), ASTM D1067, and both EN ISO 9963-1 and 9963-2.

Precise and reliable determinations of alkalinity in water by titration with HCl are made easy using the OMNIS Professional Titrator equipped with a dUnitrode with integrated Pt1000. This

system offers users flexibility combined with high-end software. The dUnitrode is suitable for pH measurements as well as titrations in water samples. The fixed ground-joint diaphragm is resistant to contamination and the electrode works even at elevated temperatures.

Aside from improving the precision and speed of the determinations, OMNIS delivers results on par with or better than other established titration systems.

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