



Application Note AN-T-238

水中度(p和m)的定

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

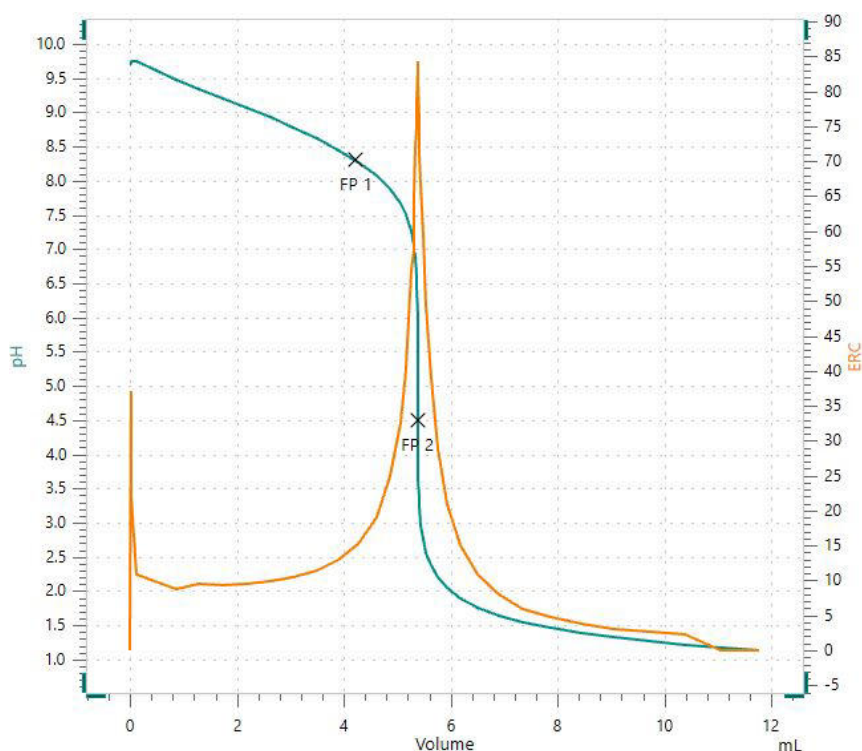


Figure 2. Titration curve showing a potentiometric determination of p alkalinity and m alkalinity with fixed endpoints at pH = 8.3 (FP1) and pH = 4.5 (FP2).

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

OMNIS Titrator, OMNIS ,(/) 3S OMNIS Liquid Adapter „Professional”

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- :51020 50 mL
- 3S OMNIS Liquid Adapter:,
- :
- :“Basic”
- (/):“Advanced”
- (/), 5 :“Professional”