



Application Note AN-T-203

Acidity in volatile solvents and chemical intermediates

Objective and reliable determination according to ASTM D1613

The presence of acidic components in volatile solvents is due to contamination of the solvents, or through their decomposition during storage, distribution, or manufacture. Increased acid content in solvents could lead to a variety of problems like shorter storage stability or chemical corrosion, which can damage costly

company assets and lead to shutdowns.

Using the Optrode for indication, the acidity is determined according to **ASTM D1613** by photometric titration with sodium hydroxide as titrant and phenolphthalein as indicator. The Optrode enables an objective recognition of the end point enhancing the accuracy of the results.

SAMPLE AND SAMPLE PREPARATION

The analysis is demonstrated on 4-methyl-2-pentanone (MIBK), 2-ethoxyethyl acetate, and 2-

ethoxyethanol.

EXPERIMENTAL

The analysis is carried out fully automatically on an OMNIS system consisting of an OMNIS Sample Robot, an OMNIS Advanced Titrator, and an OMNIS Dosing Module. The Optrode is used for indication of the end point.

For water-soluble samples (e.g., 2-ethoxyethanol), an appropriate amount of sample is pipetted into the sample beaker. While stirring, deionized water is dosed and phenolphthalein indicator solution is pipetted into the sample beaker. The solution is then titrated with standardized sodium hydroxide until after the end point is reached. After each titration, the titrated solution is aspirated and the buret tips as well as the sensor are rinsed with deionized water in the sample beaker.

For samples that are not completely miscible in water (e.g., MIBK or 2-ethoxyethyl acetate), the same procedure is used as for water-soluble samples with the exception that carbon-dioxide free ethanol is used instead of deionized water.

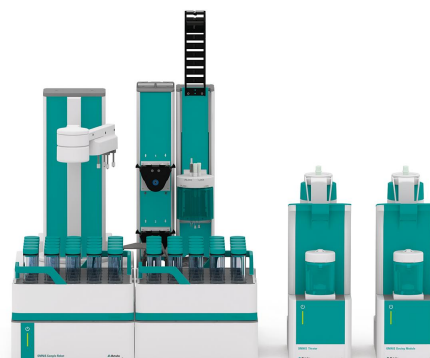


Figure 1. OMNIS system consisting of an OMNIS Sample Robot, an OMNIS Advanced Titrator, and an OMNIS Dosing Module.

RESULTS

Color changes are produced which are detected objectively with the Optrode and reliably

evaluated by the OMNIS Software.

Table 1. Overview of the results obtained for 4-methyl-2-pentanone (MIBK), 2-ethoxyethyl acetate, and 2-ethoxyethanol (n = 6).

Substance	Mean value / %	SD(abs) / %	SD(rel) / %
4-methyl-2-pentanone	0.0151	$6.0 \cdot 10^{-5}$	0.4
2-ethoxyethyl acetate	0.012	$8.0 \cdot 10^{-5}$	0.7
2-ethoxyethanol	0.0003	$1.6 \cdot 10^{-5}$	5.2

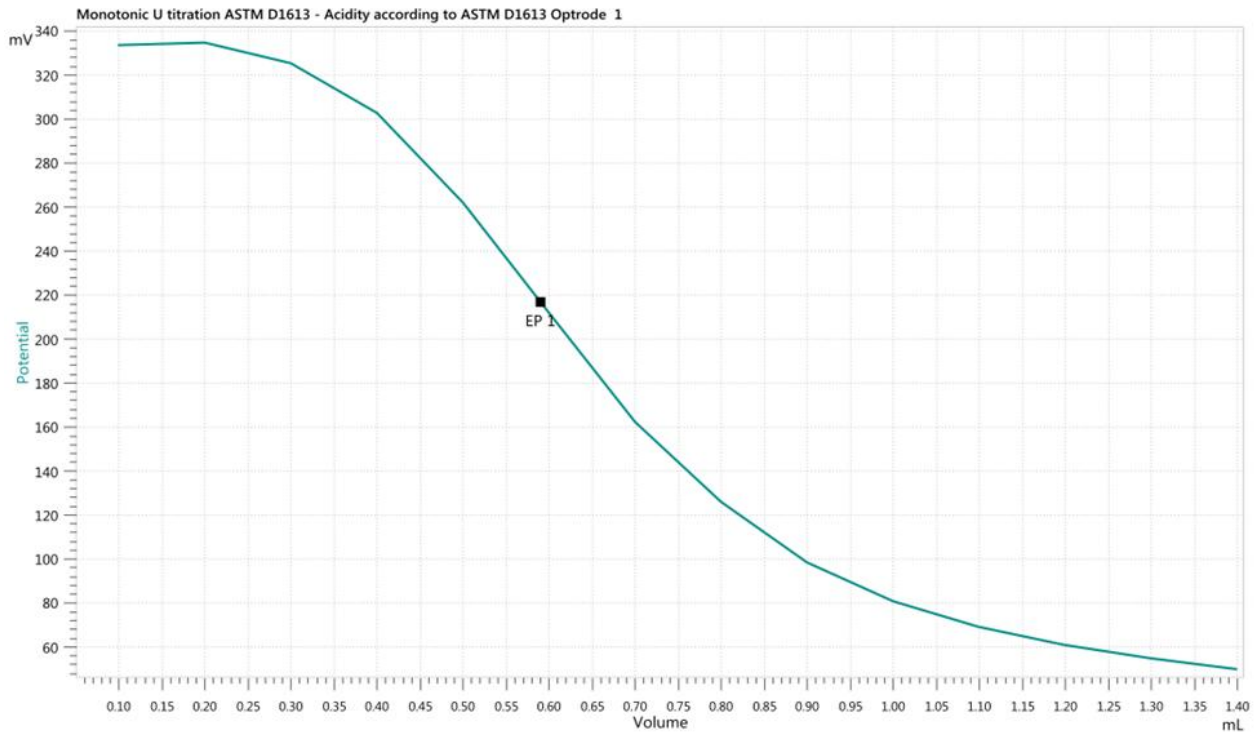


Figure 2. Titration curve showing the determination of acidity in volatile solvents according ASTM D1613.

CONCLUSION

This method shows the possibility to determine very low acidity according to **ASTM D1613**. The standard deviation is acceptable even at very low acidities due to the objective and reproducible detection of the color change by the Optrode.

With the possibility to easily change between 8 different wavelengths, the Optrode can be used for other applications. The fully automated OMNIS system allows to enhance the throughput of the analyses and enabling the best possible results.

Internal reference: AW TI CH1-1254-112018

CONTACT

瑞士万通中国
 北京市海淀区上地路1号院
 1号楼7702
 100085 北京

marketing@metrohm.com.cn

CONFIGURATION



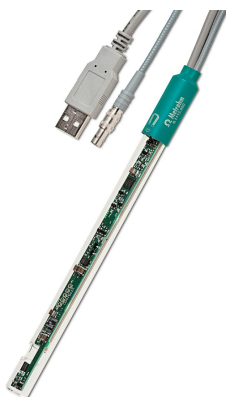
OMNIS Advanced Titrator

新型、模式位分析 OMNIS Titrator 滴定,于独立行或作 OMNIS 滴定系的核心元件行,用于使用 OMNIS Sample Robot 行点和等当点滴定(一/)。由于采用 3S 瓶配器技,理化学品从未像在一安全。可以使用量模和量管元自由配置滴定,并在需要展一台螺旋拌器。在需要可以通相的件功能可平行滴定升 OMNIS Advanced Titrator。

- 通算机或本地网控制
- 可以其他用或助溶液外接最多四个滴定模或加液模
- 螺旋拌器的接方式
- 可提供不同大小的量管:5、10、20 或 50 mL
- 采用 3S 技的瓶配器:安全理化学品,自生商的原始数据

量模式和件:

- 点定滴定:“Basic” 功能可
- 点和等当点滴定(一/):“Advanced” 功能可
- 点和等当点滴定(一/),包括平行滴定
- “Professional” 功能可



Optrode

有 8 可用波的光度滴定用光学感器。可以通件控制 (tiamo 2.5 及以上版本)或通磁来行波切。玻璃鞘溶完全耐受,并且易于清。省空的感器用于,例如:

- 按照 USP 或 EP 的非水溶性滴定
- 基端基的定
- TAN/TBN 根据 ASTM D974
- 硫酸定
- 混凝土中的 Fe、Al、Ca
- 水硬度
- 根据 USP 的硫酸骨素

感器不合通量色度(比色法)来定度。