

Application Note AN-T-173

性质变化的乙醇燃料的 pHe 值

Fast and accurate measurement according to ASTM D6423

The pHe is a measure of acid strength in alcohol fuels and in ethanol. It can be used as predictor of the corrosion potential of an ethanol-based fuel. The determination of the pHe is preferred over the total acidity, because total acidity overestimates the contribution of weak acids (e.g., carbonic acid) and underestimates the contribution of strong acids (e.g., sulfuric acid). Furthermore, the acid strength is an important parameter to determine in order to reduce the risk of failing motors.

The pHe is not to be confused with the pH value. The pH value is only applicable for aqueous solutions, whereas the pHe value is a measure for alcoholic solutions.

The pHe value is highly dependent on the sample itself, but also on the stirring rate and the time the electrode is immersed into solution. Therefore, both the stirring rate and measuring time need to be fixed.

This Application Note describes the determination of the pHe value using the 913 pH Meter and the EtOH Trode according to ASTM D6423, which covers denatured fuel ethanol and ethanol fuel blends.

SAMPLE AND SAMPLE PREPARATION

The method is demonstrated for denatured ethanol fuel.
Temperature has a strong influence on the obtained results. Therefore, sample temperatures are first adjusted to be at the same value in order to be able to compare results.

EXPERIMENTAL

This application is performed on a 913 pH Meter equipped with an EtOH Trode, a temperature sensor, and an external stirring plate. The EtOH Trode is conditioned and calibrated prior to use.
A defined amount of sample is poured into a 100 mL beaker and placed on an external stirring plate. The EtOH Trode and the temperature sensor are immersed, and the measurement is started immediately. The value after 30 seconds is considered to be the acid strength of the sample.



Figure 1. 913 pH Meter equipped with a pH electrode. Example setup for the determination of the pHe value.

RESULTS

The analysis demonstrates acceptable and reproducible pHe values. For the tested denatured ethanol fuel, a pHe value of 8.08 (n = 10, SD(rel) = 0.45%) is obtained. An example measurement curve is displayed in Figure 2.

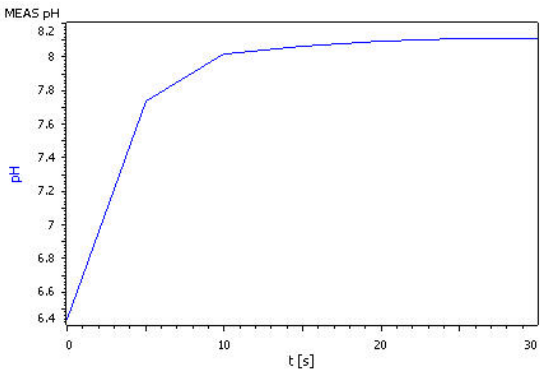


Figure 2. Example curve of a pHe measurement in denatured ethanol fuel.

CONCLUSION

With a 913 pH Meter it is possible to assess quick and easily the pHe of an ethanol fuel according to **ASTM D6423**. The used EtOH Trode is specifically mentioned in the standard, and is therefore fully compliant.

By using a 913 pH/DO meter or a 914 pH/Conductometer, it is also possible to assess the dissolved oxygen concentration or the conductivity in parallel, if necessary.

Internal reference: AW TI CH1-1232-102016

CONTACT

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

CONFIGURATION



913 pH Meter

便携式双通道 pH 测量设备,用于测量 pH/mV 和温度。通过这种电池供电的测量设备,您便可以实现面向现场测量的装备。

- 内置电池组和两个电流隔离 pH 测量输入端的便携式 pH 值计
- 模拟 pH 测量输入端,用于万通标准 pH 电极
- 数字 pH 测量输入端,用于万通智能 pH 电极
- 坚固实用的防水防尘外壳 (IP67),适合户外及实验室使用
- 背光 LCD 彩色显示屏,用于方便读取结果
- USB 接口,用于方便将数据从计算机导出到打印机上
- 更大的内存(10'000 数据组)
- 引线保护型用户和专家模式,防止修改一些默认参数
- GLP 达标打印和数据导出,带用户 ID 和时间戳



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。