



Application Note AN-T-235

定炭黑中的 pH

Fast, accurate pH measurement in carbon black for battery cathodes according to ASTM D1512, ISO 787-9, and GB/T 1717

Conductive carbon black is an essential additive in modern lithium-ion batteries. It is used as an ingredient in the cathode and forms a conductive chemical structure that ensures that non-conductive materials (e.g., lithium nickel manganese cobalt oxides) are electrically connected to each other and to the current collector. Without conductive carbon black, no electrical current would flow, and the battery cell would not work. It is therefore essential to confirm the properties and quality of carbon

black. In this respect, the pH value is among the first easy-to-check parameters.

However, in order to determine the correct pH value, both the method and the measuring equipment must meet the highest quality standards.

In this Application Note, the pH value in carbon black is accurately and reliably analyzed by using a 913 pH Meter equipped with a pH electrode according to ASTM D1512 as well as ISO 787-9 and GB/T 1717.

SAMPLE AND SAMPLE PREPARATION

This application is demonstrated on carbon black used as a conductive additive cathode

material.

Sample preparation is not required.

EXPERIMENTAL

The pH values are carried out using a 913 pH Meter equipped with a pre-calibrated Unitrode easyClean (Figures 1 and 2).

To create the cathode slurry, an appropriate amount of sample is weighed into the sample

beaker, and deionized water plus an organic solvent as wetting agent (according to the standards) are added. Afterwards, the cathode slurry pH is determined.



Figure 1. 913 pH Meter from Metrohm.



Figure 2. Unitrode easyClean with Pt1000 temperature sensor

RESULTS

This method offers very accurate results, as shown in **Tables 1 and 2**.

Table 1. Results of the pH measurement of carbon black according to ASTM D1512 (n = 6).

Sample (n = 6)	pH value	Temperature in ° C
Mean	8.62	24.3
SD(abs)	0.01	0.1
SD(rel) in %	0.1	0.2

Table 2. Results of the pH measurement of carbon black according to ISO 787-9 and GB/T 1717 (n = 6).

Sample (n = 6)	pH value	Temperature in ° C
Mean	8.00	24.9
SD(abs)	0.02	0.1
SD(rel) in %	0.2	0.3

CONCLUSION

The 913 pH Meter equipped with the Unitrode easyClean is an excellent combination to measure pH in cathode materials.

This setup is inexpensive, user-friendly, and takes up minimal bench space. Furthermore, as the

name indicates, the easyClean diaphragm of the Unitrode can be easily cleaned even in the case of heavily contaminating samples like carbon black.

CONTACT

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CONFIGURATION



913 pH Meter

便携式双通道 pH 量,用于量 pH/mV 和温度。通池供且有支架板的量,便可以面向和在室中量的装。

- 内置池和个流隔 pH 量入端的便携式 pH
- 模 pH 量入端,用于万通准 pH
- 数字 pH 量入端,用于万通智能 pH
- 固用的防水防外 (IP67),合外及室使用
- 背光 LCD 彩色示屏,用于方便取果
- USB 接口,用于方便将数据从算机出到打印机上
- 更大的内存(10000 数据)
- 引保型用和家模式,防止修改一些默参数
- GLP 打印和数据出,用 ID 和戳