Application Note AN-K-074

用休滴定法定原油中的含水量

Fully automated determination using the oven method according to ASTM D4928

Crude oil contains water. Before transport, water is removed to reduce costs. Furthermore, the presence of water in crude can cause corrosion. Therefore, it is essential to determine the water content in crude oil.

Previously, ASTM D4928 described a direct coulometric Karl Fischer titration to determine water in crude oil. This quickly contaminated the titration cell, requiring regular cleaning and frequent reagent exchange. ASTM D4928 was then revised to include coulometric Karl Fischer titration in combination with the oven method. In this method, the sample is heated in an oven. The water evaporates and is carried into the titration cell by an inert carrier gas. The water content is determined in the titration cell.

The oven method avoids titration cell contamination and significantly reduces reagent consumption. It can be fully automated, minimizing handling errors and workloads, with outstanding reproducibility.

SAMPLE AND SAMPLE PREPARATION

The method is demonstrated for three different crude oil types. The samples are homogenized before being filled into sample vials.

EXPERIMENTAL

This analysis is carried out on an automated system consisting of an 874 Oven Sample Processor and an 851 Titrando equipped with a coulometric titration cell (Figure 1).

Figure 1. The 874 Oven Sample Processor, 851 Titrando and coulometric titration cell, all controlled by tiamo software.

RESULTS

The analysis demonstrates acceptable results and well-defined titration curves. The results for the three different crude oil samples are shown in Table 1. An example titration curve is displayed in Figure 2.

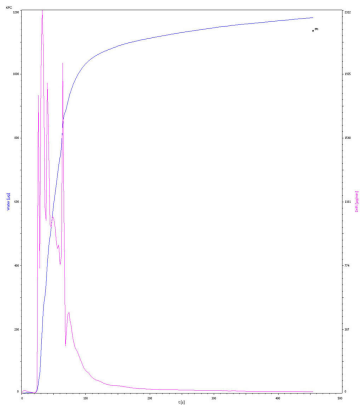

Figure 2. Example titration curve of the water content determination in crude oil.

Table 1. Results for the water content determination in crude oil according to ASTM D4928.

Water content (n = 4)	Mean in µg H_2O/g sample	SD(rel) in %
Sample 1	853	2.09
Sample 2	4865	0.44
Sample 3	41111	0.43

CONCLUSION

The oven method is the perfect option to determine water content in crude oils precisely and reliably.
Using the 874 Oven Sample Processor allows fully automated determination, freeing up valuable time and thus increasing laboratory productivity. Furthermore, by fully automating the analysis, the reproducibility can be increased and sample analysis failures due to improper handling can be reduced.

CONTACT

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CONFIGURATION

874 Oven Sample Processor
874 Oven Sample Processor 用于在·休滴定中自行化品前理。炉式方法特合于那些在高温度下方可析出水的品、以及溶品或与 KF 起反的品。

851 Titrando

法休水分定包括隔膜的生和 801拌器。

于痕量水分(10 µg-10 mg 水量)的定来,分析法是用于液体、固体和气体中水分定的理想方法。此外,分析法是一方法,因此无需行滴定度定。

使用 851 Titrando 可便快捷地行法滴定。

建的量范:10 µg-200 mg水量

使用 OMNIS件、tiamo件或触摸屏控制。如果需要,可足 GMP、GLP 和 FDA 要求,比如 21 CFR Part 11。