

Application Note AN-T-055

Determination of Lauryl Sulfate

Fast and reliable determination by turbidimetric titration

Due to its price and wide availability, the anionic surfactant sodium lauryl sulfate (SLS; SDS) can be found in many detergents as an active ingredient e.g., in cleaning or cosmetic products.

SLS is mainly added to these products to act as an emulsifier or as a fat solvent. The fact that it dissolves fats very well may lead to dry skin and hair, and thus to skin irritation. To avoid this, regulations in many countries have restricted its concentration in readyto-use products to a range between 0.05–2.5% SLS.

To control the concentration of SLS in different products, a titration is carried out with TEGO® trant A100. This cationic surfactant was designed especially for the titration of anionic surfactants, and precipitates uniformly with them.

The turbidimetric titration monitors the degree of turbidity using the Optrode. The evaluation is done automatically by means of a software, leading to reliable and reproducible results.

SAMPLE AND SAMPLE PREPARATION

The analysis is demonstrated on hand soap containing SLS. No sample preparation is required.

EXPERIMENTAL

The analysis is carried out fully automatically on a Titrando system consisting of a 905 Titrando and an Optrode (Figure 1).

The sample is transferred into a sample beaker and buffer (pH = 3) is added. The obtained solution is filled up with deionized water to a total volume of approximately 60 mL and titrated with standardized TEGO® trant A100 until after the second break point.



Figure 1. Titrando system consisting of a 905 Titrando, an Optrode, and tiamo for data processing.

RESULTS

Reproducible titration curves (see Figure 2) are obtained for all analyses. For calculation purposes, the second break point was used because this point correlates to the stage in titration where no more precipitation is formed.

With the automated analysis described here, a SLS content of 26.7 mmol/100 g (SD(rel) = 1.2%, n = 3) is obtained for the tested hand soap.

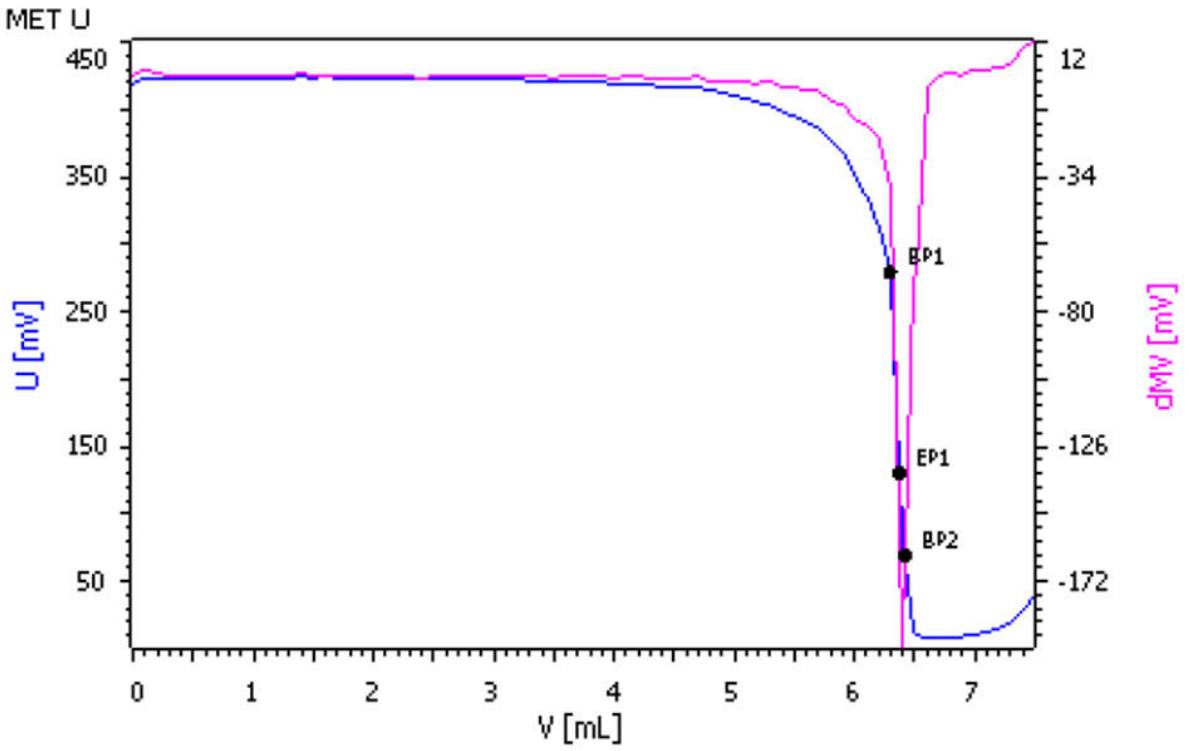


Figure 2. Titration curve of the determination of SLS with TEGO® trant A100. The titration curve shows the EP as well as BP1 and BP2. BP2 is used for the calculation.

CONCLUSION

The described system has the capability to objectively determine the change in turbidity. This leads to more precise and more reproducible results compared to manual titration. With its glass shaft, the Optrode is insensitive to solvents and can also be used at different wavelengths for other applications.

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CONFIGURATION



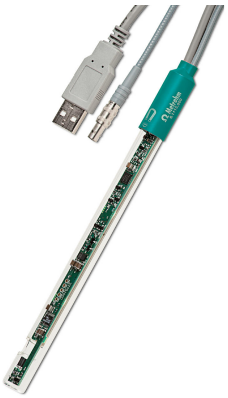
OMNIS Advanced Titrator with magnetic stirrer

Innovative, modular potentiometric OMNIS Titrator for stand-alone operation or as the core of an OMNIS titration system for endpoint titration and equivalence point titration (monotonic/dynamic). Thanks to 3S Liquid Adapter technology, handling chemicals is more secure than ever before. The titrator can be freely configured with measuring modules and cylinder units and can have a rod stirrer added as needed. If required, the OMNIS Advanced Titrator can be equipped for parallel titration via a corresponding software function license.

- Control via PC or local network
- Connection option for up to four additional titration or dosing modules for additional applications or auxiliary solutions
- Connection option for one rod stirrer
- Various cylinder sizes available: 5, 10, 20 or 50 mL
- Liquid Adapter with 3S technology: Secure handling of chemicals, automatic transfer of the original reagent data from the manufacturer

Measuring modes and software options:

- Endpoint titration: "Basic" function license
- Endpoint and equivalence point titration (monotonic/dynamic): "Advanced" function license
- Endpoint and equivalence point titration (monotonic/dynamic) with parallel titration: "Professional" function license



Optrode

Optical sensor for photometric titrations offering 8 different wavelengths. The wavelength can be switched using the software (tiamo 2.5 or higher) or with a magnet. The glass shaft is completely solvent-resistant and easy to clean. For example, this space-saving sensor is suitable for:

- Non-aqueous titrations in accordance with USP or EP
- Determinations of carboxyl end groups
- TAN/TBN in accordance with ASTM D974
- Sulfate determination
- Fe, Al, Ca in cement
- Water hardness
- Chondroitin sulfate in accordance with USP

The sensor is not suitable for determinations of concentrations via measurement of color intensity (colorimetry).