Product Brief

NanoCuvette™ One

Quantification and Kinetics of Proteins, Enzymes and Carbohydrates

Key uses

Measurements at different volumes (0.5 µL, 3 mL) and concentrations (0.02 - 300 mg/mL)

Non-absorbing protein concentrations

Monitoring label-free enzymatic reactions

Monitoring non-absorbing/ non-fluorescent kinetics

QC measurements

Key features

Affordable upgrade for your existing UV-Vis spectrophotometer

Semi-reusable cuvettes

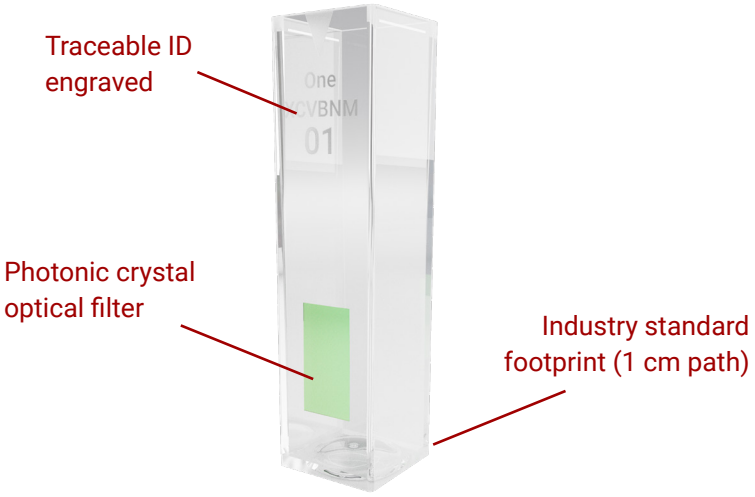
Less sample needed for analysis

Made in Denmark with unique ID for traceability

Easy to use with no training required

Overview

The NanoCuvette™ One is an excellent improvement in any laboratory workflow for quantitative analysis in numerous industries such as biotechnology, pharmaceuticals, chemistry, foods and industrial applications for quality control.
The capacity of NanoCuvette™ One goes far beyond any product currently on the market in terms of concentration determination. With the NanoCuvette™ One you are able to analyze smaller samples (down to 0.5 µL) and a large range of concentrations (0.02 - 300 mg/mL) of non-absorbing compounds.



NanoCuvette™ One

The NanoCuvette™ One expands the capabilities of your spectrophotometer. It allows you to perform classic absorbance (attenuance) spectroscopy and label-free spectroscopy via refractive index. Integrated in the surface is a patented photonic nanocrystal (optical filter), which bends the light beam such that it senses refractive index near the photonic crystal surface in the wavelength range from 550 nm to 800 nm.
Together with the unique free online software SpectroWorks™ it is possible to calculate a number of different results of a sample, such as concentrations and user-defined parameters. Thereby, you can determine concentrations without any dye or fluorescence for compounds such as carbohydrates, proteins or perform chemical or enzymatic kinetic studies.

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NanoCuvette™ One key uses:

Less sample needed for analysis

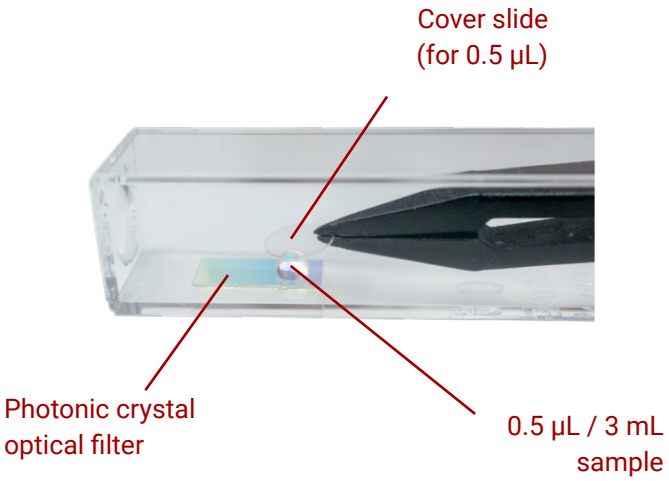
Enzymes and proteins can be expensive, some equipment needs 2 to 3 µL to measure protein. The NanoCuvette™ One can measure volumes down to 0.5 µL and concentrations down to 0.2 mg/mL for sucrose (Limit of detection is below 0.2 mg/mL sucrose concentration).

Label-free concentation determination

NanoCuvette™ One's optical filter measure refractive index and together with SpectroWorks™ it will calculate the refractive index similar to SPR. Refractive index does not require any coloration (dye or indicator) to be measured. Thus it is possible to measure concentrations with spectrophotometer of a transparent solution.

Monitoring label-free enzymatic reactions

Direct label-free detection of enzymatic activity with a substrate can be monitored with the change in the intrinsic property refractive index of the solution as product is formed over time. The NanoCuvette™ One has a built-in optical filter allowing it to measure refractive index changes due to enzymatic reaction kinetics in real time using an UV-Vis spectrophotometer.



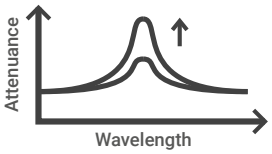
Label-free protein concentration determination

Some proteins can be quantified by absorption spectroscopy as aromatic amino acids absorb UV light at 280 nm. Depending on the amount of protein it will absorb more or less light at 280 nm and have a higher or lower extinction coefficient. The extinction coefficient can be calculated theoretically, but these values are often 10 % or more incorrect. With label-free spectroscopy the extinction coefficient has been determined with high precision. The protein refractive index is a quick way of obtaining the protein concentration without the need of making a standard curve. As an additional advantage, this method also allows for direct quantification of your protein without prior dilution.

Absorption versus label-free spectroscopy

With absorption spectroscopy, the Beer–Lambert law relates the attenuation of light to the properties of the material through which the light is travelling:

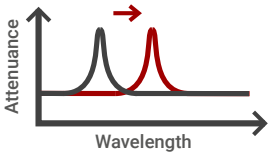
$$A = \varepsilon c l + A_0,$$



where A is the absorbance, ε is molar extinction coefficient, c is the concentration, l is the path length and A_0 is the background absorbance.

In contrast, when light hits a nanoscale photonic crystal, the resonance wavelength is related to the refractive index or concentration close to the surface:

$$\lambda = \beta(ac + n_s) + \lambda_0,$$



where λ is the wavelength, β is a coefficient, a is the specific refractive increment, c is the concentration, n_s is the solvent refractive index and λ_0 is the reference resonance wavelength. This is called label-free spectroscopy.

Why do we upgrade UV-Vis spectrophotometry?

Traditionally, spectrophotometry laboratory work has been limited by lack of robust methods to determine concentrations. We upgrade UV-Vis spectrophotometry around the world and across all major instrument brands to create new ways to determine concentration, perfom enzymatic studies in a label-free, fast, cheap, and reliable method.

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About cphnano

Since 2015, labs around the world have used our patented cuvettes and cloud software to upgrade their UV-Vis instruments. Today, our offerings include NanoCuvette™, SpectroWorks™, SpectroLink™ and SpectroShell™ available via our trusted resellers and partners in more than 20 countries.