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How do you measure fluorescence?

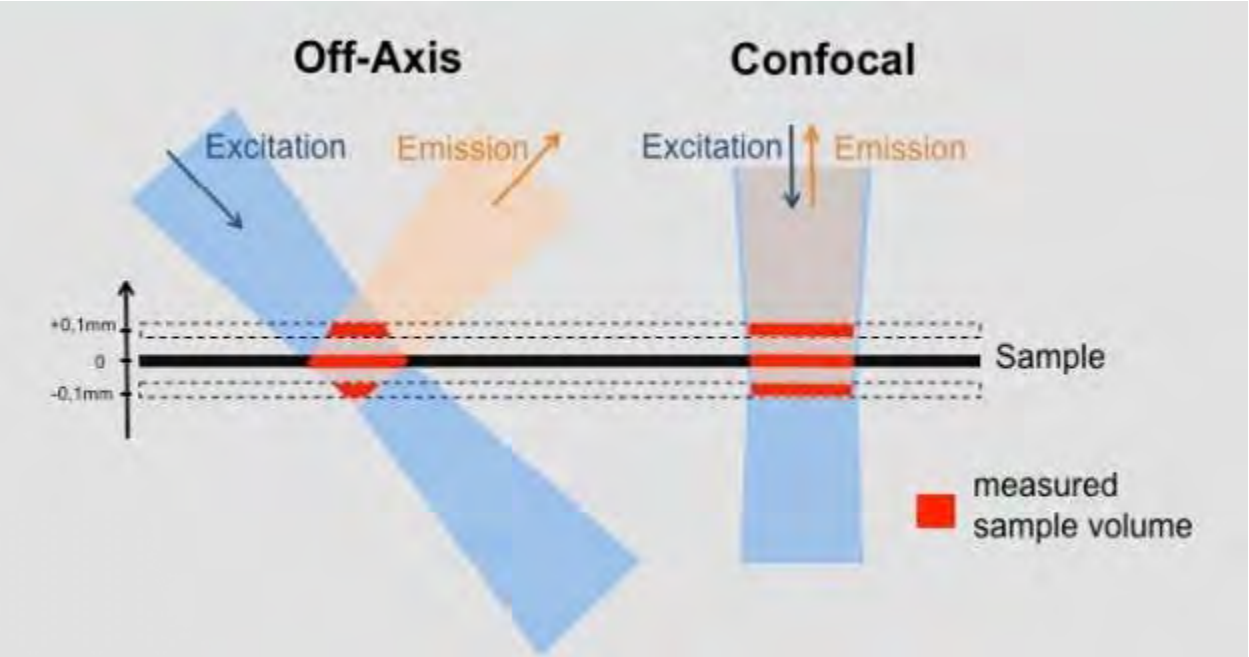
Due to the fact that today's measurement technology is complex, expensive and only practical in labs, it has not always been possible to use fluorescence techniques for many applications. Lab-based measurement systems, while highly sensitive, are usually bulky and expensive.

The measurement of fluorescence demands complex, highly sensitive systems because the emission energy, the energy of the sample's fluorescence light, is nearly a million times smaller than the energy of the excitation. The fact that the emission has only a slightly different wavelength than the excitation (20-30 nm) is one of the challenges of this technique. In addition, lab-based measurement systems use a laser or high-pressure lamp (for variable wavelengths) to excite the sample and highly sensitive detectors, such as photomultipliers or ccd-detectors, to measure the emitted energy.

The optical separation of excitation and emission is usually conducted at a measurement angle of 90°. This measurement principle is known as Off-Axis-Measurement and requires a very precise positioning of the excitation and emission beam on the sample. Therefor lab systems are very powerful and able to detect arbitrary fluorescent objects. However, these systems are very large, heavy, consume high amounts of energy and cannot be used under difficult environmental conditions due to the fact that temperature-differences, humidity or dirt particles have an enormous effect on the measured results. The operation of these systems normally requires trained personnel, which incurs additional costs. Thus, the use of these systems is still limited to labs and research institutions.

DIALUNOX has developed a small, easy to use fluorescence measurement system, which is extremely sensitive, robust and affordable! With their consistent use of modern microsystems technology, state of the art LED and filter technology, as well as highly integrated embedded systems, they were able to develop a fluorescence detector that can be used for mobile measurement systems or integrated into systems for online process monitoring (e.g. in production lines or labs).

What is special about DIALUNOX's fluorescence detectors?



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The fluorescence detector's distinguishing features are its size, ease of use and outstanding price to performance ratio. In addition, the sensitivity of the detector is comparable with expensive lab systems.

DIALUNOX's ESElog and Fluo Sens measurement systems work with impinging light based on a confocal measurement principle. In contrast to the off-axis principle, the excitation and emission beam in confocal systems have the same, parallel course. In the detector, the measurement signal is extracted by a precise system of beam splitters and filters. This can be used on arbitrary surfaces as well as in liquids.

One of the major advantages of the confocal principle compared with the off-axis principle used by lab-based systems is the much higher flexibility regarding detector and sample positioning. As seen in the comparison graph below, the accurate positioning of the sample is highly critical when using the off-axis principle whereas with the confocal principle positioning of the sample is not critical and comparable results can be easily obtained.