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## *A strategy against counterfeiting*

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Numerous sources quote the cost of counterfeit goods in the billions of USD. Legitimate businesses suffer reduced turnover as criminals are selling counterfeits where you could sell your products. Counterfeits can also lead to a damage in the perception of your company in the market due to quality issues. Even worse, an illegal copy could lead to personal injury forcing you to prove that the product in question is an illegal copy. These problems are not limited to the pharmaceutical sector, but can arise in many product segments like cosmetics, food, and spare parts.

Every manufacturing company therefore should spend some time in addressing the anti-counterfeit argument. A wide range of solutions exists on the market such as online databases with serial number systems, security labels with holographic elements, RFID, Nano or DNA elements.

As an alternative to a system from a third-party supplier, you can create your own security element using fluorescent or phosphorescent inks. In order to increase the protection, you can link the fluorescent or phosphorescent security element to a serial number system. The implementation of such an approach is quite simple while the level of protection is very high. The only prerequisite is to produce the security element in narrow tolerances and to change its design and color from time to time.

In order to support you in producing your own security elements, PERET has developed the FLUO DX Fluorescence and Phosphorescence Colorimeter. The FLUO DX is designed to be used at the press the same way you are using a densitometer or a spectrodensitometer. Simply add solid and tint percentage patches to the print control bar for the fluorescent and phosphorescent inks in use.

The FLUO DX is a hand held, battery powered device with an easy to understand, high contrast, graphical display. Thousands of individual measurements can be stored offline in the device and uploaded to a Windows PC at the end of a production shift. A unique identification number is assigned to every measurement so that at any point in time the measurement can be linked to a specific production sheet. Different applications can be linked to different references that can be stored in the device, allowing the differences between the reference and the actual measurement to be displayed in real time.

The integrated UV-light viewfinder system simplifies the correct positioning of the device on target locations that would be invisible under normal light.

The measurement sample can be illuminated with 365nm or 256nm UV light. Depending on your needs the intensity of fluorescence in RGB or the color in XYZ, Lab, or LCh can be measured.

Due to its high sample rate of 40kHz the FLUO DX is the ideal tool to evaluate phosphorescence. Phosphorescence is measured as the decay in signal intensity versus time after the UV light is switched off (cool down time). The Phosphorescence depends on the charged energy of the sample. The charging time and the charging energy are used to calculate the Phosphorescence value.



Bild 1: FLUO DX

The FLUODXConnect software gives convenient access to the configuration of the functions, filter settings, charging time, cool down time and the excitation energy. This makes the FLUO DX versatile and suitable for use with a wide range of samples. Measurement data, collected during a shift can be uploaded to the PC at the end of the shift and used for further analysis. This is an important feature for anti-counterfeit security element's traceability.

Color fluorescence and phosphorescence are technologies providing a wide range of in-house brand protection possibilities, using special designs and existing production facilities without the need for additional and expensive investments. The flexibility of quickly changing the design of brand protection features makes the counterfeiting difficult, delayed, and expensive. Being faster than the counterfeiter is the best protection you can achieve.

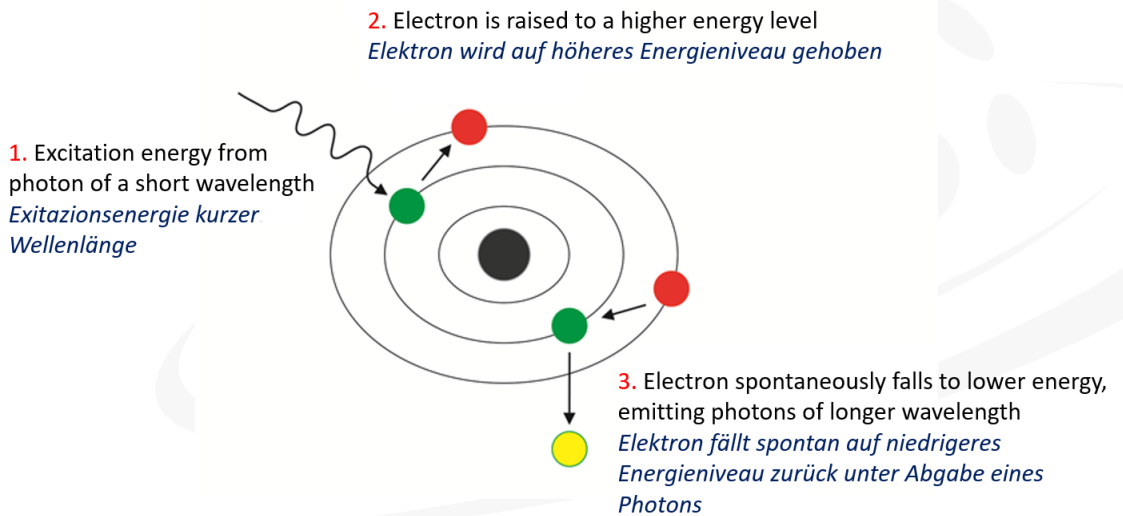
The practical use of fluorescent and phosphorescent agents in products for brand protection is dependent upon your ability to reproduce the same security feature with high accuracy and precision. This requires a simple, easy to use control tool that can be applied to daily work and guarantees high productivity within narrow tolerances. The FLUO DX is the ideal tool to help you quickly launch and support an in-house brand protection program.

The FLUO DX is the ideal tool for anybody who needs to keep their fluorescent or phosphorescent effects under control.

## Fluorescence and Phosphorescence

1. In Fluorescence a substance's glow is triggered by UV light. The substance absorbs UV light and emits visible light of a longer wavelength while the light source is on (Figure 3).
2. In Phosphorescence a substance's glow is triggered by UV light. The substance absorbs UV light and emits visible light of a longer wavelength while the light source is on and continues after the light source has been switched off (Figure 4).

3. Other types of Luminescence are triggered by a chemical reaction, electricity, X-rays, sound, temperature, mechanical impact, etc.



The Excitation energy from a photon of a short wavelength, for example 365nm reaches the fluorescent particle. This causes an electron to be raised to a higher energy level. After a short period of time, the electron spontaneously falls back to the lower energy, emitting photons of longer wavelength, typically in the visible range of light. If the time between excitation and photon emission is extremely short, and the emission ends an extremely short time after the excitation is removed, we call the effect Fluorescence. If the emission continues a significant amount of time after the removal of the excitation, we call it Phosphorescence.

