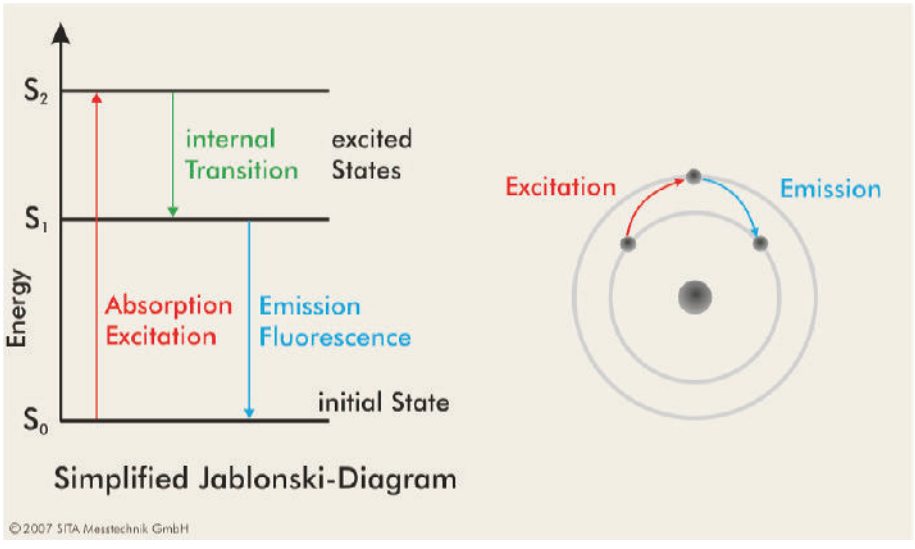
SITA CleanoSpector - Measuring Principle

The SITA CleanoSpector is a hand-held measuring device used for the cleanliness inspection of parts surfaces. The test result is displayed in the cleanliness degree of parts in percent.

The SITA CleanoSpector detects contamination on the metal's surface by stimulating the fluorescence with a light emitting diode (LED) and an ultraviolet light source. A photodiode in the measuring head of the SITA CleanoSpector measures the intensity of the radiation emitted due to the fluorescence. The higher the measured intensity of the fluorescence is, the more intense is the contamination and the lower is the displayed cleanliness respectively.

The fluorescence which is excited by an ultraviolet radiation is a special form of the luminescence. Thereby, electrons of fluorescent molecules reach a higher energy level by absorbing photons (see picture 1). Such an excited condition is energetically unfavourable and unstable. Electrons return immediately back to their ground state and the absorbed energy is released again. At the same the fluorescence light is emitted. Due to the fact that a part of the energy is converted into heat, the emitted radiation has less energy and so a longer wavelength.

The parameters of the SITA CleanoSpector are optimally adapted to typical contamination on metal pieces. If required, it is also possible to adapt the wavelength on special control tasks.

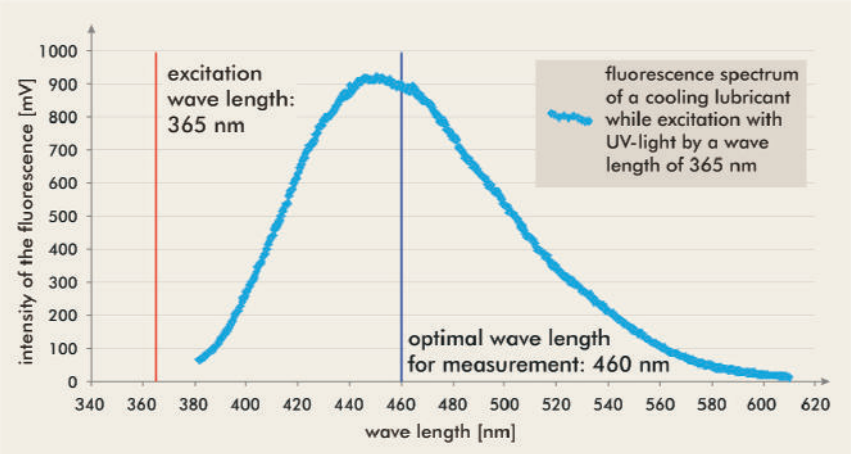


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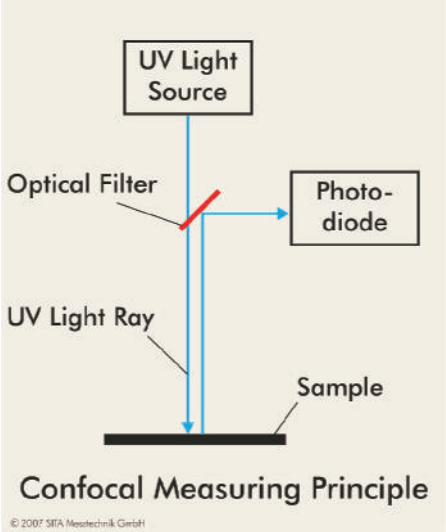
SITA CleanoSpector - Measuring Principle

Due to the fact that organic material has a strong self-fluorescence when it is exposed ultra violet light, it is possible to detect oil and grease contamination as well as surfactant residues and defined wax and corrosion protection layers.

The following diagram show the intensity of the fluorescence depending of its wavelength for a cooling lubricant and a surfactant. Here, the fluorescence was excited at a wavelength of 365 nm. With this excitation wavelength and an evaluation wavelength of 460 nm, contamination can be detected optimally with the SITA CleanoSpector.



The SITA CleanoSpector is based on the confocal measuring principle. The excitation light and light emitted by the fluorescence follow the same parallel radiation path. Therefore, a flexible positioning of the sensor head and an online measurement can be carried out very quick. The SITA CleanoSpector compensates the ambient light automatically. The measuring principle allows detecting contamination on various shaped surfaces consisting of non- or slight-fluorescing material.



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