

Media Release

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UV filter for medical diagnostics and analysis

Successful diagnostics of antibodies: Optics Balzers AG has further developed optical dielectric filters in the UV spectrum.

Short-wave light, ranging from 100 to 400nm in the UV spectrum, has the ability to fight pathogens. In medical fields this property is commonly used to combat germs, bacteria and viruses. The UV spectrum can be subdivided into different ranges according to wavelengths, and it is the UV-C range, with wavelengths below 280nm, that is of particular interest when it comes to these disinfectant properties. Because of the high energy content of this type of short-wave radiation, proteins and genetic material are destroyed. In fact, studies have shown that when irradiated with short-wave UV-C light more than 95% of viruses become ineffective.

Optical filters with transmission of over 95%

Short-wave light is also used in virological diagnostics. Antibodies are marked with a fluorochrome, and when stimulated by a defined UV radiation, can then be visualized. Specially matched optical filters are used to separate excitation and emission wavelengths. Thanks to their special spectral properties, these filters achieve a transmission of > 95% of the excitation wavelength. The light-emitting fluorescence signal is modest in comparison. The optical filters used to detect the signals are designed to take this into account and are optimized for maximum transmission in this spectrum.

The steepness of the edge found at the transition between these spectral ranges is characteristic of the high quality of our filters. On a spectrum of $T < 0.01\%$ to $T > 95\%$ an edge steepness of approximately 2 to 5nm is required. To achieve this level of precision the filters at Optics Balzers AG are manufactured using sputtering process technology to create these dielectric coatings. In addition to the spectral accuracy, the environmental stability of the filter is a decisive factor in this coating process.

Specific adaptation of filters possible

The SP270 short pass filter from Optics Balzers shows the characteristic spectral course of a corresponding filter for the excitation of fluorophoric substances. The highest possible transmission rate is guaranteed, with a pass range of around 270nm. In addition, undesired excitations of up to 480nm are suppressed in the long-wave blocking range.

The fluorophoric substances stimulated by UV radiation emit long-wave signals above 275nm. The BP310-390 long-pass filter used here enables the detection of these emitted signals. The BP310-390

filter shown in the image below has an average transmission of > 95% for signal detection, within the range of 330nm to 390nm.

Our optical filters, which enable the excitation and the detection of signals in the UV range, can be adapted to specific substances. The filter properties are characterized by the exact edge position between the pass and the blocking area, as well as the steepness of the spectral course. They are therefore a key component of any optical system in which they are used. Based on the appropriate filters, a wide range of relevant information from the UV spectrum can be obtained for further medical diagnosis.

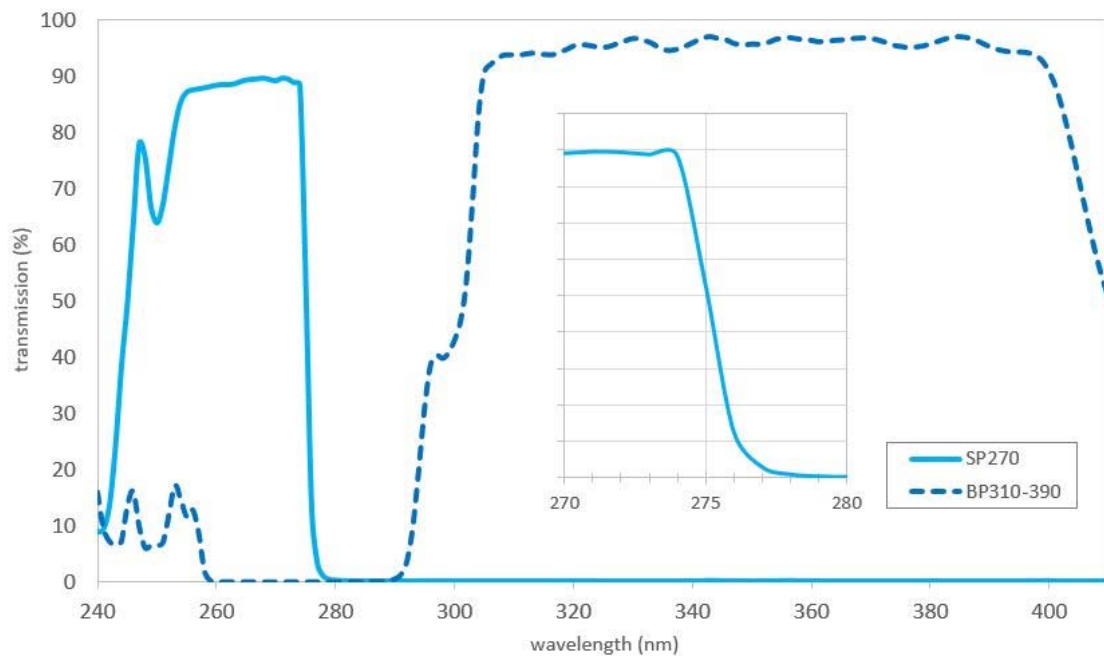


Fig: SP270 and BP310-390 filters with spectral edge @ 275nm.

Optics Balzers (located in the Principality of Liechtenstein) has been the preferred partner for providing innovative optical coatings and solutions for more than 70 years. Together with its subsidiaries in Jena (Germany) and Penang (Malaysia), Optics Balzers is a global leader in the supply of optical coatings and components. The Liechtenstein-based high-tech company focuses on selected markets such as Life Sciences, Consumer, Space, Automotive and Lighting. The products and services offered range from optical coatings and glass processing, patterning and bonding technologies, to the manufacture of complete optical subassemblies and are acknowledged as being unique worldwide.

Additional information: www.opticsbalzers.com