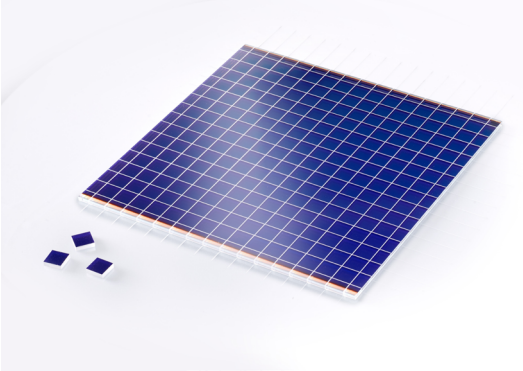
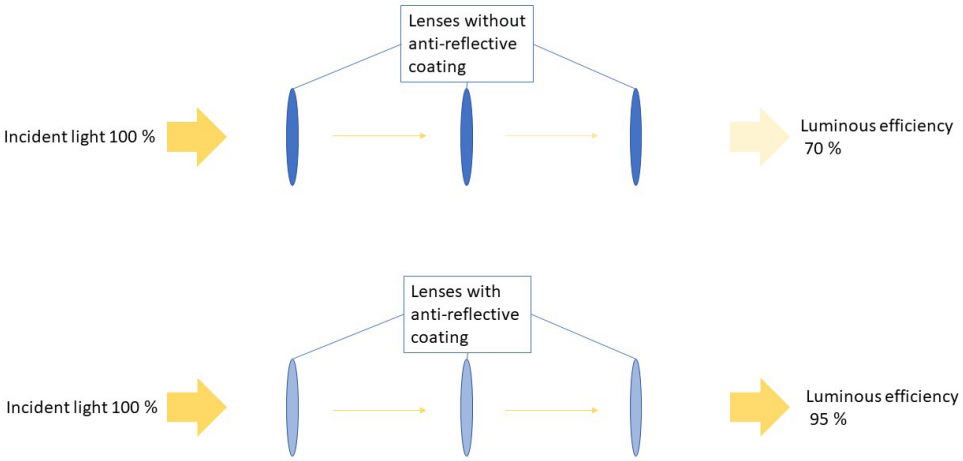
Optical Coatings

Modern PVD surface technologies help to change the surface properties of a wide variety of materials in a targeted manner (PVD=physical vapor deposition). Components created in this way are used in almost all areas of industry, especially in optics. Numerous optical components only fulfill their function thanks to thin optical coatings. The quality and functionality of optical components and their coatings therefore have a significant impact on the performance of optical technologies.



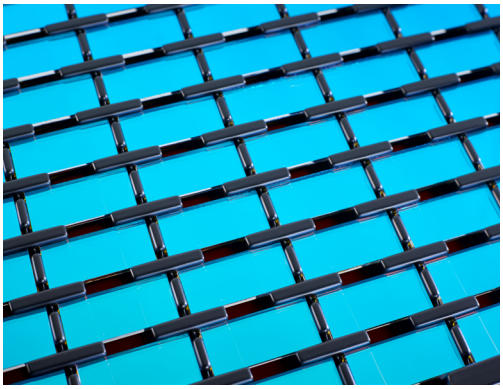
Optical coatings ensure better performance, tailored to the requirements of the coated component. Anti-reflective coatings minimize unwanted residual reflections and ensure higher transmission, while mirror coatings (highly reflective coatings) reflect certain spectral ranges to a high degree.

Optical filters filter the light in a targeted manner, e.g. certain spectral ranges. In this way, defined radiation components are specifically reflected or transmitted (example: short-pass filters transmit short wavelengths and block long-wave radiation).



Effect of optical coatings using the example of an anti-reflective coating

The benefits of optical coatings



Optical thin films are used to control the reflection, absorption and transmission behavior of surfaces and optical components, especially for UV, IR or visible light. Common applications include the mirroring and anti-reflective coating of surfaces and the production of optical filters that influence reflection and transmission depending on certain spectral ranges (wavelengths).

There are two main types of coatings: metallic and dielectric. Metallic coatings, such as aluminum or copper, are often used as reflection enhancing materials. Dielectric coatings consist of different, often oxidic, materials to create precise optical interferences that split the radiation into reflected and transmitted parts.

Depending on the application, thin films must have additional properties such as high thermal resistance, mechanical properties such as hardness and abrasion resistance as well as resistance to solvents, UV radiation and environmental influences. Bte offers a wide range of optical coatings for various applications.

At Bte Born, we offer anti-reflective coatings (AR), mirrors (metallic mirrors, dielectric mirrors, highly reflective mirrors, etc.), optical filters (bandpass filters, longpass filters, shortpass filters, UV filters, IR filters, etc.), transparent and conductive ITO coatings, beam splitters and coatings on plastic.

Applications of optical coatings

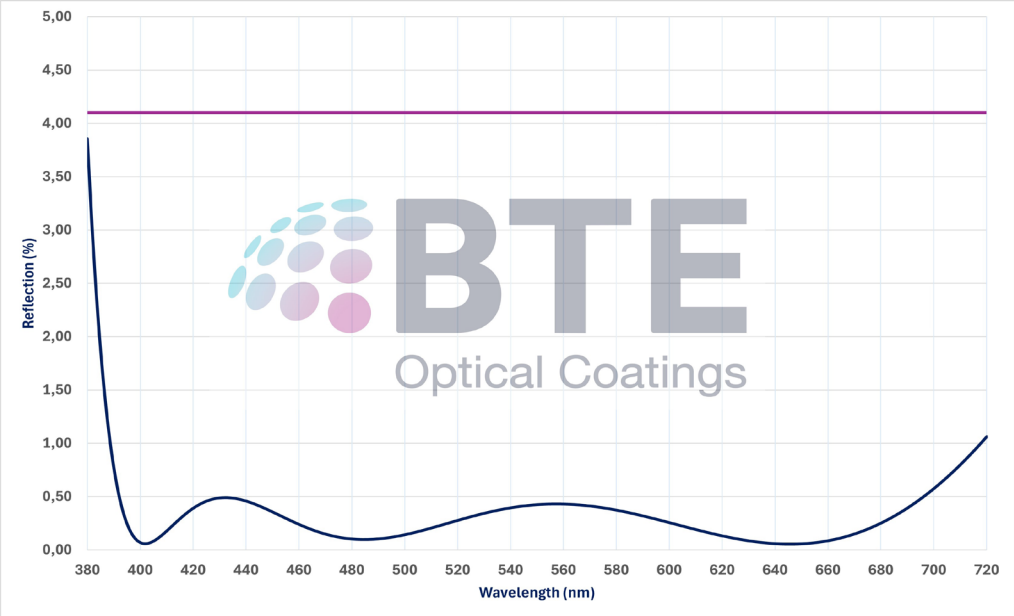
Automotive, spectroscopy, inspection systems, lighting systems, image processing and positioning systems in industrial automation, food sorting, measurement technology / measuring instruments, medical technology, security technology, defense, fluorescence microscopy and much more.

Substrates

Depending on the application: glass (borofloat, B270, float glass, etc.), plastic (Zeonex, PC, PMMA with hard coating, etc.), quartz, ceramics, metals

Principle curve AR-M (broadband antireflection VIS)

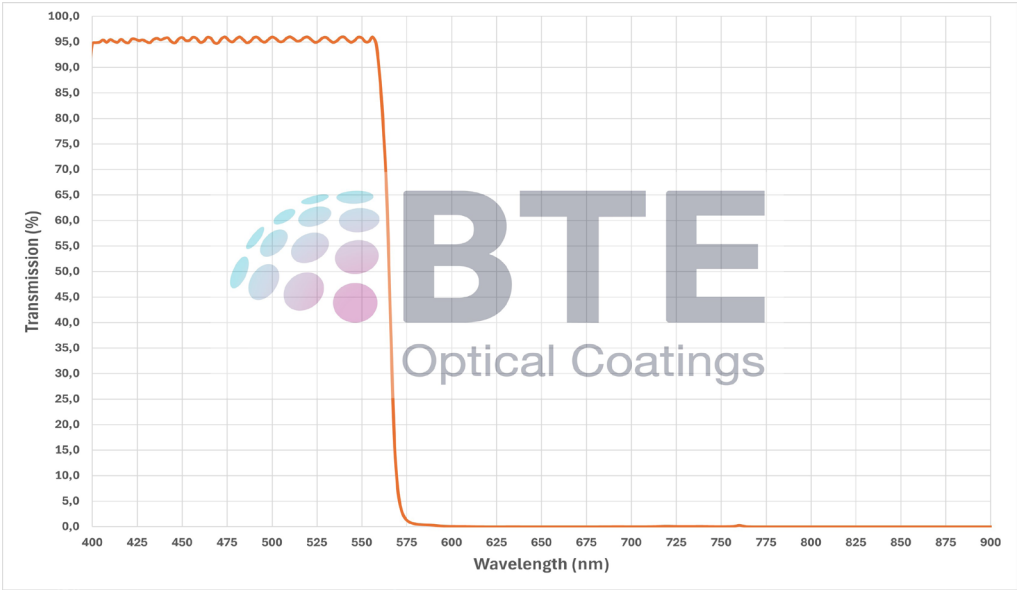
Ex.: R_avg <0,5% (400nm - 700nm); AOI=0°-10° (Purple: reflection of uncoated glass)



Principle curve short-pass filter

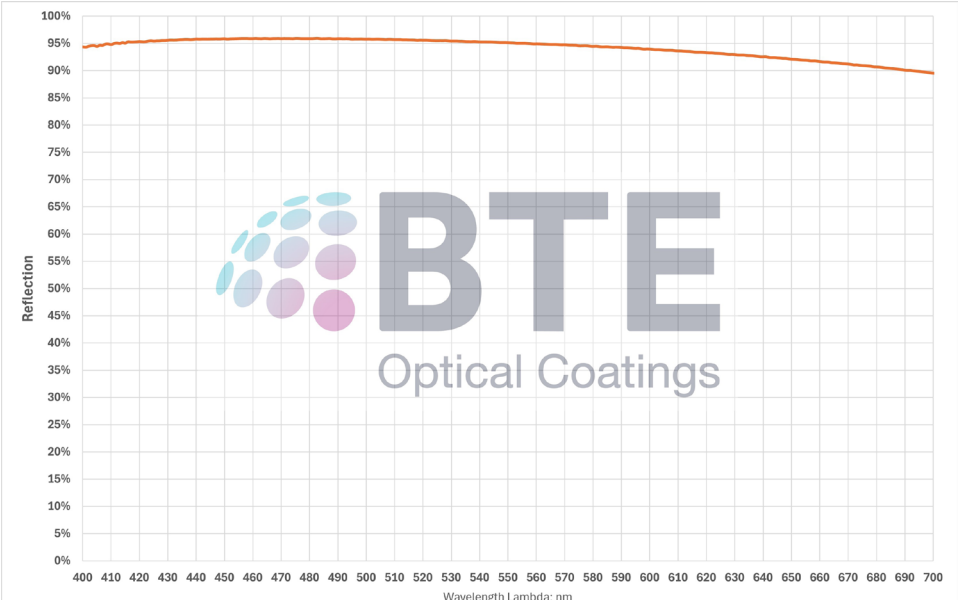
Short-pass filters transmit wavelengths below a certain cut-off wavelength.

Example: Cut-off wavelength 570nm, AOI = 0°



Principal curve front surface mirror

VS-1, 400 - 700 nm, AOI = 45°



Principal curve neutral beam splitter

Ex.: R = 80 %, T = 20 %