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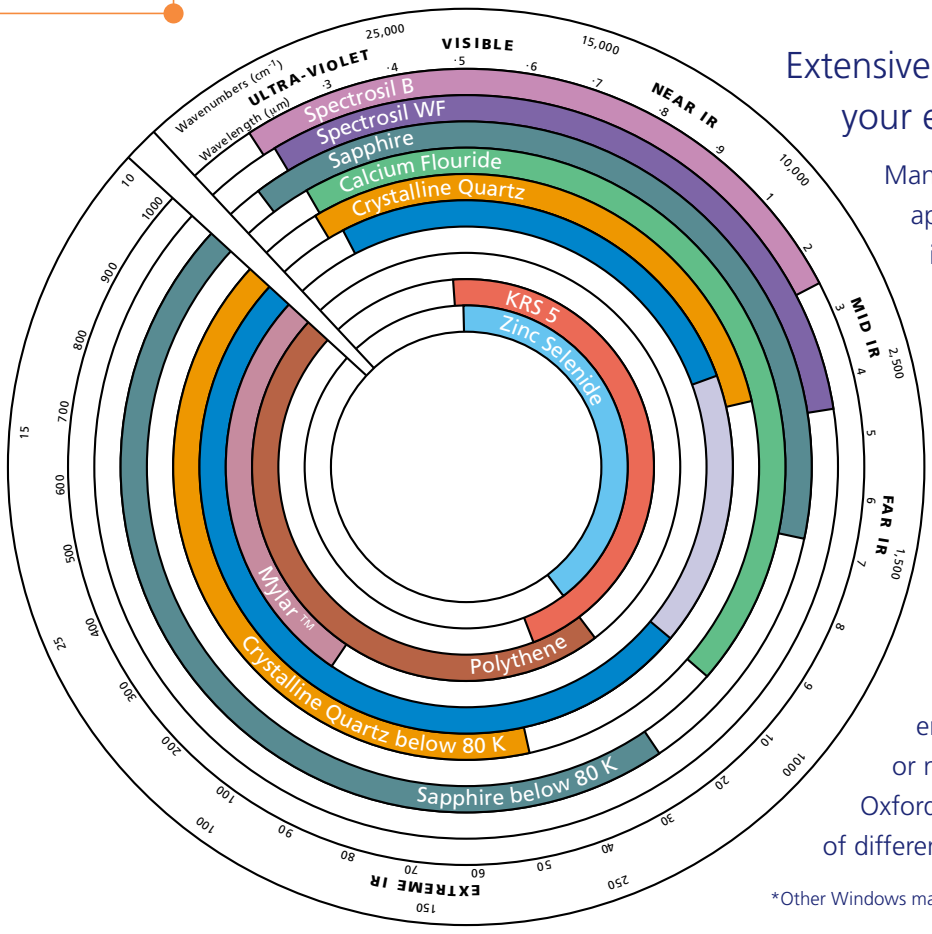
Windows for cryostats

Choosing the right windows for your experiments



Extensive choice to suit your experimental needs

Many cryostats are used in experimental apparatus where the samples must be irradiated or measurements made on emitted radiation from such samples. It is, therefore, essential that appropriate windows can be incorporated into your cryostat to permit radiation to access the sample.

*Window materials

The window material selected is determined by the wavelength and intensity of the radiation, the environmental temperature and whether or not beam polarisation is required. Oxford Instruments offers a wide range of different window materials.

*Other Windows material available on request.

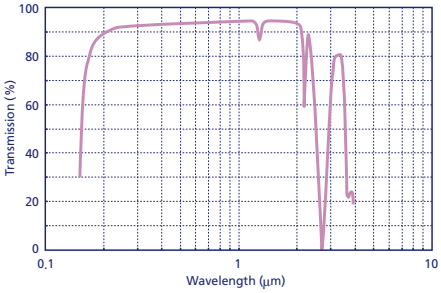
Window mounting

Room temperature windows which must be vacuum tight are generally sealed onto a rubber 'O' ring - minimising strain on the windows and allows easy removal if required. Windows fitted to radiation shields do not need to be vacuum tight but it is important that they are thermally anchored.

This is achieved by retaining the window in a copper mount using a spring clip. The windows on sample cells must be vacuum tight at low temperatures and two sealing methods, indium or copper gaskets, are used depending on whether the upper temperature is limited to 300 K or 500 K respectively.

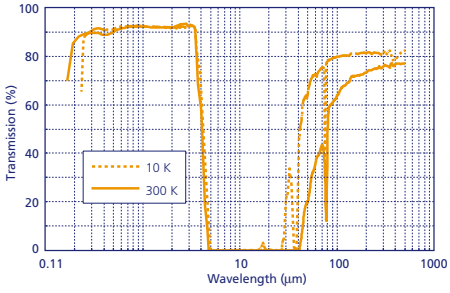
Spectrosil B

Specrosil B is a synthetic vitreous silica. The material itself is not birefringent and standard strain-relieved low temperature window mounts ensure that Spectrosil B windows do not affect polarised light. It is an excellent material for filtering out the near-mid IR room temperature thermal radiation, resulting in a low thermal load on the cryostat. The transmission data is for a 2 mm thick window.



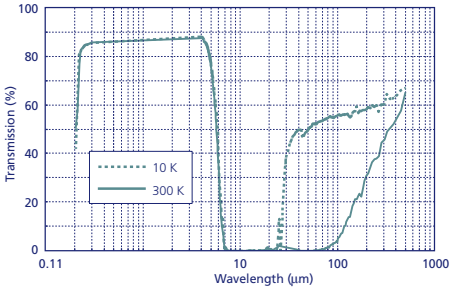
Crystalline quartz

Crystalline quartz is a window for the visible and near IR. It exhibits a strong temperature dependence in the far IR. At temperatures below 80 K the transmission is greater than 70% for wavelengths above 80 µm. This material may be used as a cold inner window for far IR applications. Crystalline quartz is birefringent and is available cut with the z-axis normal to the window to reduce polarisation effects. The transmission data is for a 2 mm thick window.



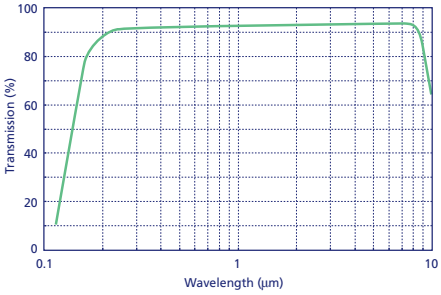
Sapphire

Sapphire is an alternative window for visible and near IR applications. It is the only window which may be used at high temperatures (up to 500 K). At temperatures below 80 K the transmission of sapphire increases in the extreme IR region. This effect allows sapphire to be used as a cold inner window for IR measurements. Sapphire is birefringent. The transmission data is for a 2 mm thick window.



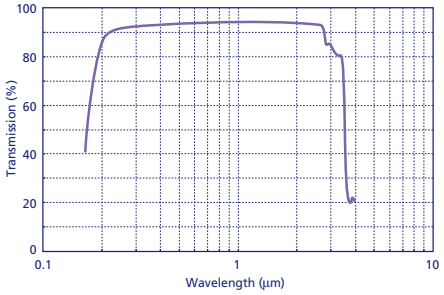
Calcium fluoride

Calcium fluoride may be used in the near and mid IR. It cannot be used as a cold inner window due to its mechanical and thermal properties. The transmission data is for a 2 mm thick window.



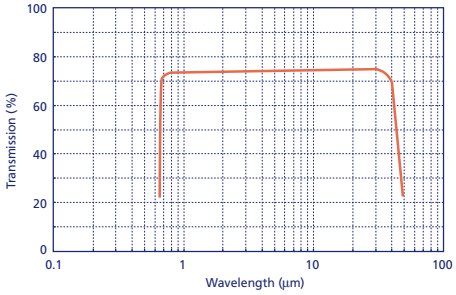
Spectrosil WF

Spectrosil WF is a water free synthetic vitreous silica. It has the same material characteristics as Spectrosil B, but has a transmission range which extends further into the IR. The transmission data is for a 2 mm thick window.



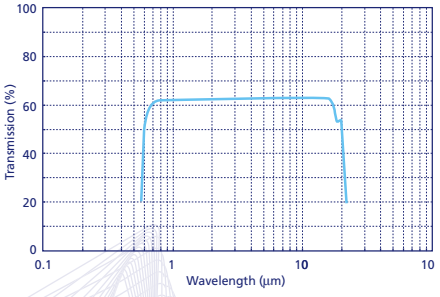
KRS 5

KRS 5 (Thallium Bromide-Thallium Iodide) is a useful window for the mid IR. The complex nature of the cold window mount and the necessity to make it vacuum tight results in the clear access diameter being reduced by 2 mm when compared with other materials. The material is toxic and should be handled with care.



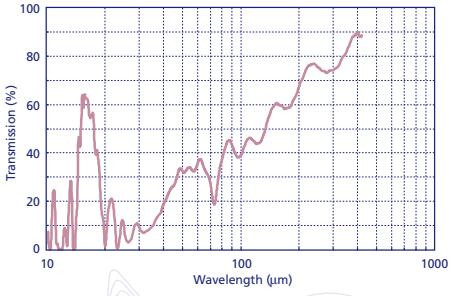
Zinc selenide

Zinc selenide is a reliable cryogenic window for the mid IR. Care should be taken with handling as it is toxic and scratches easily. The transmission data is for a 2 mm thick window.



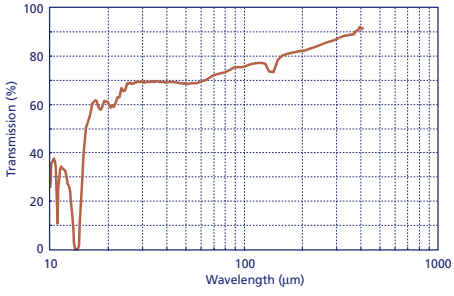
Mylar™

Mylar™ is a polyester film. Standard windows are 125 µm thick and may be used as a cryogenic window in the extreme IR. Mylar is porous to helium gas above 100 K.



Polythene

Polythene is a polymer which may be used in the extreme IR. The material is porous to helium gas above 100 K. The transmission data is for a 1 mm thick window.



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