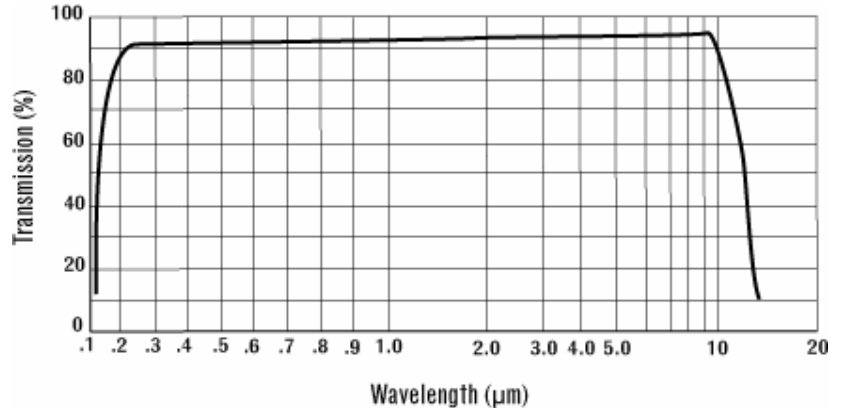


Barium Fluoride (BaF₂)

OVERVIEW

Barium Fluoride can be used in the ultraviolet, visible and infrared spectral regions. Barium fluoride is commonly used in cryogenically cooled thermal imaging systems. Barium fluoride windows can be found in infrared spectroscopy applications (ex. in the field of fuel oil analysis). Its transmittance at 200 nm is relatively low (0.60), but at 500 nm it goes up to 0.96-0.97 and stays at that level until 9 μm , then it starts falling off (0.85 for 10 μm and 0.42 for 12 μm). Barium Fluoride is half as hard as Calcium Fluoride and also more susceptible to thermal shock. It is somewhat more expensive than Calcium Fluoride and not as readily available in large sizes.



PRODUCTS



Phoenix Infrared offers BaF₂ as blanks, generated parts, polished optics, and coated optics. BaF₂ optics include: optical windows, lenses, and prisms, particularly when transmission into the ultraviolet is desired.

Barium Fluoride is less resistant to attack by water than Calcium Fluoride but attack does not begin until 500°C. In the dry atmosphere Calcium Fluoride can be used up to 800°C. Barium Fluoride is the most resistant fluoride to high energy radiation but does not have the VUV transmission of other types.

SPECIFICATIONS

Chemical Properties	BaF ₂
Crystal Class	Cubic
Molecular Weight	175.36
Lattice Constant, Å	6.196
Density, g/cm ³ (20 °C)	4.89
Knoop Hardness, kg/mm ²	82
Young's Modulus, GPa	53.05
Shear Modulus, GPa	25.4
Bulk Modulus, GPa	56.4
Apparent Elastic Limit, MPa	26.89
Poisson Ratio	0.343
Dielectric Constant for 2 x 10 ⁶ Hz	7.33
Melting Temperature, K	1550
Specific Heat, cal/(g K) at 274 K	0.096
Thermal Conductivity, W/(m K) at 286 K	11.7
Thermal Expansion, 1/K at 300 K	19.9 x 10 ⁻⁶
Bandgap, eV	9.1
Solubility, g/100 g H ₂ O	0.17

Wavelength μm	Refractive Index
0.2	1.5573
0.5	1.4779
1.0	1.4686
2.0	1.4647
3.0	1.4612
4.0	1.4587
5.0	1.4511
6.0	1.4441
7.0	1.4357
8.0	1.4258
9.0	1.4144
10.0	1.4014
11.0	1.3865
12.0	1.3696