

BaF₂

Barium (II) Fluoride

Barium fluoride (BaF₂) is a chemical compound of barium and fluorine, also known as Barium(II) fluoride. Barium Fluoride is transparent from the ultraviolet to the infrared, from 150-200 nm to 11-11.5 μm, and can be used as a material to make optical components such as lenses. It is used in windows for infrared spectroscopy, in particular in the field of fuel oil analysis.

Barium fluoride is also a common, very fast (one of the fastest) scintillator for the detection of X-rays, gamma rays or other high energy particles. One of its applications is the detection of 511 keV gamma photons in positron emission tomography; other material used in this application is eg. bismuth germanate. It responds also to alpha and beta particles, but, unlike most scintillators, it does not glow in ultraviolet light. It can be also used for detection of high-energy (10-150 MeV) neutrons, and use pulse shape discrimination techniques to separate them from simultaneously occurring gamma photons.

When heated to 500 °C, it gets corroded by water, but in dry environment it can be used up to 800 °C. Prolonged exposure to moisture degrades transmission in the vacuum UV range. It is less resistant to water than calcium fluoride, but is the most resistant of all the optical fluorides to high-energy radiation, though its far ultraviolet transmittance is lower than theirs. It is quite hard, and very sensitive to thermal shock.

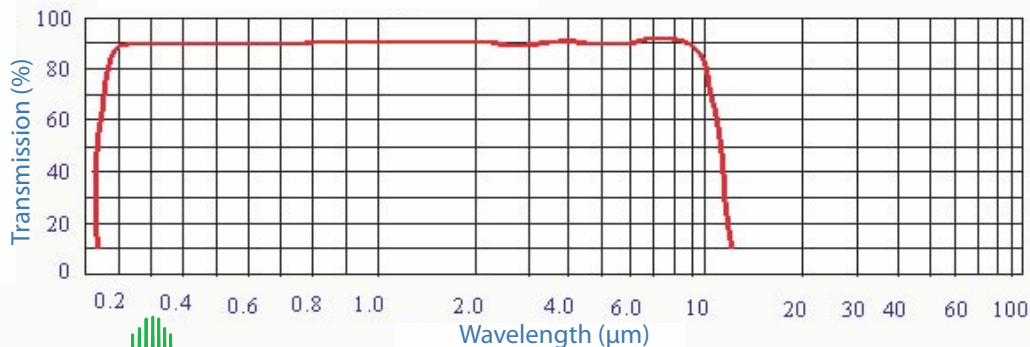
Physical and Optical Properties

Transmission Range (mm)	0.15 ~12.5
Refractive Index (within 0.26~12.00 mm)	1.5122~1.3703
Absorption Coefficient at 6mm (cm ⁻¹)	3.2×10 ⁻⁴
Density (g/cm ³)	4.89
Melting Point (°C)	1280
Thermal Conductivity at 286K (Wm ⁻¹ K ⁻¹)	11.72
Thermal Expansion at 273K (K ⁻¹)	18.1×10 ⁻⁶
Knoop Hardness	82 with 500g indenter
Specific Heat (J Kg ⁻¹ K ⁻¹)	410
Dielectric Constant at 1MHz	7.33
Elastic Coefficients	C ₁₁ = 89.2 C ₁₂ = 40.0 C ₄₄ = 25.4
Apparent Elastic Limit (Mpa)	26.9 (3900psi)
Poisson Ratio	0.343
Solubility in 100g water at 23°C (g)	0.17
Cleavage	(111)

General Specifications

Surface Quality	scratch & dig: 20/10
Clear aperture	90% of diameter
Diameter tolerance	+/- 0.05 mm
Flatness	λ/4 or better

Transmission Spectrum of BaF₂



DEL MAR PHOTONICS

4119 Twilight Ridge, San Diego, CA 92130, USA Tel:: (858) 876-3133 Fax:: (858) 630-2376
E-mail:: sales@dmphotonics.com URL:: www.dmphotonics.com

