

S & D MATERIALS

OPTICAL PARTS AND SEMICONDUCTOR SOLUTIONS

Optical Materials' Properties and Attributes

High Purity ▪ Superior Workmanship ▪ Extreme Tolerances

The ideal material choice for any application depends on many factors: desired performance, properties, cost, weight, availability, dimensional limits, processing challenges, yada yada. In many cases, more than one material can be used to achieve required functionality; care and diligence should be taken to consider every factor for long term project success.



Coating Options	MATERIAL	Index of Refraction (n_d)	Transmission range	Abbe Number (V_d)	Density (g/cm_3)	CTE ($\times 10^{-6} / ^\circ\text{C}$)	dn/dT ($\times 10^{-6} / ^\circ\text{C}$)	Knoop Hardness	Melting Point ($^\circ\text{C}$)
BBAR for the 0.8 to 2.5, 3 to 5, or 1 to 5 μm ; dual-band AR for MWIR, LWIR, triple-band for NIR, MWIR spectral regions.	Calcium Fluoride (CaF_2)	1.434	180 nm - 8.0 μm	95.1	3.18	18.85	-10.6	158.3	1420
BBAR for 0.8 to 2.5 μm , AR for 1.064 μm . Other coating for UV, VIS & IR available	Fused Silica	1.458	185 nm - 2.1 μm	67.7	2.2	0.55	11.9	500	~ 1650
BBAR for 3 to 5 μm ; specialized bands within 0.25 to 5.0 μm range	Germanium (Ge)	4.003	2.0 μm - 16 μm	N/A	5.33	6.1	396	780	947
AR coating avail for IR region but without much improvement in transmission due to low index of refraction and high transmission	Magnesium Fluoride (MgF_2)	1.413	200 nm - 6.0 μm	106.2	3.18	13.7	1.7	415	1263
BBAR in 0.8 to 2.5 μm , 3 to 5 and 8 to 12 μm . Other specialized bands possible from 0.4 to 12 μm	N-BK7	1.517	350 nm - 2.0 μm	64.2	2.46	7.1	2.4	610	557
Moisture-protection AR and BBAR coatings for various wavelengths within KBr's transmission range.	Potassium Bromide (KBr)	1.527	250 nm - 2.6 μm	33.6	2.75	43	-40.8	7	734
AR coatings for sapphire include BBAR for 3 to 5 μm . Many other specialized wavelength bands within 0.25- to 5.0- μm range.	Sapphire / Ruby (Al_2O_3)	1.768	150 nm - 5.5 μm	72.2	3.97	5.3	13.1	2200	2050
Most common AR coating is BBAR for 3 to 5 μm . Specialized bands for 1.2 to 7.0 μm range. Also DLC hard protective coating	Silicon (Si)	3.422	1.2 μm - 8.0 μm	N/A	2.33	2.55	1.6	1150	1414
Protective coatings incl: DLC for MWIR and LWIR, BBAR for multiple spectral regions; single-wavelength AR coating at 10.6 μm ; specialized bands possible from 0.6 to 16 μm	Zinc Selenide (ZnSe)	2.403	600 nm - 16.0 μm	N/A	5.27	7.1	61	120	1525
Available coatings incl: BBAR in 0.8 to 2.5 μm , 3 to 5 and 8 to 12 μm . Other specialized bands possible from 0.4 to 12 μm	Zinc Sulfide (ZnS)	2.631	400 nm - 12.0 μm	N/A	5.27	7.6	38.7	120	1185

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