OPTICAL MATERIALS : INFRA-RED

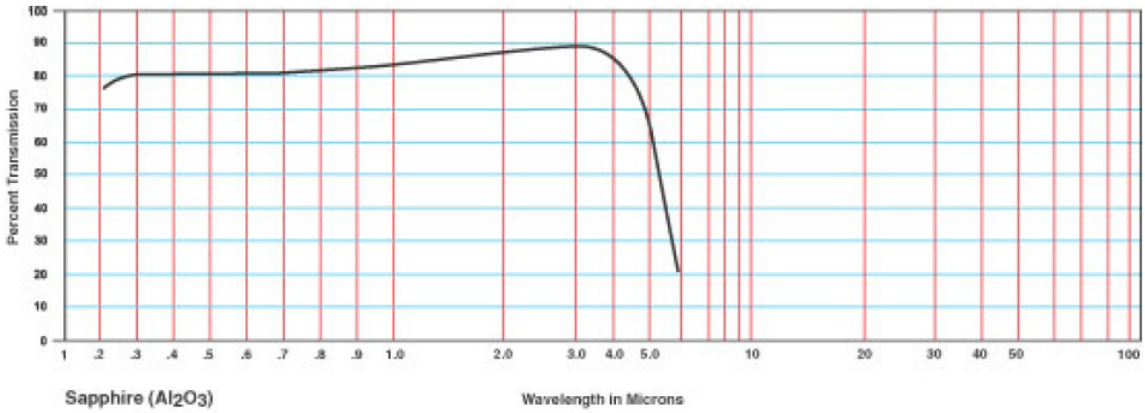
Title: Optical material/ crystals (Infrared)

Material/Specification: Sapphire for 0.17µm to 5.5µm transmission (Random)

Range/Description: OPMI-SAPPHIRE R

Glass-like. Sapphire (Al_2O_3) is an extremely hard material which is useful for UV, NIR and IR applications through 5 microns.

Internal Transmittance



Internal Transmittance $t_i(\lambda)$ vs. wavelength λ											
λ,мкм	0.2	0.5	1.0	3.0	5.0	——	——	——	——	—-	—-
$\tau_i(\lambda)$	0.79	0.97	0.97	0.97	0.45	——	——	——	——	——	—-

Refractive Index n vs. Wavelength λ	no = ordinary ne = extraordinary														
µm	0.22	0.24	0.28	0.33	0.44	0.51	0.63	0.75	0.82	1.32	2.24	3.33	4.34	5.26	—-	—-
no	1.87	1.84	1.82	1.80	1.78	1.77	1.76	1.76	1.75	1.75	1.73	1.70	1.65	1.60	—-	—-
ne	1.86	1.83	1.81	1.79	1.77	1.76	1.75	1.75	1.75	1.74	1.72	1.69	1.65	1.59	—-	—-

Optical Properties	
Transmission Range	0.17 to 5.5 µm
Refractive Index	No 1.75449; Ne 1.74663 at 1.06 µm
Refractive Loss	14% at 1.06 µm
Crystal/Class Structure	Trigonal (hex), R3c
Cleavage Plane	(1011),(1012), imperfect

Mechanical Properties	
Density	3.97 g/cc
Hardness (Knoop)	2000 with 2000g indenter
Youngs Modulus	335 GPa
Shear Modulus	148.1 GPa
Bulk Modulus	240 GPa
Poisson Ratio	0.25
Elastic Limit	300 MPa (45,000 psi)

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